



Anesthesiology and Reanimation Specialists' Society Congress  
**BALKAN STATES ANESTHESIA DAYS - VII**



**INNOVATIONS IN ANESTHESIA,  
INTENSIVE CARE AND PAIN DURING  
COVID-19 PANDEMIC ERA**

Anesthesiology Reanimation Specialists' Society

**ARUD2021**

**BALKAN STATES ANESTHESIA DAYS - VII**

**BOOK of PROCEEDINGS  
and ABSTRACTS**



e-congress 2021

**30 April-02 May 2021**

**[www.arud2021.org](http://www.arud2021.org)**

with the support of

**C+TİKA**

REPUBLIC OF TURKEY  
MINISTRY OF CULTURE AND TOURISM



TÜBİTAK





Anesthesiology and Reanimation Specialists' Society Congress



# **BOOK OF PROCEEDINGS AND ABSTRACTS**

**BALKAN STATES ANESTHESIA DAYS – VII**

**INNOVATIONS IN ANESTHESIA, INTENSIVE CARE  
AND PAIN DURING COVID-19 PANDEMIC ERA**

**[www.arud2021.org](http://www.arud2021.org)  
30 April – 2 May  
2021**



## **Editors-in-chief**

Prof. F. Feyhan Ökten, MD

Prof. Onur Özlü, MD

## **Coeditors:**

Prof. Nurdan Bedirli, MD

Prof. Murat Sayın, MD

Prof. Sumru Şekerci, MD

Prof. Dilek Ünal, MD

Assoc. Prof. Emine Arık, MD

Assoc. Prof. Reyhan POLAT, MD

Assoc. Prof. Kemal Tolga Saraçoğlu, MD

Gülten Ütebey, MD

## **Technical editor:**

Hakan Günel

Diamed Kongre Organizasyon

Ankara, Turkey

(+90 533 247 6627)

## **e-book:**

ARUD2021 / Balkan States Anesthesia Days-VII – “Innovations In Anesthesia, Intensive Care And Pain During Covid-19 Pandemic Era”, Virtual Congress Book, 2021: Book of proceedings, and abstracts / [editor-in-chief F. Feyhan Ökten]. İzmir: Turkey. / Year: 2021, Ankara / ISBN: 978-605-81748-2-5

All the copyright of the manuscripts belongs to the Proceeding Book and can not be published, reproduced or used without showing the source and permission from ARUD. In addition, the data and opinions appearing in the articles herein are the responsibility of the author(s).



Distinguished Colleagues

My dear colleagues,

Due to the COVID-19 pandemic, substantial uncertainties, unfortunately, remain on safety and feasibility of many activities and events for several months ahead, both in Europe and worldwide. Travel limitations also will most likely remain substantial in the near future.

As you know, we (as Anesthesiology Reanimation Specialists' Association) have been taken the difficult decision to postpone our physical congress which is planned to organize on 6-10 May 2020 in Tirana, and at the same time, we have decided to put our energy in organizing a Virtual Congress. We would like to thank you, all our colleagues, the Balkan teams who continue to collaborate with ARUD, and to reassure all of you that ARUD is fully committed to creating a virtual event up to the highest standards of science, education and innovation.

We started working again for our congress and this time we will organize it as a virtual congress between the dates of 30 April and 02 May in 2021. We are compiling our new program based on the program prepared last year by including Covid issues. In the meeting, which will be attended by valuable scientists from Balkan and European countries, we will share scientific knowledge and experiences and also strengthen our social relations.

Dear colleagues, we look forward to meeting you all in this Spring!

With respect and love.

Prof. Feyhan ÖKTEN  
Congress President  
President of ARUD





## Organizing Committees

### President

Prof. Feyhan Ökten, MD

### General Secretary

Prof. Onur Özlü, MD

### Organizing Committee

Assoc.Prof. Emine Arık, MD	Asst. Prof. Maja Mojsova Mijovska, MD
Assoc. Prof. Nurdan Bedirli, MD	Prof. Feyhan Ökten, MD
Prof. Hristo Bozov, MD	Prof. Onur Özlü, MD
Lulzim Emini, MD	Assoc. Prof. Reyhan POLAT, MD
Assoc. Prof. Antigona Hasani, MD, PhD	Asst.Prof. Jasmina Smajic, MD, PhD
Prof. Meral Kanbak, MD	Prof. Sumru Şekerci, MD
Doc. Andrijan Kartalov, MD, PhD	Gülten Ütebey, MD

### Scientific Committee

Ervin Bejko, MD	Nataša Kovač, MD
Prof. Abdürrahim Derbent, MD	Asst Prof. Meldijana Omerbegovic, MD
Prof. Rudin Domi, MD	Assoc. Prof. Kemal Tolga Saraçoğlu, MD
Assoc. Prof. Antigona Hasani, MD	Prof. Murat Sayın, MD
Prof. Dusanka Janjevic, MD	Prof. Mirjana Shosholcheva, MD
Prof. Marijana Karisik, MD	Assoc. Prof. Dilek Ünal, MD
Assoc. Prof. Biljana Kuzmanovska, MD	

*All the committee members are listed in alphabetical order*

## SCIENTIFIC PROGRAM

**30 April 2021, Friday**

---

### HALL A

**09:00-10:50 | Oral Presentations - General Anesthesia 1**

**Chairs:** Tülin Gümüş, Nurdan Bedirli

09:00-10:30 | O001, O003, O008, O009, O016, O018, O019, O020, O021, O024, O025, O026, O034, O035, O037, O039, O040

**10:30-10:50 | Discussion**

**10:50-11:00 | Break**

**11:00-12:50 | Oral Presentations - General Anesthesia 2**

**Chairs:** Seyhan Yağar, Dilek Ünal

11:00-12:30 | O041, O043, O046, O047, O054, O058, O060, O064, O065, O068, O069, O079, O082, O083, O085, O095, O096, O099

**12:30-12:50 | Discussion**

**12:50-13:00 | Break**

**13:00-14:30 | Oral Presentations - Regional Anesthesia 1**

**Chairs:** Güven Özkaya, Sanem Çakar Turhan

13:00-14:10 | O002, O005, O006, O007, O011, O029, O031, O038, O042, O048, O049, O051, O055, O056

**14:10-14:30 | Discussion**

### HALL A

**15:00-15:15 | Opening Speeches**

F. Feyhan Ökten, Meral Kanbak, Onur Özlü

**15:15-15:40 | Conference I - Acceleration of Digitalization, and Changing of Social Life and Business Style Due to The Pandemic**

Nilüfer Narlı

**15:30-15:40 | Discussion**

**15:40-15:50 | Break**

**15:50-17:20 | Panel 1: ANESTHESIA I (In Memory of Mihal KERCI and the Healthcare Professionals)**

**Chairs:** Hektor Sula, Meral Kanbak

**Anesthesia Considerations on Neurovascular Procedures;** Rudin Domi

**Neuromonitoring During Intradural Spinal Cord Surgery;** Uygur Er

**Anesthetic Consideration for Neuromonitoring During Spinal Surgery;** Sibel Kahraman Aközer

**Anesthesia Techniques for Awake Craniotomy;** Binnur Sarıhasan

**16:50-17:05 | Anesthesia for Temporary Clip Ligation in Cerebrovascular Surgery and Neuroprotection;**

Abdürrahim Derbent

**17:05-17:20 | Discussion**

**17:20-17:30 | Break**

**17:30-19:00 | Panel 2: ICU I - COVID-19**

**Chairs:** Lale Karabıyık, Ahmet Coşar

**17:30-17:45 | Antiviral Agents in Covid-19 Infection;** Lale Karabıyık

**17:45-18:00 | Seconder Infections;** Seda Banu Akıncı

**18:00-18:15 | Stroke Challenges after Covid-19;** Gentian Hutı

**18:15-18:30 | Hypercoagulopathy Management in Covid-19;** Seval İzdeş

**18:30-18:45 | ARDS in Covid-19;** Sema Turan

**18:45-19:00 | Discussion**

**19:00-19:10 | Break**

---

### HALL B

**09:00-10:40 | Oral Presentations - Intensive Care Anesthesia 1**

**Chairs:** Hija Yazıcıoğlu, Ayşe Ongun Özcan

09:00-10:20 | O004, O010, O014, O017, O022, O023, O027, O028, O030, O032, O033, O036, O044, O045, O050

**10:20-10:40 | Discussion**

**10:40-10:50 | Break**

**10:50-12:35 | Oral Presentations - Intensive Care Anesthesia 2**

**Chairs:** Hilal Günel Sazak, Sumru Şekerci

10:50-12:15 | O052, O053, O067, O070, O072, O073, O074, O075, O076, O077, O078, O080, O081, O084, O086, O087, O092, O093, O094, O101

**12:15-12:35 | Discussion**

**12:35-12:45 | Break**

**12:45-14:10 | Oral Presentations - Regional Anesthesia 2**

**Chairs:** Hüsnü Kürşad, Murat Sayın

12:45-13:50 | O057, O059, O061, O062, O063, O071, O088, O089, O090, O091, O097, O098, O100, O102

**13:50-14:10 | Discussion**

---

**19:10-20:40 | Panel 3: ANESTHESIA II**

Chairs: Elif Akpek, Ülkü Aypar

**19:10-19:25 | Inovations in Anesthesia, Past, Present and Future; Biljana Shirgoska****19:25-19:40 | Monitoring in Patients Undergoing Liver Transplantation; Ümit Karadeniz****19:40-19:55 | Monitoring of Brain Perfusion; Beliz Bilgili****19:55-20:10 | Effects of Polypharmacy in Clinical Outcome; Hektor Sula****20:10-20:25 | Anesthetic Challenges for Robot Assisted Surgery; Çiğdem Yıldırım Güçlü****20:25-20:40 | Discussion****20:40-20:50 | Break****20:50-22:05 | Panel 4: PALLIATIVE CARE**

Chairs: Süheyla Ünver, Orhan Kanbak

**20:50-21:05 | Philosophy of Palliative Care; Meltem Uyar****21:05-21:20 | Influence of Covid-19 Pandemic on The Timely Provision of Urgent Medical Care; Natasa Kovac****21:20-21:35 | Postoperative Neurocognitive Dysfunction in Elder Patients; Sumru Şekerci****21:35-21:50 | The Palliative Care Clinic: Patient Characteristics, Personnel Equipment; Züleyha Kazak**

Bengisun

**21:50-22:05 | Discussion****01 May 2021-Saturday****10:00-11:30 | Panel 5: ANESTHESIA III**

Chairs: Kamil Toker, Güner Kaya

**10:00-10:15 | Never Ending Debate on Pediatric Airway: Laryngoscopy, Blades and Approaches; Kemal Tolga Saraçoğlu****10:15-10:30 | Laparoscopy and The Obese Patient - Challenges and Solutions; Biljana Kuzmanovska****10:30-10:45 | Anesthesia in Laparoscopic Surgery; Fatos Katanolli****10:45-11:00 | Awake Videolaryngoscope Guided Intubation; Ilyaz Hodzovic****11:00-11:15 | Airway Challenges in Emergency Services; Dusanka Janjevic****11:15-11:30 | Discussion****11:30-11:40 | Break****11:40-12:55 | Panel 6: ANESTHESIA IV**

Chairs: Dilek Kazancı, Fatma Sarıcaoğlu

**11:40-11:55 | New Approaches for Pain Management in Major Abdominal Surgery; Ismet Jusufi****11:55-12:10 | Current Approaches to Local Anesthetic Toxicity; İlker İnce****12:10-12:25 | New Nerve Blocks; Yavuz Gürkan****12:25-12:40 | Ultrasound Guided Chronic Pain Interventions; Taylan Akkaya****12:40-12:55 | Discussion****12:55-13:30 | BREAK for LUNCH TIME****13:30-14:00 | Conference II**

Chairs: Berrin Günaydın, Dilek Özcengiz

**13:30-14:00 | Innovations in Obstetric Regional Anesthesia, and Covid-19 Infection during Pregnancy; Marc van De Velde****14:00-15:00 | Panel 7: ANESTHESIA V**

Chairs: Hülya Başar, Dilek Özcengiz

**14:00-14:15 | Management of Peripartum Hemorrhage; Berrin Günaydın****14:15-14:30 | Anesthesia for Maternal-Fetal Surgery; Onur Özlü****14:30-14:45 | Anesthesia in Covid 19 Parturient for Normal and Operative Delivery; Atanas Sivevski****14:45-15:00 | Discussion****15:00-15:10 | Break****15:10-15:50 | Conference III**

Chairs: Sadık Özmen, F. Feyhan Ökten

**15:10-15:40 | Burnout and What Motivates Health Care Personnels?; Jannicke Mellin-Olsen****15:40-15:50 | Discussion****15:50-16:00 | Break****16:00-17:15 | Panel 8: PAIN**

Chairs: İbrahim Aşık, Filiz Tüzüner

**16:00-16:15 | Prevention of Postsurgical Chronic Pain; İbrahim Aşık**

- 16:15-16:30 | Current Perspectives in Local Anesthetic Doses for Peripheral Nerve Blocks;** Perihan Ekmekçi  
**16:30-16:45 | Possibility of Improving Postoperative Pain Management By Improving Daily Practices;** Adem Bytyqi  
**16:45-17:00 | Pain Management in ICU;** Suna Akın Takmaz  
**17:00-17:15 | Discussion**  
**17:15-17:25 | Break**  
**17:25-18:40 | Panel 9: ICU II**  
**Chairs:** Lulzim Emini, Murat Sayın  
**17:25-17:40 | Management of Acute Respiratory Failure in ICU;** Alma Cani  
**17:40-17:55 | Hyperbaric Oxygen Therapy-Current Situation and Perspectives;** Hristo Bozov  
**17:55-18:10 | Early Mobilization and Rehabilitation in The Intensive Care Unit;** Mirjana Shosholcheva  
**18:10-18:25 | Sedation and Delirium in ICU;** Sibel Temur  
**18:25-18:40 | Discussion**  
**18:40-18:50 | Break**  
**18:50-20:05 | PANEL 10: ICU III**  
**Chairs:** Işıl Özkoçak Turan, Yeşim Batislam  
**18:50-19:05 | Deceased Organ Transplantation During Covid-19 Pandemic;** Maja Mojsova  
**19:05-19:20 | Intensive Care Management in Transplantation;** Pınar Zeyneloğlu  
**19:20-19:35 | Pulmonary Hypertension and Anesthesia;** Maja Sostaric  
**19:35-19:50 | Patient Oriented Transfusion Management;** Dilek Ünal  
**19:50-20:05 | Discussion**  
**20:05-20:15 | Break**  
**20:15-21:30 | Panel 11: ANESTHESIA VI**  
**Chairs:** Sema Turan, Hasib Lukac  
**20:15-20:30 | Resuscitation of Very Low Birth Weight Neonate Born to Mother with Confirmed Sars-Cov-2 Infection;** Ivana Budic  
**20:30-20:45 | New Approach to CPR During Covid-19;** Antigona Hasani  
**20:45-21:00 | New Guidelines of Cardiopulmonary Resuscitation in Pediatric Patient;** Ünase Büyükköçak  
**21:00-21:15 | Recent Improvements in Intravenous Anesthesia and Anesthetics;** Gülbin Sezen  
**21:15-21:30 | Discussion**
- 

## 02 May 2021-Sunday

---

### 08:30-09:35 | SPECIALIST'S SESSION

- Chairs:** Nurdan Bedirli, Raif Kaya  
**08:30-08:37 | Anaesthesia Management for Non-Obstetric Surgery During Pregnancy;** Volkan Baytaş  
**08:37-08:44 | Bedside Bleeding Coagulation Monitoring;** Ülkü Ceren Köksoy  
**08:44-08:51 | Prevention of Acute Kidney Injury and Protection of Renal Function in Intensive Care Unit;** Hakan Yılmaz  
**08:51-08:58 | Anesthesia in Non-Operating Procedures in Pediatric Patients;** Nilgün Şahin  
**08:58-09:05 | Diaphragmatic Pacing- An Overview;** Gülten Ütebey  
**09:05-09:12 | Epidural Analgesia for Labor and Delivery;** Mehmet Yalvaç  
**09:12-09:19 | Anesthesia for The Obese Patients;** Zübeyir Cebeci  
**09:19-09:35 | Discussion**  
**09:35-09:45 | Break**

### 09:38-10:35 | SPECIALIST'S SESSION II

- Chairs:** A. Gülsün Pamuk, Haluk Gümüş  
**09:38-09:45 | Anaesthetic Management in Bariatric Surgery;** Münire Babayigit  
**09:45-09:52 | Santral Blocks in Pediatric Anesthesia;** Asiye Ceylan  
**09:52-09:59 | DOAC Management During Anesthesia;** Merve Bayraktaroğlu  
**09:59-10:06 | Extraordinary Reactions During Propofol Anesthesia: Narcolepsy, Chronic Urticaria, Essential Tremor;** İlnur Suidiye Yorulmaz  
**10:06-10:13 | Traumatic Brain Injury in Elderly Patients;** İsmail Aytaç  
**10:13-10:20 | Innovations in Geriatric Anesthesia;** Fatma Sipahioğlu  
**10:20-10:35 | Discussion**  
**10:35-10:45 | Break**
-

**10:45-12:15 | Panel 12: ANESTHESIA VII**

Chairs: Slavenka Straus, Ayşegül Özgök

**10:45-11:00 | Anesthesia Management for Ventricular Assist Device Implementation;** Hija Yazıcıoğlu

**11:00-11:15 | Intraaortic Balloon Pump Counter Pulsation;** Ervin Bejko

**11:15-11:30 | Single Lung Ventilation;** Mehtap Tunç

**11:30-11:45 | Vasoplegia in Cardiac Surgery: How We Can Prevent It in Postoperative Period?;** Slavenka Straus

**11:45-12:00 | Medical Education During Covid-19: Our Experience;** Fatos Sada

**12:00-12:15 | Discussion**

**12:15-12:45 | BREAK for LUNCH TIME**

**12:45-13:15 | Complementary Medicine During Covid-19**

Chairs: Nurten İnan, Onur Özlü

Yüksel Küçükçelebi

**13:15-13:25 | Discussion**

**13:25-13:35 | Break**

**13:35-14:50 | Panel 13: ICU IV**

Chairs: Mehmet Uyar, Sumru Şekerçi

**13:35-13:50 | New Challenges-Old Problems in The Treatment of Infections in Intensive Care Units;** Jasmina Smajić

**13:50-14:05 | The Prevention of Organ Dysfunction in Sepsis;** İsmail Cinel

**14:05-14:20 | Vasopressin in Sepsis;** Andrijan Kartalov

**14:20-14:35 | Multiple Organ Dysfunction Syndrome in Patients with COVID-19 Disease;** Meldijana Omerbegovic

**14:35-14:50 | Discussion**

**14:50-15:00 | Break**

**15:00-16:30 | Panel 14: ANESTHESIA VIII**

Chairs: Zerrin Özköse Şatırlar, Murat Sayın

**15:00-15:15 | Acute Abdominal Pain Related to Covid-19 in Kids; Nightmare for Surgeons and Pediatritions, Challenge for Anesthesiologists;** Marijana Karisik

**15:15-15:30 | Perioperative Respiratory Complications in Children;** Berrin Işık

**15:30-15:45 | Abdominal Migraine in Pediatric Patients;** Dusica Simic

**15:45-16:00 | Effects of Anesthesia on The Brain in Children;** Nurten Bakan

**16:00-16:15 | Post-Craniotomy Pain Management in Pediatric Patients;** Dilek Yörükoğlu

**16:15-16:30 | Discussion**

**16:30-16:40 | Break**

**16:40-17:55 | Panel 15: ICU V**

Chairs: Aslı Dönmez, Nermin Göğüş

**16:40-16:55 | The History of Pandemics;** Sanem Çakar Turhan

**16:55-17:10 | The ICU Acquired Weakness and The Covid-19 Patients;** Valentin Vlasikov

**17:10-17:25 | New Concept of Sedation in The ICU With a Review in Covid-19 Patients;** Visnja Ivancan

**17:25-17:40 | ECMO Treatment in The Severe Pulmonary Infection with Covid-19;** Vedat Eljezi

**17:40-17:55 | Discussion**

**17:55-18:05 | Break**

**18:05-19:20 | Panel 16: ICU VI – ANESTHESIA**

Chairs: Çetin Kaymak, Ali Fuat Erdem

**18:05-18:20 | Data Collection and Interpretation in ICU;** Necati Gökmen

**18:20-18:35 | Newer Modes of Mechanical Ventilation and Automated Weaning;** Mustafa Kemal Bayar

**18:35-18:50 | Environmental Implications of Anesthetic Gases: Nature Friendly Anesthesia;** Süleyman Ganidağlı

**18:50-19:05 | Low Flow Anesthesia and Its Benefits;** Ali Fuat Erdem

**19:05-19:20 | Discussion**

**19:20-19:30 | Break**

**19:30-19:45 | Closing Speeches**

F. Feyhan Ökten, Onur Özlü

## CONTENTS

<b>THE IMPACT OF THE ACCELERATED DIGITALIZATION AND THE TRANSFORMATION OF SOCIAL DYNAMICS AND FORMS OF WORK AND BUSINESS WITH THE COVID-19 PANDEMIC</b>	Prof Dr Nilüfer NARLI, Turkey	2
<b>INNOVATIONS IN ANESTHESIOLOGY: PAST, PRESENT, AND FUTURE</b>	Biljana SHIRGOSKA, Macedonia	3
<b>MONITORING OF BRAIN PERFUSION</b>	Beliz BILGILI, Turkey	5
<b>EFFECTS OF POLYPHARMACY IN CLINICAL OUTCOMES</b>	Hektor SULA, Albania	6
<b>ANESTHETIC CHALLENGES FOR ROBOT ASSISTED SURGERY</b>	. Çiğdem YILDIRIM GÜÇLÜ, Turkey	11
<b>POSTOPERATIVE NEUROCOGNITIVE DISORDERS</b>	Sumru ŞEKERCI, Turkey	13
<b>PALLIATIVE CARE CLINIC: PATIENT CHARACTERISTICS, PERSONNEL EQUIPMENT</b>	Züleyha KAZAK BENGİSUN, Turkey	25
<b>ANESTHESIA FOR LAPAROSCOPIC SURGERY;</b>	Fatos KATANOLLI, Kosova	27
<b>AWAKE VIDEOLARYNGOSCOPE – GUIDED INTUBATION – WELL WORTH ADDING TO YOUR SKILL-MIX</b>	Iljaz HODZOVIC, United Kingdom	29
<b>CURRENT APPROACHES TO LOCAL ANESTHETIC TOXICITY</b>	İlker İNCE, Turkey	33
<b>ANESTHESIA FOR MATERNAL AND FETAL SURGERY</b>	Onur ÖZLÜ, Turkey	35
<b>ANESTHESIA IN COVID-19 PARTURIENT FOR NORMAL AND OPERATIVE DELIVERY</b>	Atanas SIVEVSKI, Macedonia	39
<b>POSSIBILITY OF IMPROVING POSTOPERATIVE PAIN MANAGEMENT BY IMPROVING DAILY PRACTICES</b>	Adem BYTYQI, Kosova	44
<b>PAIN MANAGEMENT IN INTENSIVE CARE</b>	Suna AKIN TAKMAZ, Turkey	46
<b>EARLY MOBILIZATION AND REHABILITATION IN THE INTENSIVE CARE UNIT</b>	Mirjana SHOSHOLCHEVA, Macedonia	51
<b>PULMONARY HYPERTENSION AND ANESTHESIA</b>	Maja SOSTARIC, Slovenia	54
<b>PATIENT CENTRED BLOOD TRANSFUSION</b>	Dilek ÜNAL, Turkey	59
<b>RESUSCITATION OF VERY LOW BIRTH WEIGHT NEONATE BORN TO MOTHER WITH CONFIRMED SARS-COV-2 INFECTION</b>	Ivana BUDIC, Serbia	68
<b>NEW APPROACH TO CPR DURING COVID-19</b>	Antigona HASANI, Kosova	72
<b>RECENT IMPROVEMENTS IN INTRAVENOUS ANESTHESIA AND ANESTHETICS</b>	Gülbin SEZEN, Turkey	75
<b>ANAESTHESIA MANAGEMENT FOR NON OBSTETRIC SURGERY DURING PREGNANCY</b>	Volkan BAYTAŞ, Turkey	86
<b>PREVENTION OF ACUTE KIDNEY INJURY AND PROTECTION OF RENAL FUNCTION IN INTENSIVE CARE UNIT</b>	Hakan YILMAZ, Turkey	91
<b>ANESTHESIA IN NON-OPERATING PROCEDURES IN PEDIATRIC PATIENTS</b>	Nilgün ŞAHİN, Turkey	99
<b>DIAPHRAGMATIC PACING – AN OVERVIEW</b>	Gülten ÜTEBEY, Turkey	102
<b>EPIDURAL ANALGESIA FOR LABOR AND DELIVERY</b>	Mehmet YALVAÇ, Turkey	106

<b>OBESITY AND ANESTHESIA PHYSIOLOGICAL AND PHARMACOLOGICAL CHANGES</b>	Zubeyir CEBECİ, Turkey	109
<b>ANAESTHETIC MANAGEMENT IN BARIATRIC SURGERY</b>	Münire BABAYİĞİT, Turkey	112
<b>CENTRAL BLOCKS IN PEDIATRIC SURGERY</b>	Asiye YÜCE CEYLAN, Turkey	115
<b>EXTRAORDINARY REACTIONS DURING PROPOFOL ANESTHESIA: NARCOLEPSY, CHRONIC URTICARIA, ESSENTIAL TREMOR</b>	İlknur Suidiye YORULMAZ, Turkey	118
<b>INNOVATIONS IN GERIATRIC ANESTHESIA</b>	Fatma OZKAN SIPAHIOĞLU, Turkey	125
<b>ANESTHESIA MANAGEMENT for VENTRICULAR ASSIST DEVICE IMPLANTATION</b>	Hija YAZICIOĞLU, Turkey	133
<b>PREDICTORS OF INTRA-AORTIC BALLOON PUMP INSERTION IN CARDIAC SURGERY</b>	Ervin BEJKO, Albania	142
<b>CURRENT ANESTHETIC APPROACHES DURING SINGLE LUNG VENTILATION</b>	Mehtap TUNÇ, Turkey	144
<b>VASOPLEGIA IN CARDIAC SURGERY: HOW WE CAN PREVENT IT IN POSTOPERATIVE PERIOD?</b>	Slavenka STRAUS, Bosnia and Herzegovina	147
<b>MEDICAL EDUCATION DURING COVID-19: OUR EXPERIENCE</b>	Fatos SADA, Kosova	151
<b>MULTIPLE ORGAN DYSFUNCTION SYNDROME IN PATIENTS WITH COVID-19 DISEASE</b>	Meldijana OMERBEGOVIĆ, Bosnia and Herzegovina	153
<b>ACUTE ABDOMINAL PAIN RELATED TO COVID-19 IN KIDS; NIGHTMARE FOR SURGEONS AND PEDIATRITIANS, CHALLENGE FOR ANESTHEHESIOLOGISTS</b>	Marijana KARIŠIK, Montenegro	161
<b>PERIOPERATIVE RESPIRATORY COMPLICATIONS IN CHILDREN</b>	Berrin IŞIK, Turkey	162
<b>POST-CRANIOTOMY PAIN MANAGEMENT IN CHILDREN</b>	Dilek YÖRÜKOĞLU, Turkey	166
<b>HISTORY OF PANDEMICS AND COVID-19</b>	K. Sanem ÇAKAR TURHAN, Turkey	168
<b>ECMO TREATMENT IN THE SEVERE PULMONARY INFECTION WITH COVID-19</b>	Vedat ELJEZI, France	171

## ORAL PRESENTATIONS

<b>O001</b>	<b>179</b>
<b>ELECTROLITE CHANGES IN THE SERUM AFTER TUR (TRANSURETRAL) PROSTATE</b>	
<u>Haxhire GANI</u> <sup>1</sup> , Greta Gani <sup>1</sup> , Majlinda NACO <sup>1</sup> , Vjollca SHPATA <sup>1</sup> , Franceska BEQIRI <sup>1</sup> , VALBONA MUCA <sup>1</sup> UHC"Mother Teresa".Tirana,Albania.	
<b>O002</b>	<b>180</b>
<b>THE ROLE OF AGE IN THE INCIDENCE OF HEMODYNAMIC CHANGES, HYPOTENSION AND BRADYCARDIA, FOR THE SAME LEVEL OF THE SPINAL BLOCK, IN PATIENTS THAT HAVE UNDERGONE SURGERY IN UROLOGY</b>	
<u>Haxhire GANI</u> <sup>1</sup> , Greta Gani <sup>1</sup> , Majlinda NACO <sup>1</sup> , Vjollca SHPATA <sup>1</sup> , Franceska BEQIRI <sup>1</sup> , Hektor SULA <sup>1</sup> UHC"Mother Teresa".Tirana,Albania.	
<b>O003</b>	<b>181</b>
<b>POSTOPERATIVE CARE IN ELDERLY PATIENTS WITH UROLOGICAL SURGICAL INTERVENTION.</b>	
<u>Xhesika MUÇA</u> , Greta GANI, Françeska BEQIRI, Haxhire GANI, UHC"Mother Teresa".Tirana,Albania.	
<b>O004</b>	<b>182</b>
<b>THE CHALLENGES IN TREATMENT OF AUTOTRANSPLANTED PATIENT IN CARDIAC INTENSIVE CARE UNIT CASE REPORT</b>	
<u>Edin KABİL</u> , Ermina MUJIĆIĆ, Slavenka ŠTRAUS, Nermir GRANOV, Sanja GRANOV-GRABOVICA Clinic for cardiovascular surgery, University Clinical Center Sarajevo, Bosnia and Herzegovina	
<b>O005</b>	<b>183</b>
<b>ERECTOR SPINAE PLANE BLOCK FOR COMPUTED TOMOGRAPHIC SCAN GUIDANCE PERCUTANEOUS RADIOFREQUENCY ABLATION OF PULMONARY METASTASIS: THREE CASES</b>	
Derya ÖZKAN <sup>1</sup> , <u>Emine ARIK</u> <sup>1</sup> , Azad HEKİMOĞLU <sup>1</sup> , Özge YAMANKILIÇ MUMCU <sup>1</sup> , Onur ERGUN <sup>1</sup> Dışkapı Yıldırım Beyazıt Eğitim ve Araştırma Hastanesi <sup>1</sup>	
<b>O006</b>	<b>184</b>
<b>THE USE OF ULTRASONOGRAPHY IN THE DIAGNOSIS OF COMPARTMENT SYNDROME AFTER TOTAL KNEE 18ARTHROPLASTY</b>	
<u>Ilkay Baran AKKUS</u> <sup>1</sup> , Alp ALPTEKİN <sup>1</sup> , Gokcen KULTUROGLU <sup>2</sup> 1-SBU Diskapi Yildirim Beyazit Training and Research Hospital, Ankara, Turkey 2-Bunyan Public Hospital, Kayseri, Turkey	
<b>O007</b>	<b>185</b>
<b>COMPARISON OF THE ERECTOR SPINA PLANE BLOCK, OBLIQUE SUBCOSTAL TRANSVERSUS ABDOMINIS PLANE BLOCK AND LOCAL ANESTHESIC INFILTRATION METHODS IN LAPAROSCOPIC CHOLECISTECTOMY</b>	
<u>Burak NALBANT</u> <sup>1</sup> , Asli DONMEZ <sup>1</sup> , Savas ALTINSOY <sup>1</sup> Diskapi Education and Research Hospital, Ankara, TURKEY	
<b>O008</b>	<b>186</b>
<b>ROLE OF ANTERIOR NECK SOFT TISSUE QUANTIFICATIONS BY ULTRASOUND IN PREDICTING DIFFICULT LARYNGOSCOPY AND INTUBATION IN OBESE PATIENTS</b>	
Basak GULEL <sup>1</sup> , <u>Emine ARIK</u> <sup>1</sup> , Azad HEKİMOĞLU <sup>1</sup> , Derya OZKAN <sup>1</sup> University of Health Sciences Diskapi Yildirim Beyazit Education and Research Hospital <sup>1</sup>	
<b>O009</b>	<b>187</b>
<b>COLOR DOPPLER IMAGING OF THE OPHTHALMIC ARTERY DURING HEART TRANSPLANTATION</b>	
<u>Eda BALCI</u> <sup>1</sup> , Aslı DEMİR <sup>1</sup> , Ayşegül ÖZGÖK <sup>1</sup> 1 Ankara City Hospital	



<b>O010</b>	<b>190</b>
<b>UNDERSTANDING THE MEASURES OF NOSOCOMIAL INFECTION FREQUENCY WITH CALCULATION OF THE RATES</b>	
Monika BELBA <sup>1</sup> , Besnik FASKAJ <sup>1</sup> , Albana ALEKSI <sup>2</sup> , Ilir NEZHA <sup>2</sup>	
1University of Medicine, Tirana, Albania ,2University Hospital Center Tirana, Albania	
<b>O011</b>	<b>191</b>
<b>COMPARISON OF TWO DIFFERENT TECHNIQUES IN ULTRASOUND GUIDED INFRACLAVICULAR BLOCK PROCEDURE: JEDI TECHNIQUE AND CLASSIC TECHNIQUE</b>	
Süleyman CAMGÖZ <sup>1</sup> , Miyase Serap DİKER <sup>1</sup> , Betül GÜVEN AYTAÇ <sup>1</sup> , İsmail AYTAÇ <sup>1</sup>	
1Ankara City Hospital Department of Anesthesiology and Reanimation	
<b>O014</b>	<b>192</b>
<b>THE EFFECTS OF DRIVING PRESSURE ON OXYGENATION DURING CORONARY BYPASS GRAFTING</b>	
Fatih TOPTAN <sup>1</sup> , Havva KOCAYİĞİT <sup>1</sup> , Ali Fuat ERDEM <sup>2</sup> , Halil İbrahim ERKENGEL <sup>3</sup>	
1Sakarya University Training and Research Hospital, Department of Anesthesiology;	
2Sakarya university School of Medicine Department of Anesthesiology,	
3Sakarya university School of Medicine Department of Cardiovascular Surgery.	
<b>O016</b>	<b>193</b>
<b>COMPARISON OF RECOVERY AND SIDE EFFECTS AFTER OPTIMAL ISOFLURANE/SEVOFLURANE / DESFLURANE ANESTHESIA WITH BIS MONITORING OF PATIENTS UNDERGOING LAPAROSCOPIC ABDOMINAL SURGERY</b>	
Nilgün ŞAHİN <sup>1</sup> , Sacide DEMİRALP <sup>2</sup>	
1 Dr. Sami Ulus Kadınoğum, Çocuk sağlığı ve hastalıkları Eğitim ve Araştırma Hastanesi	
2 Ankara Üniversitesi Tıp Fakültesi Anesteziyoloji ve Reanimasyon ABD	
<b>O017</b>	<b>194</b>
<b>OGILVIE SYNDROME AFTER VASCULAR SURGERY IN ELDERLY PATIENT. A CASE REPORT</b>	
Ass.Dr. Darko ANGJUSHEV <sup>1</sup> , Prof.Dr. Andrijan KARTALOV <sup>1</sup> , Doc.Dr. Marija SRCEVA <sup>1</sup> , Ass.Dr. Anita KOKAREVA <sup>1</sup> , Dr.Spec. Marija KOTEVSKA-ANGJUSHEV <sup>2</sup>	
1. UC TOARILUC Medical Faculty, University of “St. Cyril and Methodius” Skopje	
2. UC Cardiosurgery Medical Faculty, University of “St. Cyril and Methodius” Skopje	
<b>O018</b>	<b>195</b>
<b>MANAGEMENT OF ANAPHYLAXIS AFTER GENERAL ANESTHESIA INDUCTION IN PATIENT WITH NO ALLERGY HISTORY: A CASE REPORT</b>	
Iskra NEDELKOVA <sup>1</sup> , Jasna BUSHINOSKA <sup>1</sup> , Marija TOLESKA <sup>1</sup> , Tatjana DAVITKOVSKA <sup>1</sup> , Leutrim SULEJMANI <sup>1</sup> , Ljubomir OGNJENOVICH <sup>2</sup>	
1University Clinic for Anesthesia, Reanimation and Intensive Care, Medical Faculty, “Ss’ Cyril and Methodius” University, Skopje, R. N. Macedonia	
2University Clinic of Abdominal Surgery, University of St. Cyril and Methodius, Skopje, R. N. Macedonia	
<b>O019</b>	<b>196</b>
<b>ANESTHESIA EXPERIENCE ON A PATIENT WITH BIOTINIDASE DEFICIENCY</b>	
Merve BAYRAKTAROĞLU <sup>1</sup> , Yesim MACİT <sup>1</sup> , Onur OZLU <sup>1</sup>	
Department of Anaesthesiology and Reanimation, TOBB University of Economics and Technology, Ankara, Turkey.	
<b>O020</b>	<b>197</b>
<b>ANESTHESIA IN CRANIOSYNOSTOSIS SURGERY WITH TURNER SYNDROME</b>	
İklil GEMLİK <sup>1</sup> , Hüsne ŞAHİN <sup>1</sup> , Merve BAYRAKTAROĞLU <sup>1</sup> , Onur ÖZLÜ <sup>1</sup>	
Department of Anaesthesiology and Reanimation, TOBB University of Economics and Technology, Ankara, Turkey.	

- O021** **198**  
**ANESTHETIC MANAGEMENT OF A PATIENT WITH MYASTHENIA GRAVIS AND ANKYLOSING SPONDYLITIS UNDERGOING VIDEOASISTED THORACOSCOPIC THYMECTOMY**  
Hüsne BAYRAK SAHİN<sup>1</sup>, Merve BAYRAKTAROĞLU<sup>1</sup>, İklil GEMLİK<sup>1</sup>, Onur OZLU  
 Department of Anaesthesiology and Reanimation, TOBB University of Economics and Technology, Ankara, Turkey
- O022** **199**  
**ANESTHESIA MANAGEMENT of CABG OPERATION PERFORMED for a LIVER TRANSPLANT RECEPIENT OPERATED 10 YEARS AGO**  
Hija YAZICIOĞLU<sup>1</sup>, Gökçe SELÇUK SERT<sup>1</sup>, Perihan KEMERCİ<sup>1</sup>, Büşra TEZCAN<sup>2</sup>  
 1 T.C. Ministry of Health Ankara City Hospital Department of Anesthesiology & Reanimation,  
 2 T.C. Ministry of Health Ankara City Hospital Department of Intensive Care Units
- O023** **200**  
**A CHALLENGING ANESTHESIA MANAGEMENT of HEART TRANSPLANTATION to A RECEPIENT WHO HAD LVAD IMPLANTATION TWO YEARS AGO**  
Hija YAZICIOĞLU<sup>1</sup>, Perihan KEMERCİ<sup>1</sup>, Gökçe SELÇUK SERT<sup>1</sup>, Büşra TEZCAN<sup>2</sup>  
 1 T.C. Ministry of Health Ankara City Hospital Department of Anesthesiology & Reanimation,  
 2 T.C. Ministry of Health Ankara City Hospital Department of Intensive Care Units
- O024** **202**  
**IS AUDIOVISUAL INTERACTIONS WITH VIDEO GAMES OR DISTRACTION WITH CARTOONS AN ALTERNATIVE TO MIDAZOLAM TO PREVENT EMERGENCE DELIRIUM? PROSPECTIVE RANDOMISED TRIAL**  
Reyhan POLAT<sup>1</sup>, Bahar SAKIZCI UYAR<sup>1</sup>, Sibel CATALCA<sup>2</sup>, Aslı ZOROGLU DONMEZ<sup>1</sup>  
 1Diskapı Yıldırım Beyazıt Research and Training Hospital, Ankara; 2Hakkari State Hospital
- O025** **203**  
**ANESTHETIC MANAGEMENT OF A CHILD WITH MIS-C PRESENTING FOR APPENDECTOMY: CASE REPORT**  
Gulsen KESKİN  
 Department of Anesthesiology and Reanimation,  
 Health Sciences University Diskapi Yıldırım Beyazıt Training and Research Hospital, Ankara, Turkey
- O026** **205**  
**A RARE PATHOLOGY THAT MAY BE FATAL IF LEFT UNDIAGNOSED: A TRACHEAL HEMANGIOMA**  
Ali HASPOLAT<sup>1</sup>, Yaşar Gökhan GÜL<sup>2</sup>, Ali Şefik KÖPRÜLÜ<sup>3</sup>, Yavuz DEMIRARAN<sup>4</sup>  
 (1) Anesthesiology and Intensive Care - Asist. Prof. Dr. Kolan International Hospital, Department of Anesthesiology,  
 (2) Anesthesiology and Intensive Care - Medical Doctor, Medipol University Medipol Mega Hospital, Department of Anesthesiology,  
 (3) Anesthesiology and Intensive Care, Assoc. Prof. Dr. İstanbul Yeni Yüzyıl University Medical Faculty Head of the Department of Anesthesiology and Reanimation  
 (4) Anesthesiology and Intensive Care, Prof. Dr. İstanbul Medipol University English Medical Faculty Head of the Department of Anesthesiology and Reanimation
- O027** **207**  
**UNILATERAL NEGATIVE PRESSURE PULMONARY EDEMA: REPORT OF TWO CASES**  
Dilek ÜNAL YAZICIOĞLU, Yusuf ÖZGÜNER, Murat SAYIN  
 University Of Health Sciences Diskapi Yıldırım Beyazıt Training And Research Hospital
- O028** **209**  
**RETROSPECTIVE EVALUATION OF ADHERENCE TO STRESS ULCER PROPHYLAXIS GUIDELINES IN ICU PATIENTS AND THE INCIDENCE OF GASTROINTESTINAL BLEEDING**  
Dilek UNAL, Melis SUMAK HAZIR, Elif Sule OZDEMİR, Murat SAYIN  
 University of Health Sciences Diskapi Yıldırım Beyazıt Training And Research Hospital

<b>O029</b>	<b>211</b>
<b>NOT JUST FOCUS ON THE SPINE IN FAILED BACK SURGERY SYNDROME : TWO CASES WITH PARATHYROID ADENOMA AND MENINGIOMA</b>	
<u>Damla YÜRÜK</u> <sup>1</sup> , Hüseyin Alp ALPTEKİN <sup>1</sup>	
Ankara Dışkapı Yıldırım Beyazıt Training and Research Hospital Algology Clinic	
<b>O030</b>	<b>212</b>
<b>THE CHALLENGES OF THE MEDICAL DOCTORS WORKING IN THE INTENSIVE CARE UNIT DURING COVID-19 PANDEMIC</b>	
Helin ŞAHİNTÜRK <sup>1</sup> , İrem ULUTAŞ ORDU <sup>1</sup> , Aykan GÜLLEROĞLU <sup>1</sup> , <u>Fatma İrem YEŞİLER</u> <sup>1</sup> , Manat AITHAKANOVA <sup>1</sup> , Ender GEDİK <sup>1</sup> , Pinar ZEYNELOĞLU <sup>1</sup>	
Başkent University	
<b>O031</b>	<b>213</b>
<b>WHICH OBJEKTIVE METHOD IS A RELIABLE AND EARLY INDICATOR OF THE INFRACLAVICULAR BRACHIAL PLEXUS BLOCK SUCCESS; FIVE CANDIDATES, ONE WINNER.</b>	
<u>Abdulahkim ŞENGEL</u> <sup>1</sup> , Mahmut Alp KARAHAN <sup>2</sup> , Nuray ALTAY <sup>2</sup> , Orhan BİNİCİ <sup>2</sup> , Veli Fahri PEHLİVAN <sup>2</sup> , Ahmet ATLAS <sup>2</sup>	
1: Şanlıurfa İl Sağlık Müdürlüğü Siverek Devlet Hastanesi, 2: Harran Üniversitesi Tıp Fakültesi	
<b>O032</b>	<b>214</b>
<b>MECHANICAL POWER MEASUREMENTS IN PEDIATRIC MECHANICAL VENTILATION</b>	
<u>Ahmet YÜKSEK</u>	
Department of Anesthesiology and Reanimation, Bozok University, Yozgat, Turkey	
<b>O033</b>	<b>215</b>
<b>VALIDATION OF BOBI SCORE FOR OUTCOME PREDICTION</b>	
<u>Besnik FASKAJ</u> , Monika BELBA	
University of Medicine, Tirana, Albania ,University Hospital Center Tirana, Albania	
<b>O034</b>	<b>216</b>
<b>ANESTHESIA MANAGEMENT IN THE INTERVENTION OF FOREIGN BODY ASPIRATION IN A PATIENT WITH DANDY-WALKER MALFORMATION: A CASE REPORT</b>	
Murat IZGI <sup>1</sup> , Yasemin KILIC <sup>1</sup> , <u>Nuriye Sidar ARSLAN</u> <sup>1</sup> , Ismail GUZELKAS <sup>2</sup> , Nagehan EMIRALIOGLU <sup>2</sup>	
1 Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation, Ankara, TURKEY	
2 Hacettepe University, School of Medicine, Department of Pediatric Pulmonology, Ankara, TURKEY	
<b>O035</b>	<b>218</b>
<b>MANAGEMENT OF AN INTRACTABLE PAIN DUE TO BILATERAL LOWER LIMB COMPARTMENT SYNDROME AS A COMPLICATION OF BREAST RECONSTRUCTION SURGERY</b>	
Duygu DEMİRİZ GÜLMEZ <sup>1</sup> , <u>Hilal KIRCI</u> <sup>2</sup> , Alparslan APAN <sup>1</sup> , Özgün CUVAŞ APAN <sup>1</sup>	
1: Giresun University Medical Faculty, Department of Anesthesiology and Reanimation.	
2: S.B. Rize State Hospital Anesthesiology and Reanimation	
<b>O036</b>	<b>219</b>
<b>BAROTRAUMA DURING MECHANICAL VENTILATION IN COVID-19 PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME IN THE INTENSIVE CARE UNIT: A CASE SERIES</b>	
<u>Öznur DEMİROLUK</u> <sup>1</sup> , Arzu YILDIRIM AR <sup>1</sup> , Yıldız YİĞİT <sup>1</sup>	
1University of Health Sciences Fatih Sultan Mehmet Health Research and Application Center, Anesthesiology and Reanimation Department, Istanbul, Turkey.	
<b>O037</b>	<b>222</b>
<b>NEGATIVE PRESSURE PULMONARY EDEMA OCCURRING DURING THE POSTOPERATIVE PERIOD: A CASE REPORT</b>	
<u>Murat IZGI</u> <sup>1</sup>	
Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation, Ankara, TURKEY	

- O038** **224**  
**COMPARISON OF THE EFFECTS OF GENERAL ANESTHESIA AND EPIDURAL ANESTHESIA ADDED TO GENERAL ANESTHESIA IN THE ANESTHETIC MANAGEMENT OF GYNECOLOGICAL ONCOLOGICAL SURGERY**  
 İrfan MEHMET<sup>1</sup>, Mete Gürol UĞUR<sup>2</sup>, Mehmet CESUR<sup>1</sup>, Süleyman GANİDAĞLI<sup>1</sup>, Berna KAYA UĞUR<sup>1</sup>  
 (1)Gaziantep University School of Medicine Department of Anesthesiology and Reanimation, (2)Gaziantep University School of Medicine Department of Obstetrics and Gynecology
- O039** **225**  
**RECROSPLECTIVE ANALYSIS OF PATIENTS WHO HAVE BEEN IMPLEMENTED NEUROANESTHESIA FOR BRAIN SURGERY BETWEEN 2015-2019 AT ONDOKUZ MAYIS UNIVERSITY FACULTY OF MEDICINE HOSPITAL**  
 Hasan ÇETİNKAYA<sup>1</sup>, Bahriye Binnur SARIHASAN<sup>1</sup>  
 Ondokuz Mayıs University Faculty Of Medicine Hospital<sup>1</sup>
- O040** **226**  
**THE COMPARISON OF VIDEO FIBERSCOPE AND DCI VIDEO LARYNGOSCOPE PERFORMED BY TWO PRACTITIONERS IN PATIENTS WITH EGRI SCORE> 4**  
 Halil ÇEBECİ<sup>1</sup>, Gunes COMBA ÇEBECİ<sup>1</sup>, Ersin KOKSAL<sup>1</sup>  
 Department of Anesthesiology and Reanimation, School of Medicine, Ondokuz Mayıs University, Samsun, Turkey
- O041** **227**  
**ANESTHETIC MANAGEMENT OF PARTURIENT FOR CESAREAN SECTION BABY DELIVERY, WITH DILATED CARDIOMYOPATHY AND LOW EJECTION FRACTION**  
 Churlinov K.<sup>1</sup>; Sivevski A<sup>1</sup>.; Spasovski S.<sup>1</sup>  
 University Clinic of Gynecology & Obstetrics - Department of Anesthesiology, Reanimation & Intensive Care Medicine; Skopje, Republic of N. Macedonia
- O042** **228**  
**AVAILABILITY OF PLETH VARIABILITY INDEX IN PREVENTION OF TURP SYNDROME IN TRANSURETHRAL PROSTATE RESECTION**  
 Behiç GİRGIN<sup>1</sup>, Umut KARA<sup>2</sup>, Mehmet Burak EŞKİN<sup>2</sup>, Engin KAYA<sup>3</sup>, Ahmet COŞAR<sup>2</sup>  
 Ankara City Hospital Department of Anesthesiology and Reanim0ation <sup>1</sup>,  
 Health Sciences University Gulhane Training and Research Hospital Department of Anesthesiology and Reanimation <sup>2</sup>,  
 Health Sciences University Gulhane Training and Research Hospital Department of Urology <sup>3</sup>
- O043** **229**  
**AN EYE-POPPING EXPERIENCE DUE TO INTUBATION: A CASE REPORT**  
 Ülkü Ceren KÖKSOY<sup>1</sup>, Hakan YILMAZ<sup>1</sup>, Baturay Kansu KAZBEK<sup>1</sup>,  
 Aybeniz Elif YILDIRIM<sup>1</sup>, Perihan EKMEKÇİ<sup>1</sup>  
 1: Ufuk University, Faculty of Medicine, Department of Anesthesiology and Reanimation
- O044** **2323**  
**ANTIFIBROTIC TREATMENT FOR PULMONARY FIBROSIS INDUCED BY COVID-19**  
 Bahar SAKIZCI UYAR<sup>1</sup>, Kerem ENSARİOĞLU<sup>2</sup>, E. Bahar KURT<sup>2</sup>, Derya ÖZKAN<sup>1</sup>, Serra ÖZBAL GÜNEŞ<sup>3</sup>  
 1 University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Anesthesiology and Reanimation  
 2 University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Pulmonary Medicine  
 3 University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Radiology

<b>O045</b>	<b>233</b>
<b>A RARE COMPLICATION OF NEUTROPENIA AND HEMATOPOIETIC STEM CELL TRANSPLANTATION: SEPSIS RESULTING FROM ACUTE CHOLECYSTITIS</b>	
<u>Büşra Tezcan</u> Ankara City Hospital Intensive Care Clinic	
<b>O046</b>	<b>234</b>
<b>MANAGEMENT of DIFFICULT AIRWAY WITH CLASSIC METHODS</b>	
<u>Yağmur Sitem AKBULUT<sup>1</sup></u> , <u>Hija YAZICIOĞLU<sup>1</sup></u> , <u>Sumru ŞEKERCİ<sup>1</sup></u> 1 T.C. Ministry of Health Ankara City Hospital Department of Anesthesiology & Reanimation	
<b>O047</b>	<b>236</b>
<b>ANESTHESIA MANAGEMENT OF A PATIENT SUSPECTED WITH COVID-19 DURING ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY PROCEDURE</b>	
<u>Murat TÜMER</u> , <u>Asena KARAKUŞ</u> , <u>Ayşe Heves KARAGÖZ</u> , <u>Meral KANBAK</u> Hacettepe University Faculty of Medicine, Department of Anesthesiology and Reanimation	
<b>O048</b>	<b>237</b>
<b>EVALUATION OF MULTIMODAL ANALGESIA METHODS IN PATIENTS WHO UNDERWENT INTERSPACE BETWEEN THE POPLITEAL ARTERY AND THE CAPSULE OF THE POSTERIOR KNEE (IPACK) IN TOTAL KNEE ARTHROPLASTY SURGERY</b>	
<u>İlkay BARAN AKKUŞ<sup>1</sup></u> , <u>Taylan AKKAYA<sup>2</sup></u> , <u>Dilek YAZICIOĞLU ÜNAL<sup>3</sup></u> , <u>Melis SUMAK HAZIR<sup>4</sup></u> , <u>Elif Şule ÖZDEMİR<sup>5</sup></u> University of Health Science Diskapi Yildirim Beyazit Training and Research Hospital	
<b>O049</b>	<b>238</b>
<b>THE COMPARISON OF THE USE OF REMIFENTANIL WITH INFUSION AND PATIENT-CONTROLLED METHODS FOR SEDATION</b>	
<u>Oya G.KALE</u> , <u>Jülide HALLIOĞLU</u> , <u>İ.Haluk GÜMÜŞ</u> Sbü Dişkapi Yildirim Beyazit E.A.H.	
<b>O050</b>	<b>239</b>
<b>ROLE OF EDUCATION IN COMPLIANCE TO HAND HYGIENE PRACTICES AMONG HEALTH CARE WORKERS</b>	
<u>Nilgün ALTIN<sup>1</sup></u> Diskapi Yildirim Beyazit Ed. and Res. Hosp., Ankara, Turkey <sup>1</sup>	
<b>O051</b>	<b>240</b>
<b>EVALUATION OF THE EFFECT OF THE POSITION ON INTRAOPERATIVE CEREBRAL OXYGENATION AND POSTOPERATIVE COGNITIVE FUNCTIONS IN PATIENTS WITH SHOULDER SURGERY</b>	
<u>Murat İZGİ<sup>1</sup></u> , <u>Meriç BAYRAM<sup>1</sup></u> , <u>Gazi HURİ<sup>2</sup></u> , <u>Almila Gülsün PAMUK<sup>1</sup></u> , <u>Fatma SARICAOĞLU<sup>1</sup></u> 1 Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation, Ankara, TURKEY 2 Hacettepe University, School of Medicine, Department of Orthopedics and Traumatology, Ankara, TURKEY	
<b>O052</b>	<b>242</b>
<b>SWALLOWING FUNCTION ASSESSMENT WITH FIBEROPTIC ENDOSCOPY IN PALLIATIVE CARE UNIT: CASE REPORT</b>	
<u>Gülten ÜTEBEY<sup>1</sup></u> Health Sciences University Dişkapi Yildirim Beyazit Training and Research Hospital, Anesthesiology and Reanimation Clinic	
<b>O053</b>	<b>243</b>
<b>NUTMEG INTOXICATION</b>	
<u>Atakan SEZGİ<sup>1</sup></u> , <u>Elif Şule ÖZDEMİR<sup>1</sup></u> , <u>Mehmet CEYLAN<sup>2</sup></u> , <u>Reyhan İŞLEK<sup>1</sup></u> , <u>Gülşen ÇIĞŞAR<sup>2</sup></u> , <u>Savaş ALTINSOY<sup>1</sup></u> , <u>Mehmet Murat SAYIN<sup>1</sup></u> 1. Department of Anesthesiology University of Health Sciences Diskapi Yildirim Beyazit TRH, 2. Department of Emergency University of Health Sciences Diskapi Yildirim Beyazit TRH	

<b>O054</b>	<b>244</b>
<b>THE EFFECTS OF DESFLURANE AND SEVOFLURANE ON ANESTHETIC DEPTH AND RECOVERY IN MINIMAL FLOW ANESTHESIA: RANDOMIZED PROSPECTIVE STUDY</b>	
<u>Baturay Kansu KAZBEK<sup>1</sup>, Hakan YILMAZ<sup>1</sup>, Ülkü Ceren KÖKSOY<sup>1</sup>, Perihan EKMEKÇİ<sup>1</sup></u>	
1: Ufuk University, Faculty of Medicine, Department of Anesthesiology and Reanimation	
<b>O055</b>	<b>246</b>
<b>CAN WE SAY “ONLY THE ANESTHESIA TYPE IS IMPORTANT FOR RECOVERY TIME”?</b>	
<u>Nevzat Mehmet MUTLU</u>	
Department of Anesthesiology and Reanimation - Critical Care, Ankara City Hospital, Ankara	
<b>O056</b>	<b>246</b>
<b>EVALUATION OF THE EFFECTIVENESS OF UNILATERAL TRANSVERSUS ABDOMINIS PLANE BLOCK ON POSTOPERATIVE ANALGESIA IN OPEN APPENDECTOMY</b>	
<u>Çağdaş BAYTAR<sup>1</sup>, Eralp ÇEVİKKALP<sup>2</sup></u>	
1) Zonguldak Bülent Ecevit University Medicine Faculty, Department of Anaesthesiology and Reanimation, Zonguldak, Turkey	
2) Bursa Medicabil Private Hospital, Department of Anaesthesiology and Reanimation, Bursa, Turkey	
<b>O057</b>	<b>250</b>
<b>DIAPHRAGM SPARING EFFECTIVE ANALGESIA IN ARTHROSCOPIC SHOULDER SURGERY: ICB-SSB VS ISB</b>	
<u>M. Tuğba ARSLAN<sup>1</sup>, Derya ÖZKAN<sup>1</sup>, Savaş ALTINSOY<sup>1</sup>, Fatma KAVAK AKELMA<sup>1</sup>, Faruk ÇATMA<sup>2</sup></u>	
1 University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Anaesthesiology,	
2 University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Orthopedics	
<b>O058</b>	<b>251</b>
<b>A CASE OF POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME ASSOCIATED WITH LATE PREGNANCY</b>	
<u>Darko ANGJUSHEV<sup>1</sup>, Andrijan KARTALOV<sup>1</sup>, Teodora STOJANOVSKA<sup>1</sup>, Marija KOTEVSKA-ANGJUSHEV<sup>2</sup></u>	
1. UC TOARILUC Clinical centre "Mother Teresa" Skopje, Macedonia,	
2. UC Cardiac surgery Clinical centre "Mother Teresa" Skopje	
<b>O059</b>	<b>252</b>
<b>THE EFFECT OF INTRAOPERATIVE KETAMINE AND LIDOCAINE INFUSION ON POSTOPERATIVE OPIOID CONSUMPTION IN POSTERIOR SPINAL FUSION SURGERY – PROSPECTIVE DOUBLE-BLIND RANDOMIZED CONTROLLED STUDY</b>	
<u>Vedat OZTURK<sup>1</sup>, Canan ATALAY<sup>1</sup>, Kamber KASALI<sup>2</sup>, Ayşenur DOSTBİL<sup>1</sup>, Ilker INCE<sup>1</sup>, Ozgur OZMEN<sup>1</sup></u>	
1. Department of Anesthesiology and Reanimation, School of Medicine, Ataturk University	
2. Department of Biostatistics, School of Medicine, Ataturk University of	
<b>O060</b>	<b>253</b>
<b>DIFFICULT AIRWAY MANAGEMENT AFTER TRAUMA:A CASE REPORT</b>	
<u>İrem ATEŞ<sup>1</sup>, Ela Nur MEDETOĞLU<sup>1</sup></u>	
Atatürk University Faculty of Medicine, Anesthesiology and Reanimation, Erzurum, TURKEY	
<b>O061</b>	<b>255</b>
<b>THE EFFECT OF TOPICAL LOCAL ANESTHESIA ON PROPOFOL CONSUMPTION IN SEDATION FOR UPPER GASTROINTESTINAL ENDOSCOPY IN PEDIATRIC PATIENTS</b>	
<u>Feyza SEVER<sup>1</sup>, Sengül ÖZMERT<sup>1</sup>, Arzu Meltem DEMİR<sup>2</sup></u>	
1 Ankara City Hospital, Children Hospital, Department of Anesthesiology, Ankara Turkey	
2 Ankara City Hospital, Children Hospital, Department of Pediatric Gastroenterology, Ankara Turkey	

<b>O062</b>	<b>257</b>
<b>COMPARISON OF THREE DIFFERENT INTRATHECAL MORPHINE DOSES USED FOR POSTOPERATIVE ANALGESIA IN THORACOTOMY AND VATS SURGERIES.</b>	
<u>Esra TURUNÇ</u> , İsmail Serhat KOCAMANOĞLU Ondokuz Mayıs Üniversitesi	
<b>O063</b>	<b>259</b>
<b>SPIELBERGER STATUS AND CONSTANT ANXIETY LEVELS IN OPERATING ROOM EMPLOYEES IN THE COVID-19 PANDEMIC: AN EXAMPLE OF A TERTIARY HOSPITAL</b>	
<u>Gamze KÜÇÜKOSMAN</u> <sup>1</sup> , Bengü Gülhan AYDIN <sup>1</sup> 1Zonguldak Bülent Ecevit University Faculty of Medicine, Department of Anesthesiology and Reanimation	
<b>O064</b>	<b>261</b>
<b>THE USE OF PROPOFOL IN SPINA BIFIDA REPAIR SURGERY</b>	
<u>Esmâ Meltem Şimşek</u> Ankara Şehir Hastanesi	
<b>O065</b>	<b>262</b>
<b>DUTIES OF ANESTHETISTS AND ASSESSMENT OF AWARENESS, CONCERNS AND EXPECTATIONS ON ANESTHESIA PRACTICES</b>	
<u>Melahat YALÇIN SOLAK</u> <sup>1</sup> , Murat İZGİ <sup>1</sup> , Murat TÜMER <sup>1</sup> , Şennur UZUN <sup>1</sup> 1Hacettepe University, Faculty of Medicine, Department of Anaesthesiology, Ankara, Turkey	
<b>O067</b>	<b>263</b>
<b>ENIGMA OF BRAIN DEATH IN A PATIENT WITH COVID-19 FOLLOWED IN PRONE POSITION</b>	
<u>Behiye Deniz KOSOVALI</u> <sup>1</sup> 1.Ankara City Hospital, Department of Critical Care	
<b>O068</b>	<b>265</b>
<b>SURGICAL AND ANESTHETIC MANAGEMENT OF POSTPARTUM HEMORRHAGE 45 DAYS AFTER CESAREAN SECTION</b>	
<u>Funda CEVHER AKDULUM</u> <sup>1</sup> , <u>Nuray CAMGOZ ERYILMAZ</u> <sup>2</sup> , Berrin GUNAYDIN <sup>2</sup> , Ayşe BORKLUCE <sup>2</sup> , Esra BOSTANCI <sup>1</sup> , Ahmet ERDEM <sup>1</sup> 1 Gazi University School of Medicine Departments of OBGYN 2 Gazi University School of Medicine Departments of Anesthesiology and Reanimation	
<b>O069</b>	<b>267</b>
<b>ANESTHESIA MANAGEMENT DURING FAILED INTRAUTERINE BALLOON PULMONARY VALVULOPLASTY</b>	
<u>Özge ÖZEN</u> <sup>1</sup> , Banu KILIÇASLAN <sup>1</sup> , Murat ÇAĞAN <sup>2</sup> , Meral KANBAK <sup>1</sup> 1 Hacettepe University Department of Anesthesiology and Reanimation 2 Hacettepe University Department of Gynecology and Obstetrics	
<b>O070</b>	<b>269</b>
<b>ANESTHESIA MANAGEMENT OF RENAL TRANSPLANTATION IN A PATIENT WITH POST LIVER TRANSPLANTATION</b>	
<u>Sertaç ÇETİNKAYA</u> <sup>1</sup> , Behiç GİRĞİN <sup>1</sup> , Yağmur Sitem AKBULUT <sup>1</sup> , Ayşe Sema TÜRKAY YILMAZ <sup>1</sup> , Nevriye SALMAN <sup>1</sup> , Ümit KARADENİZ <sup>1</sup> Ankara City Hospital Department of Anesthesiology and Reanimation <sup>1</sup>	
<b>O071</b>	<b>270</b>
<b>PREGNANCY AND COVID19; PERFORMING SPINAL ANESTHESIA UNDER UNEXPECTED CONDITIONS</b>	
<u>Aygün GÜLER</u> Ankara City Hospital	

- O072** **271**  
**MANAGEMENT OF ACUTE EUDEMATOUS PANCREATITIS IN PATIENTS WITH SEVERE COVID-19 PNEUMONIA**  
Mustafa HACIÖMEROĞLU<sup>1</sup>, Salih Birkan ARI<sup>1</sup>, Zehra KOÇ<sup>1</sup>, Çetin KAYMAK<sup>1</sup>, Bülent BALTACI<sup>1</sup>, Hülya BAŞAR<sup>1</sup>  
 1Universty of Health Science Ankara Training and Research Hosptial
- O073** **273**  
**THE SIGNIFICANCE OF USING USG FOR CENTRAL VENOUS CATHETERIZATION IN ATRIAL SEPTAL DEFECT SURGERY**  
Hülya YİĞİT ÖZAY  
 Ankara Şehir Hastanesi, Anesteziyoloji ve Reanimasyon Kliniği
- O074** **274**  
**A CASE OF GUILLAIN-BARRÉ SYNDROME ASSOCIATED WITH COVID-19 INFECTION**  
Trajkovska Elena<sup>1</sup>, Angjushev Darko<sup>1</sup>, Kartalov Andrijan<sup>1</sup>, Dimitrova Martina<sup>1</sup>, Trposka-Poposka Angela<sup>1</sup>  
 1. University Clinic of Anesthesiology, Reanimation and Intensive care Medicine ( KARIL ) –  
 Skopje, Republic of North Macedonia
- O075** **275**  
**RETROSPECTIVE EVALUATION OF CYTOKINE STORM PARAMETERS IN SEVERE COVID-19 PNEUMONIA**  
 Ayşe ÖZCAN, Çetin KAYMAK, Hülya BAŞAR, Yusuf Harun İREN, Mustafa HACIÖMEROĞLU, İlayda PEKTAŞ, Merve Tuğçe GÖÇ  
 University of Health Sciences, Ankara Training and Research Hospital Department of Anesthesiology and Reanimation, Intensive Care Unit
- O076** **276**  
**EFFICACY OF PLASMA EXCHANGE IN CRITICALLY ILL COVID-19 PATIENTS**  
 Ayşe ÖZCAN, Çiğdem KIZILAY, Çetin KAYMAK, Birkan ARI, Ayşe EKEN, Meltem BEKTAŞ, Hülya BAŞAR  
 University of Health Sciences, Ankara Training and Research Hospital Department of Anesthesiology and Reanimation, Intensive Care Unit
- O077** **277**  
**A CHALLENGING PREGNANT: ECLAMPSIA OR COVID-19?**  
 Ayşe ÖZCAN, Yusuf Harun İREN, Çiğdem KIZILAY, Yusuf ÜSTÜN, Çetin KAYMAK, Hülya BAŞAR, Mert NAKİP  
 University of Health Sciences, Ankara Training and Research Hospital Department of Anesthesiology and Reanimation, Intensive Care Unit
- O078** **279**  
**CEREBRAL INFARCT: DUE TO MUCORMYCOSIS OR COVID-19?**  
 Çiğdem KIZILAY, Ceren KAÇAN, Ayşe ÖZCAN, Hülya BAŞAR, Çetin KAYMAK  
 University of Health Sciences, Ankara Training and Research Hospital Department of Anesthesiology and Reanimation, Intensive Care Unit
- O079** **280**  
**ANESTHESIA MANAGEMENT OF LIVER TRANSPLANTATION IN A PATIENT WITH RENAL FAILURE**  
Yağmur Sitem AKBULUT<sup>1</sup>, Behiç GİRĞİN<sup>1</sup>, Ayşe Sema TÜRKAY YILMAZ<sup>1</sup>, Sertaç ÇETİNKAYA<sup>1</sup>, Nevriye SALMAN<sup>1</sup>, Ümit KARADENİZ<sup>1</sup>  
 1 Ankara City Hospital Departman Of Anesteziyoloji And Reanimasyon
- O080** **281**  
**SYSTEMIC INFLAMMATORY RESPONSE SYNDROME IN CYANOTIC AND ACYANOTIC CHILDREN UNDERGOING AFTER CONGENITAL HEART SURGERY**  
Feride KARACAER<sup>1</sup>, Ebru BİRİCİK<sup>1</sup>, Murat ILGINEL<sup>1</sup>, Demet TUNAY<sup>1</sup>, Numan BERK<sup>2</sup>, Yasin GÜZEL<sup>3</sup>  
 1Çukurova University Medical Faculty, Anesthesiology and Reanimation Department,  
 2Adıyaman Kahta State Hospital, Anesthesiology and Reanimation Department,  
 3Çukurova University Medical Faculty, Cardiovascular Surgery Department



<b>O081</b>	<b>282</b>
<b>THE IMPORTANCE OF DIFFERENTIAL DIAGNOSIS IN SUSPECTED COVID19 PREGNANTS</b>	
<u>Nihan AYDIN GÜZEY</u>	
Ankara Şehir Hastanesi Anesteziyoloji ve Reanimasyon Kliniği	
<b>O082</b>	<b>283</b>
<b>IS THERE A RESIDUAL NEUROMUSCULAR BLOCKER EFFECT IN THE TRANSITION FROM PRONE TO SUPINE?</b>	
<u>Alparslan KOÇ<sup>1</sup>, Ufuk KUYRUKLUYILDIZ<sup>2</sup>, Didem ONK<sup>2</sup>, Mustafa GAZİ<sup>1</sup>, Hakan Gökalp TAŞ<sup>3</sup></u>	
1. Erzinca Mengucek Gazi Training and Research Hospital	
2. Faculty of Medicine, Erzinca Binali Yildirim University.	
3. Siran Government Hospital, Gumushane	
<b>O083</b>	<b>284</b>
<b>COMPARISON OF HEMODYNAMIC EFFECTS OF ETOMIDATE IN GENERAL ANESTHESIA INDUCTION IN DIABETIC AND NON-DIABETIC PATIENTS</b>	
<u>Alparslan KOÇ<sup>1</sup>, Sinan UZMAN<sup>2</sup>, Didem ONK<sup>3</sup>, Ufuk KUYRUKLUYILDIZ<sup>3</sup>, Hakan Gökalp TAŞ<sup>4</sup></u>	
1 Department of Anesthesiology and Reanimation, Erzinca Mengucek Gazi Training and Research Hospital, Erzinca – Turkey	
2 Department of Anesthesiology and Reanimation, Sultangazi Haseki Training and Research Hospital, University of Health Sciences, Istanbul – Turkey.	
3 Department of Anesthesiology and Reanimation, Faculty of Medicine, Erzinca Binali Yildirim University, Erzinca – Turkey.	
4 Department of Anesthesiology and Reanimation, Siran Government Hospital, Gumushane – Turkey	
<b>O084</b>	<b>285</b>
<b>EXTRACORPOREAL BLOOD PURIFICATION WITH OXIRIS® HEMOFILTER IN SEVERE COVID-19 PATIENTS: A SINGLE CENTER CASE SERIES</b>	
<u>Fatma İrem YEŞİLER<sup>1</sup>, Emre KANDEMİR<sup>1</sup>, Mesher ÇAPRAS<sup>1</sup>, Helin ŞAHİNTÜRK<sup>1</sup>, Pınar ZEYNELOĞLU<sup>1</sup></u>	
1 Department of Anesthesiology and Critical Care, Başkent University Faculty Of Medicine, Ankara, Turkey	
<b>O085</b>	<b>287</b>
<b>THE EFFECTS OF PREOPERATIVE FRAILTY ON POSTOPERATIVE DELIRIUM IN GERIATRIC ONCOLOGIC PATIENTS</b>	
<u>Nursedda EREZ<sup>1</sup>, Gonca OĞUZ<sup>1</sup>, Serpil ŞAVLI METE<sup>1</sup>, Süheyla ÜNVER<sup>1</sup></u>	
University of Health Sciences, Dr AY Ankara Oncology Training and Research Hospital Department of Anesthesiology and Reanimation	
<b>O086</b>	<b>288</b>
<b>TRACHEOSTOMY EXPERIENCE IN PEDIATRIC INTENSIVE CARE UNIT; LAST EIGHT YEARS</b>	
<u>Sinan YAVUZ<sup>1</sup>, Mehmet ÇELEĞEN<sup>2</sup>, Selman KESİCİ<sup>1</sup></u>	
1) Hacettepe University Faculty of Medicine, Division of Pediatric Intensive Care, Ankara	
2) Afyonkarahisar Health Sciences University Faculty of Medicine, Pediatric Intensive Care Unit, Afyonkarahisar	
<b>O087</b>	<b>289</b>
<b>OUR TREATMENT EXPERIENCE IN A PATIENT WITH COEXISTENCE END STAGE RENAL FAILURE AND SEVERE HYPONATREMIA</b>	
<u>Ayşe AYYILDIZ<sup>1</sup>, Meryem ONAY<sup>1</sup>, Birgül YELKEN<sup>1</sup></u>	
1 Eskisehir Osmangazi University, Faculty of Medicine, Department of Anesthesiology and Reanimation	
<b>O088</b>	<b>291</b>
<b>A CESE OF SEVERE REBOUND INTRACRANIAL HYPERTENSION FOLLOWED BY INTRACRANIAL HYPOTENSION SUBSEQUENT TO EPIDURAL PATCH PROCEDURE</b>	
<u>Sehend DEBBAG<sup>1</sup>, Fatma SARICAĞLU<sup>1</sup></u>	
1- Hacettepe Univesity Medical faculty , Anesthesiyoloji and Reanimation Department	

<b>O089</b>	<b>292</b>
<b>ANTIBACTERIAL EFFECT OF TRAMADOL AGAINST PATHOGENS ASSOCIATED WITH NOSOCOMIAL INFECTIONS: AN IN VITRO STUDY</b>	
<u>Ozlem KOCATURK</u> <sup>1</sup> , <u>Esin POYRAZOGLU</u> <sup>2</sup> , <u>Halil BIYIK</u> <sup>3</sup>	
1 Department of Oral and Maxillofacial Surgery, Division of Anaesthesiology, Adnan Menderes University Faculty of Dentistry, Aydın, Turkey	
2 Department of Biology, Adnan Menderes University Faculty of Art and Science, Aydın, Turkey	
<b>O090</b>	<b>294</b>
<b>SPEC.ANESTEZIOLOGY</b>	
<u>Elisaveta Tomova</u> <sup>1</sup> , <u>Milica Zlatkova</u> <sup>2</sup> , <u>Jasmina Krstevska</u> <sup>3</sup> ,	
Gynekology Obstetric Clinic University Mother Teresa Skopje	
<b>O091</b>	<b>295</b>
<b>CASE REPORT: SPINAL ANESTHESIA IN A PATIENT WITH RECEIVING HEPARIN INFUSION</b>	
<u>M. Tuğba ARSLAN</u> <sup>1</sup>	
University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital,	
<b>O092</b>	<b>296</b>
<b>EVALUATION OF BLOOD TRANSFUSION NEED IN HOSPITALIZED COVID-19 PATIENTS</b>	
D.Berrin GÜNAYDIN <sup>1</sup> , <u>Azer İlbengü KAPTAN</u> <sup>1</sup> , Şeniz GÖRAL <sup>1</sup> , Zühre KAYA <sup>1</sup> , Asiye UĞRAŞ DİKMEN <sup>1</sup> , Murat DİZBAY <sup>1</sup> , Özlem GÜZEL TUNÇCAN <sup>1</sup>	
1: Gazi University Medical Faculty Hospital	
<b>O093</b>	<b>298</b>
<b>EVALUATION OF SECONDARY INFECTIONS IN SARS-COV-2 PATIENTS IN HACETTEPE UNIVERSITY ANESTHESIA INTENSIVE CARE UNIT</b>	
<u>Nihal Deniz BULUT YÜKSEL</u> <sup>1</sup> , Adnan Menderes VURAL <sup>1</sup> , Mehmet Yasir PEKTEZEL <sup>2</sup> , Seda Banu AKINCI <sup>1</sup> , Ömrüm UZUN <sup>3</sup>	
1Hacettepe University, Department of Anesthesiology and Reanimation, Intensive Care, Ankara 2Hacettepe University, Department of Neurology, Intensive Care, Ankara	
3Hacettepe University, Department of Clinical Microbiology and Infectious Diseases, Ankara	
<b>O094</b>	<b>300</b>
<b>CLINICAL CHARACTERISTICS AND RISK FACTORS OF COVID-19 PNOMONIA PATIENTS HOSPITALIZED IN ATETRIARIY ICU: A RETSOSPECTIVE STUDY</b>	
Hülya BAŞAR <sup>1</sup> , Çetin KAYMAK <sup>1</sup> , Ayşe ÖZCAN <sup>1</sup> , <u>Mert NAKİP</u> <sup>1</sup> , Ümit Murat PARPUCU <sup>1</sup> , Ceren KAÇAN <sup>1</sup> , Hikmet Furkan YALÇIN <sup>1</sup> , Murat KAYKAÇ <sup>1</sup>	
1: University of Health Sciences Ankara Training And Research Hospital	
<b>O095</b>	<b>302</b>
<b>CEREBRAL NEAR-INFRARED SPECTROSCOPY (NIRS) MONITORING IN CRANIOSYNOSTOSIS SURGERY: SERIES OF 5 CASES</b>	
<u>Mine AKİN</u>	
ANKARA CITY HOSPITAL	
<b>O096</b>	<b>304</b>
<b>THE EFFECT OF PREOPERATIVE ORAL HYDRATION ON HEMODYNAMIA IN CARDIAC SURGERY</b>	
Feride KARAKUŞ <sup>1</sup> , <u>Gamze SARKILAR</u> <sup>2</sup> , Funda GÖK <sup>2</sup> , Yüksel DERELİ <sup>2</sup> , Sema TUNCER UZUN <sup>2</sup>	
1: Başakşehir Çam ve Sakura Şehir Hastanesi, İstanbul,	
2: Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi , Konya	

<b>O097</b>	<b>305</b>
<b>SHOULD PREGNANT WOMAN BE TESTED FOR COVID-19?</b>	
Asude AYHAN <sup>1</sup> , Sertac ESIN <sup>2</sup> , Elvin KESIMCI <sup>1</sup>	
1 Baskent University School of Medicine, Department of Anaesthesiology and Reanimation;	
2 Baskent University School of Medicine, Department of Obstetrics and Gyneacology	
<b>O098</b>	<b>307</b>
<b>MEDIAN NERVE HYDRODISSECTION IN THE TREATMENT OF CARPAL TUNNEL SYNDROME: A CASE SERIES</b>	
Habip Burak ÖZGÖDEK, Muhammed Enes AYDIN	
Ataturk University Faculty of Medicine	
<b>O099</b>	<b>309</b>
<b>LUNG ULTRASOUND IN TOTAL LUNG LAVAGE: A CASE REPORT</b>	
Volkan SIVGIN, Aycan OZDEMIRKAN	
Gazi University	
<b>O100</b>	<b>310</b>
<b>RETROSPECTIVE EVALUATION OF PATIENTS DEVELOPING CHRONIC PAIN FOLLOWING LOWER EXTREMITY AMPUTATION: A THREE YEARS' EXPERIENCE</b>	
Süheyla KARADAG ERKOC, Dostali ALIYEV, Hatice GUNES, Sanem CAKAR TURHAN, Feyhan OKTEN	
Ankara University Medical Faculty Department of Anesthesiology and ICU	
<b>O101</b>	<b>311</b>
<b>UNEXPECTED DIAGNOSIS DURING PERCUTANEOUS ENDOSCOPIC GASTROSTOMY APPLICATION IN THE INTENSIVE CARE UNIT</b>	
Onur OZLU, Merve BAYRAKTAROGLU, Cihan SAHİN	
Department of Anaesthesiology and Reanimation, TOBB University of Economics and Technology, Ankara, Turkey.	
<b>O102</b>	<b>312</b>
<b>RETROSPECTIVE EVALUATION OF EARLY POSTOPERATIVE PAIN AND LATE TERM MORTALITY IN COVID POSITIVE AND NEGATIVE PATIENTS UNDERGOING SURGERY FOR HIP FRACTURE</b>	
Suheyla KARADAG ERKOC <sup>1</sup> , Mehmet Can GEZER <sup>2</sup> , Volkan BAYTAS <sup>1</sup> , Mahmut KALEM <sup>2</sup>	
1 Ankara University Medical School Department of Anesthesiology and ICU	
2Ankara University Medical School Department of Orthopedics and Traumatology	

## POSTER PRESENTATIONS

<b>P01</b>	<b>315</b>
<b>ANESTHESIA MANAGMENT IN A PATIENT WITH AFF UNDERGOING PERTROCHANTERIC FRACTURE REPAIR . A CASE REPORT</b>	
TRPOSKA POPOSKA Angela. <sup>1</sup> , TOLESKA DONESKA Marija. <sup>1</sup> , NAUMOVSKI Filip. <sup>1</sup> , STOJKOVSKA Ana. <sup>1</sup> , KUZMANOVSKA Biljana <sup>1</sup> , KARTALOV Adrijan <sup>1</sup>	
1University Clinic of Anesthesiology, Reanimation and Intensive care Medicine (KARIL) -Skopje - Skopje (Republic of North Macedonia)	

<b>P04</b>	<b>316</b>
<b>DESCENDING NECROTIZING MEDIASTITIS FOLLOWING DENTAL EXTRACTION :</b>	
<b>A CASE REPORT</b>	
<u>Ana STOJKOVSKA<sup>1</sup></u> , Marija TOLESKA <sup>1</sup> , Angela TRPOSKA <sup>1</sup> , Filip NAUMOVSKI <sup>1</sup> , Biljana LOZANOVSKA <sup>2</sup>	
University Clinic of TOARILUC , Skopje - Department of Anesthesia, Reanimation and Intensive care <sup>1</sup> Clinical Hospital Triphun Panovski, Bitola <sup>2</sup>	
<b>P05</b>	<b>318</b>
<b>THE ADDITION OF COLLOIDS TO PARKLAND FORMULA AMELIORATES 'FLUID CREEP' IN ELDERLY BURNED PATIENTS, A CASE REPORT</b>	
<u>Albana ALEKSI</u> , Monika BELBA	
UHC "Mother Teresa", Tirana	
<b>P08</b>	<b>320</b>
<b>A DOUBLE-EDGED SWORD: ANESTHETIC MANAGEMENT OF COCKAYNE'S SYNDROME BOTH IN OUT OF THE OPERATING ROOM AND WITH DIFFICULT AIRWAY</b>	
<u>Berna KAYA UĞUR<sup>1</sup></u> , Ersal BOZGEYİK <sup>1</sup> , Ahmet Şenol UYAR <sup>1</sup> , <u>Süleyman GANİDAĞLI<sup>1</sup></u>	
1Gaziantep University School of Medicine Department of Anesthesiology and Reanimation	
<b>P09</b>	<b>321</b>
<b>ANESTHESIA MANAGEMENT IN A PATIENT WITH DESBUQUOIS SYNDROME: A CASE REPORT</b>	
<u>Murat TÜMER</u> , Hazar KÖKTEN, Aysun Ankay YILBAŞ, Fatma SARICAOĞLU	
Hacettepe University Faculty of Medicine, Department of Anesthesiology and Reanimation	
<b>P13</b>	<b>323</b>
<b>PRIMARY HYPERPARATHYROIDISM AND SEVERE HYPERCALCEMIA</b>	
<u>Aleksandra PANOSKA<sup>1</sup></u> , Marija JOVANOVSKI SRCEVA <sup>2</sup> , Slobodanka SIMEVSKA <sup>1</sup>	
Department of Anaesthesia, University Clinic for Gynecology and Obstetrics, Skopje, North Macedonia <sup>1</sup> , University Clinic for Anesthesiology Reanimation and Intensive Care, Skopje, North Macedonia <sup>2</sup>	
<b>P19</b>	<b>324</b>
<b>WHICH COMORBIDITIES ARE SEEN IN PALLIATIVE CARE PATIENTS WITH MALNUTRITION?</b>	
<u>Özlem DELİGÖZ<sup>1</sup></u> , Osman EKİNCİ <sup>1</sup>	
1- Department of Anesthesiology and Reanimation, University of Health Sciences Turkey, Haydarpaşa Numune Training and Research Hospital, Istanbul, Turkey	
<b>P21</b>	<b>326</b>
<b>ANESTHESIA IN EPIDERMOLYSIS BULLOSA</b>	
<u>Esmâ Meltem Şimşek</u>	
Ankara City Hospital	
<b>P23</b>	<b>328</b>
<b>EVALUATION OF THE EFFECTS OF VENOUS CANNULATION SITES ON POSTOPERATIVE DELIRIUM IN CHILDREN: HAND OR FOOT?</b>	
<u>Ezgi ERKİLİÇ</u> , Tülin GÜMÜŞ, İrem KOCABAŞ, Mecit SANCAK, Orhan KANBAK	
Ankara City Hospital	
<b>P26</b>	<b>329</b>
<b>PNEUMOTORACS RELATED TO SURGICAL TRACHEOSTOMY: RARE COMPLICATION</b>	
<u>Ezgi ERKİLİÇ</u> , Yasemin AKÇAALAN, Fazilet ERBAY, Tülin GÜMÜŞ, Orhan KANBAK	
Ankara Şehir Hastanesi	

<b>P28</b>	<b>330</b>
<b>EVALUATION OF THE EFFECTS OF PANDEMIC PROCESS ON EMERGENCY SURGERY PROFILE; COMPARATIVE STUDY</b>	
Yasemin AKCAALAN <sup>1</sup> , Ezgi ERKILIC <sup>1</sup> , Handan GULEC <sup>2</sup> , Gizem KAYAN <sup>2</sup> , Orhan KANBAK <sup>1</sup> , Tulin GUMUS <sup>1</sup> , Levent OZTURK <sup>2</sup>	
1 Ankara Sehir Hastanesi Anestezi ve Reanimasyon Kliniği, 2 Ankara Yıldırım Beyazıt Tıp Fakültesi Anestezi ve Reanimasyon ABD.	
<b>P29</b>	<b>331</b>
<b>ISOLATED ACUTE CONVULSIVE SEIZURES ASSOCIATED WITH COVID-19: A CASE REPORT</b>	
Çiğdem KIZILAY, Zehra KOÇ, Tuğçe SOLAK, Ayşe ÖZCAN, Çetin KAYMAK, Hülya BAŞAR	
University of Health Sciences, Ankara Training and Research Hospital Department of Anesthesiology and Reanimation, Intensive Care Unit	
<b>P31</b>	<b>332</b>
<b>ANESTHESIA MANAGEMENT IN PATIENT WITH SMA TYPE II</b>	
Yasemin AKCAALAN <sup>1</sup> , Ezgi ERKILIC <sup>1</sup> , Mine AKIN <sup>1</sup>	
1Ankara Sehir Hastanesi Anestezi ve Reanimasyon Kliniği	
<b>P32</b>	<b>333</b>
<b>PERINATAL ASPHYXIA-OUR EXPERIENCE AND TREATMENT AT NEONATAL INTENSIVE CARE UNIT</b>	
Hristina MANDZUKOVSKA, Aspazija SOFIJANOVA, Silvana NAUNOVA, Tamara VOINOVSKA, Spasija NESHKOVA, Mica KIMOVSKA	
University Children's Hospital – Skopje, N.Macedonia	
<b>P33</b>	<b>334</b>
<b>COVID-19 INDUCED CEREBRAL ISCHEMIA: A CASE REPORT</b>	
Ceren KAÇAN <sup>1</sup> , Kardelen TÜRK <sup>1</sup> , Filiz BIÇER <sup>1</sup> , Ayşe ÖZCAN <sup>1</sup> , Çetin KAYMAK <sup>1</sup> , Hülya BAŞAR <sup>1</sup>	
1 University Of Health Sciences Ankara Education And Research Hospital Department Of Anesthesiology And Reanimation	
<b>P35</b>	<b>336</b>
<b>CASE PRESENTATION: THE NON-ST MYOCARDIAL INFARCTION DURING COVID-19</b>	
Meryem GUREL, Ahmet Furkan GUREL, Ceren KACAN, Murat KAYKAC, Ayşe OZCAN, Hülya BASAR	
1-University of Health Sciences, Ankara Training and Research Hospital, Department of Anesthesiology and Reanimation	
<b>P36</b>	<b>337</b>
<b>INTUBATION EXPERIENCE IN A CONGENITAL ERYTHROPOIETIC PORPHYRIA CASE</b>	
Mehmet ÇAKIRCA <sup>1</sup> , Meltem BEKTAS <sup>1</sup>	
1:University of Health Sciences, Ankara Training and Research Hospital, Department of Anesthesiology and Reanimation, Ankara, Turkey	
<b>P37</b>	<b>339</b>
<b>PREVALENCE OF SPINAL ANESTHESIA IN COMPARISON WITH GENERAL ANESTHESIA FOR CESAREAN SECTION IN COVID-19 POSITIVE PATIENTS OF THE UNIVERSITY CLINIC OF GYNECOLOGY AND OBSTETRICS, SKOPJE</b>	
Slobodanka SIMEVSKA <sup>1</sup> , Aleksandra PANOSKA <sup>1</sup> , Dafina KARADZOVA <sup>1</sup> , Frosina NIKOLIKJ <sup>1</sup>	
1 University Clinic for Gynecology and Obstetrics, Skopje, Republic of North Macedonia	
<b>P39</b>	<b>340</b>
<b>DETERMINATION OF THE ANXIETY LEVEL IN THE CASES TO BE COLONOSCOPY UNDER ANESTHESIA</b>	
Dilruba GÜNGÖR <sup>1</sup> , Gamze SARKILAR <sup>2</sup> , Tuba Berra SARITAŞ <sup>3</sup> , Funda GÖK <sup>2</sup> , Sema TUNCER UZUN <sup>2</sup>	
1: Erzurum Bölge Eğitim ve Araştırma Hastanesi 2: Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi 3: Afyonkarahisar Sağlık Bilimleri Üniversitesi	

**P40**

**341**

---

**TRETEMENT OF COVID-19 COMPLICATIONS AT HOME CONDITIONS: A CASE REPORT**

Saimir Kuci<sup>1</sup>, Alfred Ibrahim<sup>1</sup>, Ervin Bejko<sup>1</sup>, Stavri Llazo<sup>1</sup>, Marsela Goga<sup>1</sup>, Ermal Likaj<sup>2</sup>, Andi Kacani<sup>2</sup>, Alket Collaku<sup>3</sup>, Diana Dhimitri<sup>3</sup>

1.Cardiac Anesthesia Department “Mother Teresa” University Hospital Center Tirana

2.Cardiac Surgery Department “Mother Teresa” University Hospital Center Tirana

3.Radiology Department German Hospital International Tirana

**P41**

**342**

---

**ARTERIAL THROMBOSIS IN COVID 19 PATIENT**

Dr.ErvinBejko, Dr.EsmerildaBulku, DrStavriLlazo, Dr.JonelaBurimi,Dr. AlfredIbrahimi, Dr.SaimirKuci  
Mother Teresa” University Hospital Center Tirana

## **SUMMARIES**

**30 April 2021, Friday**

**15:15-15:40 | Conference I**

Acceleration of Digitalization, and Changing of Social Life and Business Style Due to The Pandemic  
Nilüfer Narlı

---

## **THE IMPACT OF THE ACCELERATED DIGITALIZATION AND THE TRANSFORMATION OF SOCIAL DYNAMICS AND FORMS OF WORK AND BUSINESS WITH THE COVID-19 PANDEMIC**

***Prof Dr Nilüfer Narlı***  
*Bahcesehir University*

The aim of the paper is to explore the major drivers shaping the future world's social dynamics, work and education patterns in order to understand how a new world in the post pandemic era, and next normal would look like. In order to do this task, the first question to be answered is: what the COVID-19 pandemic is doing globally and locally? The COVID-19 has accelerating digitalization which is the major force that is transforming the way we live and work as well as altering our mind and brain, creating a change inside us, and perhaps shaping a new humankind. To explain what is happening to us can be described by employing Pasolini's conception of "anthropological mutation". The humanity went throughout anthropological mutation when it moved from the agrarian society to an industrial society. Now with accelerated digitalization we are moving from third, the digital revolution to Fourth Industrial Revolution. The third one has been occurring since the middle of the 20th century. A fusion of technologies that is blurring the lines between the physical, digital, and biological spheres best characterize the third revolution. The arrival of a Fourth is different from the former revolutions. Rather than evolving at a linear speed, the Fourth is evolving at an exponential pace. Moreover, it is disrupting almost every industry in every country. Soon human kind would face the transfer of power from humans to technology and control of the decision making by algorithms and Big Data, as Harari underlines. The COVID-19 pandemic has led to a paradigm shift and it is creating transformation in the followings: education, work environment and forms of work, social dynamics, life styles, more importantly, decision-making in business and politics. In some of the sectors, the change is more predominant such as education, while its impact is minor and slow in others. The pace of this acceleration and system impacts can be different from country to country depending on its digital infrastructure, economic dynamics and human development factors.

The COVID-19 does not only transform life, work and education with accelerated digitalization. It has exposing fault lines and inequalities as well as sharpening inequalities globally. It is reversing the positive impact of the UN led achievements in decreasing poverty, engulfing the digital and gender gaps and in improving access to formal education. Added to the already increased uncertainties of the 21st century in the pre-COVID-19 world, this pandemic has been expanding the exiting risks and cascading risks. It has also created new uncertainties about the economy, work environment, education, governance, geopolitics, and technology. The impact of all these challenges and disruptions depends on our response to them.



## 30 April 2021, Friday

19:10-20:40 | Panel 3: ANESTHESIA II

Chairs: Elif Akpek, Ülkü Aypar

**Inovations in Anesthesia, Past, Present and Future;** Biljana Shirgoska

**Monitoring in Patients Undergoing Liver Transplantation;** Ümit Karadeniz

**Monitoring of Brain Perfusion;** Beliz Bilgili

**Effects of Polypharmacy in Clinical Outcome;** Hektor Sula

**Anesthetic Challenges for Robot Assisted Surgery;** Çiğdem Yıldırım Güçlü

## INNOVATIONS IN ANESTHESIOLOGY: PAST, PRESENT, AND FUTURE

***Biljana Shirgoska***

*ENT University clinic, Medical faculty, University,  
St. Cyril and Methodius, Skopje, Republic of North Macedonia*

Modern medicine and modern anesthesia has its history, present and the future. The early form of anesthesia (ether) was first used in Boston by the dentist and the surgeon in 1846. They removed vascular neck tumor painless.

Innovations of new volatile agents, intravenous, local anesthetics, analgesics and muscle relaxants improved patient's safety. New techniques, used for general, regional or local anesthesia, continuous nowadays.

Monitoring during anesthesia become more available and more sophisticated. We can measure the depth of anesthesia, implicit and explicit memories, we can predict cognitive impairments of the patients.

Innovation continues with new devices for difficult airway management, that we can use for difficult airway prediction, for establishing the airway and for its treatment.

New ultrasound machines allowed to perform ultrasound of the whole body for diagnostic and therapeutically purposes. We use them in every day clinical practice in regional and local anesthesia, for better outcome of neuroaxial and regional blocks. We can diminish the complications of the procedure and we can make the hospitality days shorter.

Current clinical trends could be based on the new innovation tools. The education in anesthesia has to be based on new techniques and new anesthesiology machines. They provide patients safety during general anesthesia and mechanical ventilation in intensive care unit. Electronic medical records can be used for scientific purposes.

Simulation as an educational tool is another benefit of innovations. We can use them for online education and residents training.

Conclusion: Innovation in anesthesiology continues to be driven. The health care system, the patients' health and the society have a great benefit of the new technology innovations.

Key words: innovation, anesthesiology, past, present, future.

### References

1. Howard Markel. The painful story regard modern anesthesia. Health Oct 16, 2013 2:49 PM EST

2. Jense RJ. Innovations in Anesthesia: Past, Present and Future, April 2017, DOI: 10.19070/2332-2780-170003e
3. Seger C. Recent advances in technology of anesthesia. Journal List F1000Res v.9; 2020 PMC7236591 DOI: 10.12688/f1000research.24059.1

---

## 30 April 2021, Friday

---

19:10-20:40 | Panel 3: ANESTHESIA II

Chairs: Elif Akpek, Ülkü Aypar

Inovations in Anesthesia, Past, Present and Future; Biljana Shirgoska

Monitoring in Patients Undergoing Liver Transplantation; Ümit Karadeniz

Monitoring of Brain Perfusion; Beliz Bilgili

Effects of Polypharmacy in Clinical Outcome; Hektor Sula

Anesthetic Challenges for Robot Assisted Surgery; Çiğdem Yıldırım Güçlü

---

### MONITORING OF BRAIN PERFUSION

**Assoc. Prof Beliz Bilgili**

*Marmara University, School of Medicine*

*Department of Anesthesiology and Intensive Care*

Maintenance of cerebral oxygen supply to meet the metabolic demand is the main goal in perioperative settings to prevent or minimize ischemic neurologic injury. When the reduced oxygen supply is insufficient to meet metabolic demand, the result is cerebral hypoxia that leads to undesirable patient outcomes. The brain takes up 15–20% of cardiac output and consumes 20% of total body oxygen. Intraoperative brain perfusion monitoring provides early warning of cerebral ischemia and is of service to optimize brain perfusion and oxygenation. The predominant monitoring strategy focuses on obtaining measurements of cerebral blood flow or its surrogates. Adequacy of cerebral blood flow (CBF) can be monitored by assessing oxygen delivery either locally or globally. Intracranial pressure or brain tissue oxygenation (PbtO<sub>2</sub>) monitoring methods require insertion of a probe in the brain which can't be applied to a non-traumatic brain or during anesthesia. The jugular venous oxygen saturation (SvjO<sub>2</sub>) monitoring was the first bed side monitor of cerebral oxygenation. SvjO<sub>2</sub> represents a global measure of cerebral oxygenation and provides a non-quantitative estimate of the adequacy of cerebral perfusion. The disadvantages such as being insensitive to regional ischemia and requiring invasive insertion procedure with the risk of carotid puncture, vein thrombosis and hematoma replaced the method with other non-invasive monitoring tools.

Non-invasive techniques for monitoring brain perfusion are promising. Transcranial doppler ultrasonography (TCD) for cerebral blood flow and near-infrared spectroscopy (NIRS) derived cerebral oximetry for regional cerebral oxygenation are mostly used non-invasive methods.

#### **Transcranial Doppler Ultrasonography**

TCD is a real time technique for the examination of cerebral hemodynamics and uses ultrasound waves to measure the velocity of blood flow through large cerebral vessels from the doppler shift caused by red blood cells moving through the field view. One should remember that TCD measures only the flow velocity, not the absolute blood flow. Cardiopulmonary bypass, carotid endarterectomy, brain injury, vasospasm, and brain death are clinical conditions where TCD can be applied. TCD indices and EEG changes of ischemia has a good correlation during carotid endarterectomy which is used to guide the need for shunt placement. Due to other modalities such as EEG, carotid stump pressure, and real-time cerebral oximetry, TCD is only selectively used in this setting, generally dependent upon personal preference and familiarity.

**Near-infrared spectroscopy derived cerebral oximetry**

Near-infrared spectroscopy derived cerebral oximetry measures regional cerebral oxygen saturation (rSo<sub>2</sub>). NIRS measures the concentration of oxyhemoglobin and deoxyhemoglobin in arterial, venous and capillary blood flow within the field of view, rSo<sub>2</sub> values represent a weighted tissue oxygen saturation measured from these three compartments. The balance between the degree of oxygen supply and demand can be determined and used as a surrogate for CBF. Even though the normal range of rSo<sub>2</sub> is reported between 60% and 75% in studies, interindividual and intraindividual variability is high, therefore, cerebral oximetry is best considered as a trend monitor. There is no ischemic threshold validated for regional cerebral oxygen saturation. Adult clinical data have shown that absolute value of rSo<sub>2</sub> of 50% or a 20% decline from baseline is associated with adverse neurologic outcome, these values are used in clinical management protocols as a trigger for initiating measures to improve cerebral oxygenation.

Clinical application of cerebral oximetry in cardiac and non-cardiac surgery has been interpreted in several studies. In cardiac surgeries, intraoperative cerebral desaturation found to associated with postoperative cognitive dysfunction and prolonged hospital stay in elderly patients. Patients suffering a decrease more than 30% from the baseline rSo<sub>2</sub> experienced prolonged postoperative cognitive dysfunction. Although early and late postoperative cognitive dysfunction shown to be associated with intraoperative cerebral desaturation, there is insufficient data to conclude that interventions to prevent or treat a decrease in rSo<sub>2</sub> are effective in preventing postoperative cognitive dysfunction or adverse neurologic outcome.

In non-cardiac surgeries several patient positions have an impact on cerebral blood flow. Beach chair position (BCP) is often used for shoulder arthroscopy, 28.8% incidence of cerebral desaturation was reported in this position. A strong correlation was found between the degree of BCP and the magnitude of cerebral desaturation. However, the occurrence of cerebral desaturation in BCP did not result a postoperative cognitive dysfunction. Steep Trendelenburg position can lead to an increase in intracranial pressure and affect cerebral perfusion pressure. Cerebral oxygenation was well preserved in Steep Trendelenburg and pneumoperitoneum during laparoscopic radical prostatectomy, on the contrary more than 4 hours in this position resulted a clinically irrelevant decrease in rSo<sub>2</sub>. Prolonged duration in Steep Trendelenburg position can impair cerebral autoregulation. Detection of cerebral autoregulation using NIRS-based monitors in cardiac surgery established that cerebral oximetry index was a strong indicator of the presence or absence of cerebral autoregulation. Cerebral oximetry index was also shown to be an early and accurate indicator of insufficient organ perfusion than rSo<sub>2</sub>.

Cerebral oximetry provides a non-invasive measure of cerebral oxygenation that is a surrogate of cerebral perfusion. Even though detection of cerebral desaturation in some clinical circumstances linked to postoperative unfavorable neurologic events, the readings should be interpreted in the context of clinical situations under the knowledge of a variety of factors that have an impact on cerebral perfusion such as blood pressure, hemoglobin concentration, use of vasopressors and inspired fraction of oxygen.

The aim in monitoring brain perfusion is to prevent unfavorable neurologic events. Indeed, there is accumulating data supporting an association between low rSo<sub>2</sub> and poor outcomes but will reestablishing cerebral oxygenation improves outcome is still to be determined. Due to the complex mechanism of cerebral autoregulation, multimodal monitoring approach that incorporates cerebral oxygenation monitoring and cerebral blood flow is required.

---

## 30 April 2021, Friday

19:10-20:40 | Panel 3: ANESTHESIA II

Chairs: Elif Akpek, Ülkü Aypar

Inovations in Anesthesia, Past, Present and Future; Biljana Shirgoska

Monitoring in Patients Undergoing Liver Transplantation; Ümit Karadeniz

Monitoring of Brain Perfusion; Beliz Bilgili

Effects of Polypharmacy in Clinical Outcome; Hektor Sula

Anesthetic Challenges for Robot Assisted Surgery; Çiğdem Yıldırım Güçlü

---

### EFFECTS OF POLYPHARMACY IN CLINICAL OUTCOMES

**Hektor Sula**

*Medical University of Tirana*

The likelihoods of a complication or adverse outcome in a patient rise with the drugs intake increase. The prevalence of polypharmacy is multifactorial, with factors spanning from the individual/patient level (increased longevity, coexistence of chronic medical conditions, availability of over-the-counter drugs, use of more than one pharmacy, etc.), to the physician level (medical guidelines, prescribing practices), to systems-level issues (multiple prescribing providers, electronic medical records, transitions of care). Lack of communication between treatment teams and disruption in communication during transitions of care from the outpatient setting to the inpatient setting and vice-versa can precipitate polypharmacy, which is associated with increased adverse outcomes, including different drug reactions, drug to drug interactions, drug to disease interactions, non-adherence, falls, cognitive impairment, hospital admission, length of stay, increased costs, and mortality.

Age related chronic diseases (or comorbidity) such as dyslipidemia, hypertension, diabetes, depression, etc. usually require the use of multiple drugs, a state known as polypharmacy. This refers to the use of multiple medications and/or more medications than clinically indicated. It is estimated that more than 40% of adults aged 65 or older use 5 or more medications, and 12% of them use 10 or more different medications. Being sometimes inevitable, polypharmacy is not always efficient, nor safe.

#### **The specificities of polypharmacy in different patient groups are:**

**Elderly:** As the elderly age, which is the majority group of polypharmacy users, they are at increased risk of complications from polypharmacy, including the inability to effectively metabolize and excrete multiple medications, due to changes in liver and kidney function. Polypharmacy in elderly patients has been shown to be a predictor of frequent hospitalizations, nursing home placement, hypoglycemia, fracture, impaired mobility, pneumonia, malnutrition, and death.

**Kidney disease:** There is a high incidence of polypharmacy in patients with chronic kidney disease (CKD). Complex medication regimens may be necessary in CKD, in order to treat related comorbid conditions; however, patients are at high risk of drug-drug interactions (DDIs), especially due to changes in pharmacokinetic and pharmacodynamic parameters associated with decreased kidney function, and therefore require constant adjustment of medication doses accordingly.

Liver disease: Multiple drug regimens have shown to cause development of various forms of hepatotoxic reactions, and many patients with cirrhosis often have complicated medication regimens and are at higher risk for complications from polypharmacy.

Mental illness: In this population of patients, both psychotropic and non-psychotropic drugs contribute to polypharmacy and bring with it associated complications. Low adherence, noncompliance, adverse drug reactions (ADRs), and DDIs contribute to the detrimental effects of multiple drug therapy.

In the hospital settings, polypharmacy is a strong predictor of adverse drug reactions. Not only are hospitalized adults at risk of adverse events from potentially inappropriate medications or DDIs, patients with polypharmacy are at higher risk due to medication discrepancies that may result from unintended discrepancies in actual regimen versus recorded regimen during transitions from outpatient to inpatient and vice-versa, changes to medication regimens while in the hospital, and poor communication of medication changes to both patient and next provider of care.

Adverse effects management may require a hospital stay and, moreover, has a negative economic impact. Three factors have been indicated as key for increased costs with medications in the elderly: (a) increased use of prescribed medications, (b) increased costs of prescription drugs and (c) the advent of new drugs.

Advances in both surgical and anaesthetic techniques have resulted in more elderly patients undergoing operative procedures and it is projected that in the next 30 years the number of noncardiac surgery operations will increase by 50% as the population over 65 years increases. Clearly it is not necessarily the drug per se that increases the risk of postoperative complications but being on a drug unrelated to the surgery highlights a risk.

- ASA (American Society of Anaesthesiologists) groupings have been shown to correlate reasonably well with postoperative complications. Patients in a higher ASA category might not be considered for some surgical procedures except when their drug therapy for underlying conditions lowers their ASA category. This artificially lowers risk and permits the patient to be considered for surgery. Discontinuing these drugs at the time of surgery may unmask their true ASA category and their greater operative risk.
- The acute withdrawal of a patient's regular drug therapy contributes to their postoperative complications. It is observed that once the predisposing frailty of the patients is unmasked due to drug withdrawal, there is an increase in nonsurgical postoperative complications. The stress of the operation superimposes on the underlying pathology, which is now without its normal pharmacological support, thus leading to more complications.
- On the other side, drug withdrawal in surgical patients has significant implications. Prolonged drug withdrawal may be associated with more severe procedures in sicker patients, showing that being on a drug unrelated to surgery affects outcomes.

Polypharmacy could contribute to adverse drug–drug interactions, especially in the perioperative settings where new anesthetic and analgesic medication exposures are present for all patients and where pharmacokinetics can be altered by acute changes in end organ functions. Furthermore, acute hospitalization is also associated with increased risk of post-discharge medication-related adverse events, which could contribute to poor postoperative outcomes. Based on the proposed mechanisms underlying the polypharmacy–outcome association, it is expected that the risk of polypharmacy would be greater in people with worse baseline health status. If a causal relationship does exist, baseline illness would need to be a true effect modifier. In other words, older surgical patients with frailty or multimorbidity would benefit from exposure to multiple drugs. Perhaps medically complex patients

are preferentially selected as appropriate candidates for elective surgery when their medical conditions are well managed using multiple appropriate agents. For patients with polypharmacy who are not frail or multimorbid, perhaps the impact of multiple or inappropriate agents, for which harm outweighs benefit, are amplified by the stress of the perioperative period. However, low risk of bias prospective study with highly accurate adjustment for comorbidity, frailty, function, cognition, and exposure status based on medication appropriateness will be required to definitively answer this important question of causality in older surgical patients.

The methods employed to control and reduce polypharmacy in the elderly are complex and pose a great challenge. Randomized clinical studies have shown that programmed interventions reduce polypharmacy for a short period only. It seems that the decision of using or not prescribed medications in most cases depends on the preference of physicians and patients. Another factor that could contribute to reduced polypharmacy complications is the reduction of conflicting information given by many different health professionals.

There is a growing body of research regarding the development of evidence-based interventions to reduce polypharmacy, inappropriate prescribing, and patient nonadherence. While many of the published tools and interventions have focused on the elderly population, the evidence-based studies encompass numerous themes involving various strategies. The themes include interventions to:

- Address appropriate versus inappropriate prescribing
- Strengthen patient education and patient-physician communication
- Promote better medication reconciliation
- Ameliorate high-risk error areas such as transitions of care
- Enhance physician to physician communication and interprofessional collaboration
- Reduce nonintentional nonadherence by patients.

Balancing the risks and benefits of multiple drug therapies may be useful in the establishment of rational interventions for the safe use of drugs. Accordingly, the use of technologies in the monitoring of DDIs and recognition of ADRs, such as computer-based screening, could help practitioners to recognize potential and clinically significant interactions and adverse events.

Thus, patient's regular drug therapy as part of preoperative assessment and postoperative care in a surgical unit needs to be considered carefully. It would be helpful for the surgical team to be more aware of the impact of their patients' drug therapy unrelated to their surgery. There may be a special role for the clinical pharmacists to monitor drug withdrawal and alert the surgical team to therapeutic options. Steps to reinstitute early therapy should be considered.

Paying attention to the patient's usual drug therapy may minimize postoperative aggravation of these coexisting conditions, hospital stays may well be shortened, and the overall postoperative course may be less hazardous.

#### **References:**

1. Volpe, M.; Chin, D.; Paneni, F. The challenge of polypharmacy in cardiovascular medicine. *Fundam Clin Pharmacol.* 2010 Feb;24(1):9-17
2. Queneau, P. [Pitfalls of polypharmacy, particularly in the elderly]. *Bull Mem Acad R Med Belg.* 2006;161(6):408-421; discussion 422-404.
3. Gurwitz JH, Field TS, Harrold LR, Rothschild J, Debellis K, Seger AC, et al. Incidence and preventability of adverse drug events among older persons in the ambulatory setting. *JAMA.* [Internet]. 2003 [accessed 28 Jul 2015]; 289(9):1107-16. Available at: <http://jama.jamanetwork.com/article.aspx?articleid=19609>
4. Safran DG, Neuman P, Schoen C, et al. Prescription drug coverage and seniors: Findings From A 2003 national survey. *Health Aff (Millwood).* 2005

5. Vonbach P, Dubied A, Krähenbühl S, Beer JH. Prevalence of drug-drug interactions at hospital entry and during stay of patients in internal medicine. *Eur J Intern Med*. [Internet]. 2008 [Acesso 13 mar 2016];19(6):413-20. doi: 10.1016/j.ejim.2007.12.002
6. Karci. A Polypharmacy in the elderly. *Balkan States of Anesthesia days, ARUD 2018*, 39-40
7. Aminzadeh F, Dalziel WB. Older adults in the emergency department: a systematic review of patterns of use, adverse outcomes, and effectiveness of interventions. *Ann Emerg Med*. 2002;39(3):238-47.
8. Moore C, Wisnivesky J, Williams S, McGinn T: Medical errors related to discontinuity of care from an inpatient to an outpatient setting. *J Gen Intern Med* 2003; 18:646–51
9. Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW: The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med* 2003; 138:161–7
10. Kennedy JM, van Rij AM, Spears GF, Pettigrew RA, Tucker IG: Polypharmacy in a general surgical unit and consequences of drug withdrawal. *Br J Clin Pharmacol* 2000; 49:353–62.
11. Jeong YM, Lee E, Kim KI, Chung JE, In Park H, Lee BK, Gwak HS: Association of pre-operative medication use with post-operative delirium in surgical oncology patients receiving comprehensive geriatric assessment. *BMC Geriatr* 2016; 16:134
12. Daniel I. Mclsaac et al, Association of Polypharmacy with Survival, Complications, and Healthcare Resource Use after Elective Noncardiac Surgery *Anesthesiology* 2018; 128:1140-50



---

**30 April 2021, Friday****19:10-20:40 | Panel 3: ANESTHESIA II****Chairs: Elif Akpek, Ülkü Aypar****Inovations in Anesthesia, Past, Present and Future; Biljana Shirgoska****Monitoring in Patients Undergoing Liver Transplantation; Ümit Karadeniz****Monitoring of Brain Perfusion; Beliz Bilgili****Effects of Polypharmacy in Clinical Outcome; Hektor Sula****Anesthetic Challenges for Robot Assisted Surgery; Çiğdem Yıldırım Güçlü**

---

## ANESTHETIC CHALLENGES FOR ROBOT ASSISTED SURGERY

**Assoc Prof. Çiğdem Yıldırım Güçlü**

*Ankara University School of Medicine,  
Department of Anesthesiology and Reanimation*

Advances in technology undoubtedly cause changes in our practice in medicine and surgery. One of the most important of these developments is the integration of robot technology in surgery. This development affects not only our surgical practice but also our anesthesia practice.

It is claimed that the advantages of robot-assisted laparoscopic surgeries include reduction of postoperative pain, improved cosmetics (smaller incisions), shorter hospital stay, faster postoperative recovery, potentially lower costs and improved patient satisfaction.

Despite the various advantages of robotic surgery, there are some limitations to consider. Issues such as the robot's need for a large room, the necessity of being accompanied by trained personnel, the necessity of not moving the patient in any way after positioning, the limitation of the working area of anesthesia and perhaps the price can be considered as disadvantages.

The final position and locking of the robot should only be performed after the patient has been positioned in the most appropriate way for surgery. Since the position will be different according to the surgery, the anesthesiologist should have a good command of this issue. It will be appropriate to fix the patient on the table after the patient is given the appropriate position.

For some procedures, the anesthesiologist may stay away from the patient's airway. This situation becomes even more challenging if there are airway interventions that require manipulations such as bronchoscopy. It can be difficult to reach the patient's intravenous ways, not just the airway. In other words, intravenous access should be checked and secured before position. During positioning, the robot should be positioned in such a way that it does not harm the patient during its movement. Especially in the early stages, it is anticipated that the case will take longer in relation to the experience and management should be planned accordingly.

Once the proper patient position has been established, intraoperative considerations should be addressed. Physiological changes during robotic surgery are the same as in laparoscopic procedures. Hemodynamic changes are associated with increases in intra-abdominal pressure and its effect on the diaphragm, and the position of the patient also contributes to hemodynamic changes.

Increases in systemic vascular resistance, mean arterial pressure, filling pressures and 50% reduction in cardiac index may occur first after CO<sub>2</sub> insufflation. Approximately 10 minutes after CO<sub>2</sub> insufflation, the cardiac index gradually increases, systemic vascular resistance decreases.

CO<sub>2</sub> insufflation also has effects on the respiratory system. Pneumoperitoneum reduces pulmonary compliance by 30-50% in healthy and obese patients. Functional residual capacity decreases due to diaphragm elevation. Airway pressures, intrathoracic pressures and plateau pressure increase. Even more careful anesthetic management is required for those with underlying respiratory disease and those who are obese.

Another challenge associated with robotic surgery is cases in the long trendelenburg position and their fluid management. With the effect of gravity, the issue of edema that may occur in the face, eyes and upper airway should be considered.

With the reality that robot-assisted surgery will increasingly take place in our lives, it is necessary to know the features and differences of these surgeries.

**30 April 2021, Friday**

**20:50-22:05 | Panel 4: PALLIATIVE CARE**

**Chairs:** Süheyla Ünver, Orhan Kanbak

**Philosophy of Palliative Care;** Meltem Uyar

**Influence of Covid-19 Pandemic on The Timely Provision of Urgent Medical Care;** Natasa Kovac

**Postoperative Neurocognitive Dysfunction in Elder Patients;** Sumru Şekerci

**The Palliative Care Clinic: Patient Characteristics, Personnel Equipment;** Züleyha Kazak Bengisun

## POSTOPERATIVE NEUROCOGNITIVE DISORDERS

**Prof. Dr. Sumru Şekerci**

*T.C Ministry of Health, Ankara City Hospital*

### POSTOPERATIVE COGNITIVE DYSFUNCTION (POCD)

POCD is a research term used historically to describe postoperative decline in cognition compared with an individual's preoperative measurements on various neuropsychological tests. The newer nomenclature based on DSM-V criteria have been proposed to improve communication across specialties, ability to conduct reviews and meta-analyses, and development of consistent patient and provider educational materials.

### NEUROCOGNITIVE DISORDER (NCD)

The diagnostic and statistical manual 5th edition (DSM-V) suggest the terminology for neurocognitive disorder (NCD) to use for an international, multidisciplinary group to describe alterations in behavior, affect or cognition that occasionally occur after anesthesia and surgery (1).

### PERIOPERATIVE NEUROCOGNITIVE DISORDERS (PND)

Perioperative neurocognitive disorder (PND) is used as a term for cognitive impairment identified in the perioperative period.

There are existing 4 cognitive impairment:

1. Preexisting Cognitive Impairment: Diagnosed in the preoperative period.
2. Postoperative Delirium (POD): A specific form of acute cognitive event.
3. Delayed Neurocognitive Recovery: It is occurring up to 30 days post-surgery. Such delayed recovery occurs in 17 to 43 percent of postoperative patients. It is often associated with major surgical procedures (2) and/or complicated postoperative recovery period.
4. Postoperative Neurocognitive Disorder: If cognitive decline persists for more than 30 days but less than 12 months following surgery, it is termed POCD or postoperative neurocognitive disorder. Any cognitive impairment still present after one year is termed merely NCD and comprises dementia (major NCD) as well mild cognitive impairment (mild NCD).

### SEVERITY OF SYMPTOMS IN PND

PND is further qualified as being mild or major according to the severity of documented symptoms.

Mild NCD is roughly equivalent to the National Institute on Aging/Alzheimer's Association (NIA/AA) (3) term Mild Cognitive Impairment (MCI). Major NCD is roughly equivalent to the NIA/AA definition for Dementia .

### **POSTOPERATIVE DELIRIUM (POD)**

Older adults are particularly susceptible to development of persistent POD, with an incidence of up to 62 percent after major surgery(4). A brief period of delirium is a common phase of emergence from general anesthesia. Patient may exhibit agitation, hyperexcitability, disinhibition, crying, restlessness and mental confusion(5,6) . But it is very brief (a few minutes), and often resolves quickly following removal of a noxious stimulus such as the endotracheal tube.

The DSM-V criteria for the diagnosis of delirium include; an acute and fluctuating disturbance in attention and/or awareness with additional disturbances in cognition, representing a change from baseline.

Agitation during emergence in the operating room occurred in 19 percent of 400 adult patients(5).

In some patients postoperative delirium persists or reoccurs after initial emergence from anesthesia or only becomes evident in the post-anesthesia care unit (PACU) or later in the postoperative course.

In the PACU, delirium may manifest as agitation (hyperactive subtype) or as excessive somnolence with altered mental status (hypoactive subtype). The incidence of delirium decreased to 15 percent after 30 minutes, 8 percent after 60 minutes, and only 4 percent at the time of PACU discharge (5).

Known causes of delirium should be investigated in the postoperative period. These include preexisting dementia, medication-induced delirium, substance intoxication or withdrawal, or delirium caused by other medical conditions.

### **PATHOPHYSIOLOGIC MECHANISMS**

The systemic inflammatory response to the surgical procedure itself is thought to be an important cause of PND.

Proposed mechanisms include a preexisting neuroinflammation or neurodegeneration, which primes the brain to react more strongly to this inflammatory response, resulting in accelerated progression of neuroinflammation and neurodegeneration with delay in neurocognitive recovery (7-9).

Distruption of Blood-Brain-Barrier (BBB) and microglial activation: Peripheral pro-inflammatory cytokines disrupt the BBB via COX-2 upregulation. This allows entry of inflammatory cytokines into the CNS. This setting activates microglial cells, which have proinflammatory and phagocytic property.

Progression or eventual resolution of PND is caused by these initial inflammatory responses to surgery and is likely impacted by various intraoperative and postoperative factors.

### **INCIDENCE**

The incidence of POCD varies depending on the cognitive performance tests, time of postoperative assessment, and the limitations of specificity and sensitivity of the current cognitive tests and the statistical methodology used.

The incidence after cardiac surgery is reported to be 30%–80% few weeks after surgery and 10%–60% after 3–6 months (10,11).

Patients over the age of 65 years who underwent non-cardiac surgery had a 40% prevalence of POCD at discharge, 26% within few weeks which decreased to 10% 3 months postoperatively (12). 11.7% amongst the 6477 identified patients at three months of follow-up (13), in high risk surgery for example hip surgery it's reach 22% (14).

---

**POSTOPERATIVE NEUROCOGNITIVE DISORDERS SYMPTOMS**

- Problems with thinking and perception
- Problems with memory and learning
- Problems with planning and organisation
- Feeling “fuzzy”
- Memory impairments
- Impaired performance on intellectual tasks
- Loss of concentration short attention span
- Personality changes
- Social interaction changes
- Disorientation
- Loss of perception, attention
- Depression
- Problems concerning speed of information processing and speech
- Psychomotor dexterity

**DIAGNOSIS AND NEUROPSYCHOLOGICAL TESTS**

Diagnosis is reached by comparing preoperative neuropsychological tests with postoperative decline in cognition.

Testing for POCD is complex. There is no gold standard for the diagnosis of POCD. Use of combination of neurocognitive tests.

A decline in z-scores on the tests should prompt consideration for referral to an appropriate specialist for further assessment (consultation with geriatrists or psychiatrists).

Avoid testing on the day of surgery, the ideal time after surgery is the first week and three months later.

There are various tests for diagnosis (Table 1). The test used most frequently is Minimental State Examination (MMSE). But MMSE is sensitive for dementia. For mild and medium cognitive dysfunction it's sensitivity is low. MoCA, ACE-III and QuickMCI Screen are becoming more important for diagnosis. Especially Mo CA has become the most important test.

Montreal Cognitive Assessment: Detailed cognition test, sensitive to detect even mild cognitive impairments, takes 10–15 min to administer.

Advantages: Covers many cognitive domains, sensitive for mild cognitive impairment, easy interpretation of results. Available in many languages and parallel versions.

Disadvantages: Requires operator training, time-consuming administration makes it unsuitable for clinical routine.

Table 1: Neuropsychological Tests (15)

TEST		Duration	Advantages	Disadvantages
MMSE Minimal State Examination	Design for Alzheimer's disease detection	10 mins	Easy to administer  Widely use into clinical routine  Good date availability	Low sensitivity for mild and medium cognitive dysfunction  Sensitive for dementia
Mini Cog	It's consist of three- word registration, a clock drawing test, three- word recall	5 mins	Easy to administer  Result independent from language skills and education	Not sensitivity for mild cognitive dysfunction  Higher sensitivity for medium cognitive dysfunction compared to MMSE
IQ-CODE (short form) Information Questionnaire on Cognitive Decline in the Elderly	Change in every day activities in 7 aspects (short-term/long-term memory, temporal spatial orientation, learning, managing financial issues)	Fill –up by relatives or friends	No patient participation required  Easy administration Easy evaluation	Only subjective estimation of cognitive function  Limited scientific usability
Clock-drawing Test	Detect impairment in visio-spacial and problem-solving abilities		Short and easy	Different approach to evaluate the results  Conflicting database on sensitivity for mild cognitive impairments
MoCA (Version 8.1) Montreal Cognitive Assessment Tool	Detailed cognition test	10 mins	Covers many cognitive domains Sensitive to detect even mild cognitive impairment Easy interpretation results Sensitivity 90% Specifity 87%	Requires operator training
ACE –III Addenbrooke's Cognitive Exam		16 mins	Sensitivity 84-93% Specifity 100%	Lack of discriminatory cut off scores between MCI&Demantia
Q MCI Quick MCI Screen		5 minutes	Sensitivity 90% Specifity 87%	Needs longer scale studies to validate use in detecting MCI

**RISK FACTORS FOR PERIOPERATIVE NEUROCOGNITIVE DISORDERS (PND)**

There are many factors that contribute to PND, these are surgical procedure, anesthetic exposure, and patient susceptibility.

**PREOPERATIVE RISK FACTORS**

- Preexisting cognitive impairment (overt dementia) is an important risk factor, during the informed consent process, it is particularly important to discuss the possibility of postoperative exacerbation of any preexisting cognitive impairment.
- Older age (4-55 %)
- Lower educational achievement

- Comorbidities: Prior neuronal damage (stroke, traumatic brain injury), cardiac disease, severe vascular disease, Diabetes, Frailty
- Sleep disorders
- Excessive consumption of alcohol and cigarettes
- Psychotropic drug use
- Nutritional deficiency
- Physical impairments
- Immobility
- Depression
- Preoperative use of benzodiazepines or narcotics
- Vision and hearing impairments
- Hospital associated factors
- Having Apo lipoprotein E genotype

## **INTRAOPERATIVE RISK FACTORS**

### **SURGERY**

Minor surgical procedures performed on an outpatient basis with minimal postoperative hospitalization have low risk in the elderly for developing POCD. As the duration and complexity of surgery increase so do the incidence and severity of POCD.

- Major and invasive surgical procedures (cardiac, vascular, orthopedic surgery)
- Emergency surgical procedures
- Prolonged surgical procedures (increased with surgical duration, with a 6 percent increase for every 30 minutes of surgery )(16).
- Intraoperative complications (e.g excessive surgical blood loss, intraoperative transfusion)

### **ANESTHESIA**

- Anesthetic technique
- Selection and dosing of certain anesthetic
- Adjunct agents
- Possibly:
  - Depth of general anesthesia,
  - Depth of anesthesia-induced prolonged hypotension,
  - Hypoxia,
  - Cerebral desaturations

#### **1. ANESTHETIC TECHNIQUE**

Evidence is insufficient to recommend specific anesthetic techniques to avoid perioperative neurocognitive disorders (PND)(17). Compared with general anesthesia, neuraxial or regional anesthesia with either light or deep sedation does not consistently decrease the incidence of PND in adults (17) .

When general anesthesia is selected for adult patients; neither a total IV anesthetic (TIVA) technique nor an inhalation-based anesthetic technique effects the likelihood of developing postoperative delirium (POD)(18). Anesthetic technique that should be used is balanced anesthesia with the use of shorter-acting and more rapidly eliminated anesthetics.

#### **2. ANESTHETIC AGENTS**

##### **2. 1. INHALATION ANESTHETIC AGENTS**

There is scant evidence to support use of any one inhalation agent to reduce any form of PND (19) .

A retrospective review that compared maintenance of general anesthesia with desflurane or sevoflurane noted no difference in POCD (19).

Another retrospective study found a higher incidence of delirium in older adults ( $\geq 60$  years of age) when desflurane was administered ( $n=404$ ), rather than sevoflurane ( $n=75$ ) or isoflurane ( $n=53$ ) (20). However, a small randomized trial found that patients receiving desflurane ( $n=15$ ) had less POCD (ie, delayed neurocognitive recovery) at one week compared with those receiving isoflurane ( $n=15$ ) (21).

## **2. 2. INTRAVENOUS ANESTHETIC and ADJUNCT AGENTS**

Evidence is insufficient to recommend the use of specific anesthetic agents to minimize the risk of PND.

### **2. 2. A. AGENTS ASSOCIATED WITH HIGHER RISK**

**BENZODIAZEPINES:** Perioperative benzodiazepine administration is associated with increased risk of delirium and is avoided in high-risk patients, particularly older adults (22, 23).

**OPIOIDS:** Opioids may precipitate delirium, but uncontrolled pain is also a risk factor for delirium (5, 22). Meperidine is sometimes used to treat postoperative shivering, it is typically avoided in high-risk patients because its metabolite, normeperidine, is associated with delirium (24,25).

**PREGABALIN:** Perioperative administration of pregabalin may decrease postoperative pain and opioid requirements, it is associated with an increased risk of developing POCD (26,27).

**KETAMINE:** The psychotomimetic side effects of ketamine may present as emergence delirium (e.g. hallucinations, nightmares, vivid dreams) (27- 30).

### **2. 2. B. AGENTS ASSOCIATED WITH LOWER RISK**

**DEXMEDETOMIDINE:** A 2018 meta-analysis of randomized trials in patients undergoing either cardiac or noncardiac surgery noted a lower incidence of delirium when intraoperative or postoperative dexmedetomidine was administered, compared with no exposure to dexmedetomidine (31).

**DEXAMETHASONE:** Randomized trials have found no effect on the incidence of PND with administration of dexamethasone in either cardiac or non-cardiac surgery, and administration may cause adverse effects.

Only two small randomized controlled trials found a lower incidence of POCD in the early postoperative period in patients receiving a preoperative dose of dexamethasone compared with controls (32,33).

**ACETAMINOPHEN:** In a small randomized trial in older adults having cardiac surgery, postoperative scheduled IV acetaminophen combined with iv propofol or iv dexmedetomidine reduced the incidence of in-hospital delirium compared with placebo (34).

**PARECOXIB:** Less opioid consumption and a lower incidence of POCD up to one week after noncardiac surgery in small randomized trials of patients who received parecoxib administered during the intraoperative and postoperative periods as a supplemental agent to produce postoperative analgesia(35,36). It is not known whether these effects of acetaminophen and parecoxib are due to opioid-sparing and/or anti-inflammatory properties, and whether similar agents would be equally beneficial.

## **3. ANESTHETIC DEPTH:**

As age increases anesthetic requirements decrease, anesthetic dosing should be age-adjusted. Anesthesiologists may use raw or processed electroencephalography(EEG) or other neuromonitoring techniques to aid in managing intraoperative dosing of anesthetic agents. 2018 systematic reviews of randomized trials concluded that the use of processed EEG-guided anesthesia was associated with a



38 percent reduction in risk of POD, neuromonitoring to guide anesthetic depth using either processed EEG or auditory evoked potentials reduced risk of postoperative delirium in patients older than 60 years (37,38). Data regarding the effect of EEG monitoring on development of other forms of cognitive decline such as POCD are inconsistent.

The European Society of Anaesthesiology (ESA) guideline on (POD) postoperative delirium and the American Society of Anesthesiologists (ASA) Brain Health Initiative (BHI) suggest avoiding low processed EEG values associated with high doses of anesthetic agents (17,39).

#### **4. HYPOTENSION:**

Hypotension with decreased cerebral blood flow has been implicated in the development of POD or other forms of PND (40-42).

Episodes of either low or high blood pressure have been associated with an increased risk for PND, possibly due to an individual patient's inability to compensate via autoregulation(43-45).

#### **POSTOPERATIVE RISK FACTORS**

Postoperative factors that may impact development, worsening, or resolution of PND, these include:

- Pain
- Other discomfort
- Certain medications (opioids, benzodiazepines)
- POD
- Sensory impairments
- Immobilization
- Sleep deprivation
- Dehydration
- Specific laboratory abnormalities (eg, sodium or glucose levels),
- Infection
- Inflammation
- Intensive care unit admission

#### **PREVENTIVE STRATEGIES (46)**

Currently, there are no medications or treatments for PND, early recognition and management of potential perioperative risk factors are important.

The concept of Enhanced Recovery After Surgery (ERAS) also known as “accelerated recovery” stemmed from the idea of “stress free anesthesia and surgery” proposed by Henrick Kehlet in early 1990s (47). It has been clearly shown that ERAS program could enhance postoperative recovery, shorten the length of hospital stay, and reduce morbidity by adopting series of optimization measures recommended by evidence-based medicine during the perioperative period (48,49).

#### **1. PREOPERATIVE OPTIMIZATION**

**PREHABILITATION:** It is a novel concept, improving the preoperative functional state of a patient by a multimodal system involving; appropriate physical exercise program (e.g. inspiratory muscle training), nutritional supplementation (Vit B12, Folic acid, Homocysteine, Vit D ) and education for period of 6–8 weeks prior to major surgery.

During this period, patients should be persuaded to quit smoking and alcohol, sleep quality should be improved, cognitive prehabilitation and preoperatif mental preparation should be done,

cardiovascular risk factors should be controlled (HT, AF, DM) , anemia and electrolyte imbalances (Mg +2) should be corrected.

## 2. PREOPERATIVE ASSESSMENT

There should be close collaboration between surgeons, anesthesiologists, and geriatricians. The duration of hospital stay can be reduced by selecting the optimum short-term surgical technique.

- Detailed history of medications (Continuation of chronic psychoactive medications such as anticholinesterase therapy)
- Putting intervals between surgeries
- Evaluation of comorbid diseases (HT, DM)
- Detection of sensory or perceptual deficits
- Cognitive evaluation with neuropsychological tests
- Adequate perioperative feeding (Six hours for solids and 2 hours for clear liquids)
- A clear carbohydrate beverage should be given (100 mg of carbohydrate on the night before the surgery and 3 hours prior to surgery). Preloading carbohydrate attenuates the neuroendocrine stress response, catabolism, insulin resistance and improves well-being.
- Correct the electrolyte and fluid disturbances

## 3. DURING ANESTHESIA

The most important anesthesia goals: Maintenance of hemodynamic stability and preservation of vital organ function.

- MINIMIZING or AVOIDING USE: sedatives and anxiolytics (avoid benzodiazepines, flurazepam), opioids (particularly meperidine), anticholinergics (atropine, particularly scopolamine), prophylactic neuroleptics, diphenhydramine, metoclopramide, agents that may cause Serotonin Syndrome.
- Aware of increased cholinergic activity
- Avoid deep anaesthesia (minimize the variety of drugs, adjust drug doses)
- Avoid prolonged hypotension (in cardiac surgery mean arterial pressures must be 80–90mmHg is recommended)
- Avoid hypoxia
- Avoid hyperglycemia
- Blood sugar, temperature, depth of anesthesia (BIS 40-60) and cerebral oxygenation should be monitoring,
- Limited data in cardiac and noncardiac surgical patients suggest that cerebral oximetry monitoring using NIRS technology may be useful to detect abnormalities in autoregulation of cerebral blood flow, possibly affecting outcomes such as PND (50-52).
- Avoid hypothermia (hypothermia leads to increased metabolic demand, altered drug metabolism, impaired immunity, and coagulation).
- Nitrous oxide is preferably avoided especially for long duration
- Avoid succinylcholine
- Prefer short acting NMBA, spontaneous recovery of NM blockade
- Correct the electrolyte imbalances
- Fluid therapy is goal-directed, and fluid overloading should be avoided
- Hypotension associated with central neuraxial blockade and general anesthesia should be managed with vasoconstrictors rather than fluids

## 4. SURGERY

- Minimal invasive surgery techniques

- Short operation duration
- Avoid insertion of drains and nasogastric tubes to help early mobilization of patient

## 5. POSTOPERATIVE INTERVENTION

- EARLY EXTUBATION
- EFFECTIVE ANALGESIA
  1. Multimodal analgesic approach with cautious use of opioids that tend to cause nausea, vomiting, drowsiness, and respiratory depression. All of these can cause delay in discharge.
  2. Use of epidural anesthesia reduces stress response associated with surgery and provides excellent pain management. Epidural catheters should be removed on second postoperative day to allow ease of mobilization.
  3. Paracetamol and nonsteroidal anti-inflammatory drugs should be used in preference to opioids.
  4. Local wound infiltration with local anesthetics (provides excellent pain relief and lowers the rates of urinary retention).
  5. Transverse abdominal plane blocks are popular as alternate options to wound infiltration in abdominal surgeries.
- PAY ATTENTION TO POSTOPERATIVE FLUID STRATEGY
  1. Early initiation of oral fluids 2 hours after surgery.
  2. Tapering off intravenous fluids by the second postoperative day (reduce anastomotic dehiscence, infection, and length of hospital stay).
  3. Use balanced salt solution, avoid normal saline solution (as it is associated with sodium overload, metabolic acidosis, and hyperchloremia leading to unfavorable outcomes).
  4. Avoid dehydration.
- DON'T LET HIGH BLOOD SUGAR (Postoperative hyperglycemia is known to increase the length of hospital stay and mortality rates) Regular blood glucose monitoring should aim at maintaining blood sugar levels between 180 and 200 mg/dL
- Correct atrial fibrillation (there is a growing evidence which links AF as a risk factor for POCD (53).
- ASSIST IN EARLY MOBILIZATION
  - Early identification of delirium and treatment with haloperidol
  - Maintenance of sensory input [glasses, hearing aids]
  - Keep patient informed and oriented
  - Promoting patient autonomy
  - Frequent re-orientation
  - Visit by family or friends
  - Reassure patient and family
  - Setting up a well-lit cheerful room
  - Elderly patients should be nursed in a quiet surrounding environment, preferably in the presence of family members as this has proven benefits against POCD.
- EARLY DISCHARGE

This presentation is mostly based on :

### 1. Perioperative neurocognitive disorders.

Authors: Elizabeth Mahanna-Gabrielli, MD

Roderic G Ekenhoff, MD

Section Editor

Natalie F Holt, MD, MPH

Deputy Editor:

Nancy A Nussmeier, MD, FAHA

**Literature review current through: Feb 2021. | This topic last updated: Apr 22, 2019.**

2. Kotekar N, Shenkar A, Nagaraj R. **Postoperative cognitive dysfunction – current preventive strategies.** Clin Interv Aging 8;13:2267–2273, 2018.

## REFERENCES

1. Evered L, Silbert B, Knopman DS, et al. Recommendations for the nomenclature of cognitive change associated with anaesthesia and surgery-2018. Br J Anaesth 2018; 121:1005.
2. Evered L, Scott DA, Silbert B, Maruff P. Postoperative cognitive dysfunction is independent of type of surgery and anesthetic. Anesth Analg 2011; 112:1179 .
3. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th ed, American Psychiatric Association, Arlington 2013.
4. American Geriatrics Society Expert Panel on Postoperative Delirium in Older Adults. Postoperative delirium in older adults: best practice statement from the American Geriatrics Society. J Am Coll Surg 2015; 220:136.
5. Card E, Pandharipande P, Tomes C, et al. Emergence from general anaesthesia and evolution of delirium signs in the post-anaesthesia care unit. Br J Anaesth 2015; 115:411.
6. Munk L, Andersen G, Møller AM. Post-anaesthetic emergence delirium in adults: incidence, predictors and consequences. Acta Anaesthesiol Scand 2016; 60:1059.
7. Cole DJ, Kharasch ED. Postoperative Brain Function: Toward a Better Understanding and the American Society of Anesthesiologists Perioperative Brain Health Initiative. Anesthesiology 2018; 129:861.
8. Berger M, Terrando N, Smith SK, et al. Neurocognitive Function after Cardiac Surgery: From Phenotypes to Mechanisms. Anesthesiology 2018; 129:829.
9. Subramaniyan S, Terrando N. Neuroinflammation and Perioperative Neurocognitive Disorders. Anesth Analg 2019; 128:781.
10. van Harten AE, Scheeren TW, Absalom AR. A review of postoperative cognitive dysfunction and neuroinflammation associated with cardiac surgery and anaesthesia. Anaesthesia. 2012;67(3):280–293.
11. Wu CL, Hsu W, Richman JM, Raja SN. Postoperative cognitive function as an outcome of regional anesthesia and analgesia. Reg Anesth Pain Med. 2004;29(3):257–268.
12. Brown EN, Pardon PL. The aging brain and anaesthesia. Curr Opin Anaesthesiol. 2013;26:414–419.
13. Paredes S, Corfínez L, Contreras V, Silbert B. Post-operative cognitive dysfunction at 3 months in adults after non-cardiac surgery: a qualitative systematic review. Acta Anaesthesiol Scand 2016; 60: 1043–58.
14. Chow WB, Rosenthal RA, Merkow RP, et al. Optimal preoperative assessment of the geriatric surgical patient: a best practices guideline from the American College of Surgeons national surgical quality improvement program and the American Geriatrics Society. J Am Coll Surg 2012; 215: 453.
15. M. J. Needham, C. E. Webb and D. C. Bryden. Postoperative cognitive dysfunction and dementia: what we need to know and do. Br J Anaesth 2017; 119 (S1):i115–i125:66. <sup>[1]</sup><sub>SEP</sub>
16. Cereghetti C, Siegemund M, Schaedelin S, et al. Independent Predictors of the Duration and Overall Burden of Postoperative Delirium After Cardiac Surgery in Adults: An Observational Cohort Study. J Cardiothorac Vasc Anesth 2017; 31:1966.
17. Berger M, Schenning KJ, Brown CH 4th, et al. Best Practices for Postoperative Brain Health: Recommendations From the Fifth International Perioperative Neurotoxicity Working Group. Anesth Analg 2018; 127:1406.
18. Rasmussen LS, Johnson T, Kuipers HM, et al. Does anaesthesia cause postoperative cognitive dysfunction? A randomised study of regional versus general anaesthesia in 438 elderly patients. Acta Anaesthesiol Scand 2003; 47:260.
19. Lu J, Chen G, Zhou H, et al. Effect of parecoxib sodium pretreatment combined with dexmedetomidine on early postoperative cognitive dysfunction in elderly patients after shoulder arthroscopy: A randomized double blinded controlled trial. J Clin Anesth 2017; 41:30.
20. Alalawi R, Yasmeen N. Postoperative Cognitive Dysfunction in the Elderly: A Review Comparing the Effects of Desflurane and Sevflurane. J Perianesth Nurs 2018; 33:732.

21. Kinjo S, Lim E, Magsaysay MV, et al. Volatile anaesthetics and postoperative delirium in older surgical patients-A secondary analysis of prospective cohort studies. *Acta Anaesthesiol Scand* 2019; 63:18.
22. Eriksson LI, Lundholm C, Narasimhalu K, et al. Hospitalization, surgery, and incident dementia. *Alzheimers Dement* 2019; 15:534.
23. Kim J, Shim JK, Song JW, et al. Postoperative Cognitive Dysfunction and the Change of Regional Cerebral Oxygen Saturation in Elderly Patients Undergoing Spinal Surgery. *Anesth Analg* 2016; 123:436.
24. Horn EP, Standl T, Sessler DI, et al. Physostigmine prevents postanesthetic shivering as does meperidine or clonidine. *Anesthesiology* 1998; 88:108.
25. Adunsky A, Levy R, Heim M, et al. Meperidine analgesia and delirium in aged hip fracture patients. *Arch Gerontol Geriatr* 2002; 35:253.
26. Morrison RS, Magaziner J, Gilbert M, et al. Relationship between pain and opioid analgesics on the development of delirium following hip fracture. *J Gerontol A Biol Sci Med Sci* 2003; 58:76.
27. Myhre M, Jacobsen HB, Andersson S, Stubhaug A. Cognitive Effects of Perioperative Pregabalin: Secondary Exploratory Analysis of a Randomized Placebo-controlled Study. *Anesthesiology* 2019; 130:63.
28. Bowdle TA, Radant AD, Cowley DS, et al. Psychedelic effects of ketamine in healthy volunteers: relationship to steady-state plasma concentrations. *Anesthesiology* 1998; 88:82.
29. Kleinloog D, Uit den Boogaard A, Dahan A, et al. Optimizing the glutamatergic challenge model for psychosis, using S+ -ketamine to induce psychomimetic symptoms in healthy volunteers. *J Psychopharmacol* 2015; 29:401.
30. Grace RF. The effect of variable-dose diazepam on dreaming and emergence phenomena in 400 cases of ketamine-fentanyl anaesthesia. *Anaesthesia* 2003; 58:904.
31. Kim DJ, Kim SH, So KY, Jung KT. Effects of dexmedetomidine on smooth emergence from anaesthesia in elderly patients undergoing orthopaedic surgery. *BMC Anesthesiol* 2015; 15:139.
32. Fang Q, Qian X, An J, et al. Higher dose dexamethasone increases early postoperative cognitive dysfunction. *J Neurosurg Anesthesiol* 2014; 26:220.
33. Ottens TH, Dieleman JM, Sauër AM, et al. Effects of dexamethasone on cognitive decline after cardiac surgery: a randomized clinical trial. *Anesthesiology* 2014; 121:492.
34. McDaid C, Maund E, Rice S, et al. Paracetamol and selective and non-selective non-steroidal anti-inflammatory drugs (NSAIDs) for the reduction of morphine-related side effects after major surgery: a systematic review. *Health Technol Assess* 2010; 14:1.
35. Subramaniam B, Shankar P, Shaefi S, et al. Effect of Intravenous Acetaminophen vs Placebo Combined With Propofol or Dexmedetomidine on Postoperative Delirium Among Older Patients Following Cardiac Surgery: The DEXACET Randomized Clinical Trial. *JAMA* 2019; 321:686.
36. Huang S, Hu H, Cai YH, Hua F. Effect of parecoxib in the treatment of postoperative cognitive dysfunction: A systematic review and meta-analysis. *Medicine (Baltimore)* 2019; 98:e13812.
37. MacKenzie KK, Britt-Spells AM, Sands LP, Leung JM. Processed Electroencephalogram Monitoring and Postoperative Delirium: A Systematic Review and Meta-analysis. *Anesthesiology* 2018; 129:417.
38. Punjasawadwong Y, Chau-In W, Laopaiboon M, et al. Processed electroencephalogram and evoked potential techniques for amelioration of postoperative delirium and cognitive dysfunction following non-cardiac and non-neurosurgical procedures in adults. *Cochrane Database Syst Rev* 2018; 5:CD011283.
39. Aldecoa C, Bettelli G, Bilotta F, et al. European Society of Anaesthesiology evidence-based and consensus-based guideline on postoperative delirium. *Eur J Anaesthesiol* 2017; 34:192.
40. Zenilman ME. Delirium: An Important Postoperative Complication. *JAMA* 2017; 317:77.
41. Ballard C, Jones E, Gauge N, et al. Optimised anaesthesia to reduce post operative cognitive decline (POCD) in older patients undergoing elective surgery, a randomised controlled trial. *PLoS One* 2012; 7:e37410.
42. Yocum GT, Gaudet JG, Teverbaugh LA, et al. Neurocognitive performance in hypertensive patients after spine surgery. *Anesthesiology* 2009; 110:254.
43. Williams-Russo P, Sharrock NE, Mattis S, et al. Randomized trial of hypotensive epidural anesthesia in older adults. *Anesthesiology* 1999; 91:926.
44. Siepe M, Pfeiffer T, Gieringer A, et al. Increased systemic perfusion pressure during cardiopulmonary bypass is associated with less early postoperative cognitive dysfunction and delirium. *Eur J Cardiothorac Surg* 2011; 40:200.

45. Gold JP, Charlson ME, Williams-Russo P, et al. Improvement of outcomes after coronary artery bypass. A randomized trial comparing intraoperative high versus low mean arterial pressure. *J Thorac Cardiovasc Surg* 1995; 110:1302.
46. Postoperative cognitive dysfunction – current preventive strategies. Kotekar N, Shenkar A, Nagaraj R. *Clin Interv Aging* 8;13:2267–2273,2018.
47. Kehlet H. The surgical stress response: should it be prevented? *Can J Surg*. 1991; 34(6):565–567.
48. Sethi AK, Kochhar A, Ahmad Z. Enhanced Recovery After Surgery. In: Sehgal R, Trikha A, editors. *Yearbook of Anesthesiology-6*. New Delhi, India: Jaypee Brothers Medical Publishers (P) Ltd; 2017: 152–163. [SEP]
49. Khan S, Gatt M, Horgan A, et al. ASGBI: Issues in professional practice guidelines for implementation of enhanced recovery protocols. ASGBI, London; 2009. Available from: [http://www.asgbi.org.uk/en/publications/issues\\_in\\_professional\\_practice.cfm](http://www.asgbi.org.uk/en/publications/issues_in_professional_practice.cfm). Accessed October 31, 2018. [SEP]
50. Gold JP, Charlson ME, Williams-Russo P, et al. Improvement of outcomes after coronary artery bypass. A randomized trial comparing intraoperative high versus low mean arterial pressure. *J Thorac Cardiovasc Surg* 1995; 110:1302.
51. Hori D, Brown C, Ono M, et al. Arterial pressure above the upper cerebral autoregulation limit during cardiopulmonary bypass is associated with postoperative delirium. *Br J Anaesth* 2014; 113:1009.
52. Zheng F, Sheinberg R, Yee MS, et al. Cerebral near-infrared spectroscopy monitoring and neurologic outcomes in adult cardiac surgery patients: a systematic review. *Anesth Analg* 2013; 116:663.
53. Hui DS, Morley JE, Mikolajczak PC, Lee R. Atrial fibrillation: A major risk factor for cognitive decline. *Am Heart J*. 2015;169(4):448–456.

## 30 April 2021, Friday

20:50-22:05 | Panel 4: PALLIATIVE CARE

Chairs: Süheyla Ünver, Orhan Kanbak

Philosophy of Palliative Care; Meltem Uyar

Influence of Covid-19 Pandemic on The Timely Provision of Urgent Medical Care; Natasa Kovac

Postoperative Neurocognitive Dysfunction in Elder Patients; Sumru Şekerci

**The Palliative Care Clinic: Patient Characteristics, Personnel Equipment;** Züleyha Kazak Bengisun

### PALLIATIVE CARE CLINIC: PATIENT CHARACTERISTICS, PERSONNEL EQUIPMENT

**Prof Züleyha Kazak Bengisun, MD**

*Ufuk University, School of Medicine,  
Department of Anesthesiology and Reanimation*

Palliative care is a term derived from the Latin word palliar "to hide". Palliative care is a multidisciplinary approach and specialized medical care for people with serious illness. The aim of therapy is to improve the quality of life. It focuses on providing patients with relief from the symptoms, pain, physical stress, and mental stress of a serious illness.

Hippocratic oath; It teaches doctors who are faced with situations in which medicine is helpless and who cannot treat their patients, to try to protect their well-being by respecting the life and autonomy of the patient. In line with this thought, the foundations of palliative care have been laid.

#### **WHO palliative care:**

In 1989, after curative treatments were completed, he defined it as the care provided for supportive treatment in the last period;

It defines the diagnosis of life-threatening diseases in 2002 and physical, psychosocial and psychological support and care to the family during the period when therapeutic treatments were terminated and symptomatic treatments started during the mourning period.

In 2014, it was defined as the ethical responsibility of healthcare professionals to reduce physical, psychosocial and emotional complaints, regardless of whether the disease or condition is treatable.

According to the world health organization Palliative Care:

- Provides relief from pain and other distressing symptoms
- Confirms life and sees dying as a normal process
- Does not intend to hasten or postpone death
- Integrates the psychological and spiritual aspects of patient care
- Helping patients to live as actively as possible until they die
- Helping the family cope during the patient's illness
- It includes treatments such as chemotherapy or radiation therapy that will increase the quality of life and also affect the course of the disease positively.

After the diagnosis of life-threatening diseases, it aims to provide physical, psychosocial and mental support and care to the patient in the period when symptoms such as pain, respiratory problems,

gastrointestinal problems, pressure sores-ulcers, skin rashes and lesions, neuropsychiatric problems begin.

Worldwide, people in need of palliative care total 56,840,123 people of all ages and globally need palliative care, including both the deceased and the non-deceased. Palliative care was needed for 45.3% of all deaths in 2017, and 76% of these were in low- and middle-income countries. 68.9% (36.5 million people) of adult palliative care needs are associated with noncommunicable diseases. Approximately 40% of patients in need of palliative care are 70 years and older, 27% are 50-69 years old, and approximately 26% are 20-49 years old, and only 7% are children.

As a result, the need for palliative care in the world is increasing every year, but the inequality of access to palliative care and facilities is also noteworthy.



---

## 01 May 2021-Saturday

---

10:00-11:30 | Panel 5: ANESTHESIA III

Chairs: Kamil Toker, Güner Kaya

**Never Ending Debate on Pediatric Airway: Laryngoscopy, Blades and Approaches;** Kemal Tolga Saraçoğlu  
**Laparoscopy and The Obese Patient - Challenges and Solutions;** Biljana Kuzmanovska

**Anesthesia in Laparoscopic Surgery;** Fatos Katanolli

**Awake Videolaryngoscope Guided Intubation;** Ilyaz Hodzovic

**Airway Challenges in Emergency Services;** Dusanka Janjevic

---

### ANESTHESIA FOR LAPAROSCOPIC SURGERY;

***Fatos Katanolli, DESAIC, MD***

*Anesthesiologist at American Hospital of Kosovo*

The laparoscopic approach has become a standard of care for many abdominal surgical procedures. Compared with laparotomy, laparoscopy can reduce postoperative pain, result in shorter recovery time, allow smaller incisions, and reduce the postoperative stress response. Laparoscopy requires insufflation of intraperitoneal or extraperitoneal gas, usually carbon dioxide (CO<sub>2</sub>), to create space for visualization and surgical maneuvers

Anesthetic issues and concerns for patients undergoing laparoscopic differ from those for patients undergoing open abdominal surgery. They include the physiologic effects of the pneumoperitoneum, absorption of CO<sub>2</sub>, and positioning required for surgery. In addition, some laparoscopic procedures take longer than the open alternative.

Cardiopulmonary physiologic changes include the following:

Increased systemic vascular resistance (SVR), arterial blood pressure (ABP), and cardiac filling pressures.

Pulmonary changes – Increased intrathoracic pressure, reduced functional residual capacity (FRC), and increased airway pressures.

Special care in positioning, since surgical intervention may warrant intraoperative changes of patient positioning.

Usually general anesthesia with endotracheal intubation for laparoscopy, though regional anesthesia is being used safely and commonly for short laparoscopic procedures.

Laparoscopic surgery results in less pain than the corresponding open procedure. Multimodal approach to postoperative pain control, including acetaminophen, nonsteroidal antiinflammatory drugs, and local/regional analgesia, with the addition of opioid medication only as necessary.

It is suggested prophylaxis for PONV for all patients who undergo laparoscopy (Grade 2C).

Complications include those related to the physiologic effects of the laparoscopic approach (eg, hemodynamic compromise, respiratory decompensation), surgical maneuvers (eg, access-related injury; vascular, solid-organ, or bowel injury; carbon dioxide [CO<sub>2</sub>] spread to subcutaneous and intrathoracic spaces; gas embolism), and patient positioning.

Rare but significant complications can occur during laparoscopy, including traumatic vascular and organ injury, CO<sub>2</sub> embolism, capnothorax, and capnomediastinum. Treatment requires supportive measures.

---

## 01 May 2021-Saturday

---

10:00-11:30 | Panel 5: ANESTHESIA III

Chairs: Kamil Toker, Güner Kaya

Never Ending Debate on Pediatric Airway: Laryngoscopy, Blades and Approaches; Kemal Tolga Saraçoğlu

Laparoscopy and The Obese Patient - Challenges and Solutions; Biljana Kuzmanovska

Anesthesia in Laparoscopic Surgery; Fatos Katanolli

Awake Videolaryngoscope Guided Intubation; Ilyaz Hodzovic

Airway Challenges in Emergency Services; Dusanka Janjevic

---

### AWAKE VIDEOLARYNGOSCOPE – GUIDED INTUBATION – WELL WORTH ADDING TO YOUR SKILL-MIX

***Ilyaz Hodzovic, MD FRCA (UK)***

*Cardiff University and Aneurin Bevan University  
Health Board, Cardiff and Newport, United Kingdom*

***Ovidiu Bedreag, MD, PhD***

*Anaesthesia and Intensive Care Department, "Pius  
Branzeu" Emergency County Hospital, Timşoara,, Romania*

Until now, awake fiberoptic intubation (FOI) was the most widely recommended technique for the management of the anticipated difficult airway. However, awake FOI is becoming more and more obsolete and used only by a few airway enthusiasts [1]. Recent evaluations of the awake videolaryngoscope guided intubation (VLI) [2-16] strongly suggest that this technique is not only a suitable alternative to awake FOI but should now be the 1st choice technique for managing anticipated difficult airway.

Many anaesthetists avoid awake FOI as it is challenging technique to learn and perhaps more importantly, once learned, this skill is difficult to maintain [17, 18]. The Fourth National Audit Project [19] cited 18 cases where the reviewers thought an awake method of securing the airway was appropriate, but the anaesthetist avoided it and chose a more familiar but riskier general anaesthesia with serious consequences. Furthermore, of the 15 awake fiberoptic intubation cases cited in the report, 60% failed suggesting a lack of skill with the procedure even amongst experienced clinicians [19]. In addition, the ASA closed claims database [20] revealed a number of complications, including brain damage and death, when awake fiberoptic intubation was chosen to manage the airway, further suggesting difficulty in maintaining this skill.

Awake videolaryngoscope guided intubation, on the other hand, may be the solution to most of the problems associated with awake FOI technique. Videolaryngoscopes have become freely available allowing the use in a greater number and wider variety of patients gaining the

advantage of familiarity and experience. This is especially relevant when managing difficult airways out of hours and in an emergency.

Videolaryngoscopy appears to be easier to learn. In order to reach competence with fiberoptic scope-guided intubations (> 90% success rate within three minutes), the anaesthetist needs some 25 intubations [21]. To reach the same level of competence with videolaryngoscope guided intubations, the anaesthetist needs between one and six intubations [22-24]. There is a suggestion that to become an expert user of a videolaryngoscope requires 76 attempts and sustained deliberate practice [25]. This is typically acquired over a period of 10 years [26]. It can be argued that the expertise in awake intubation would be easier achieved with videolaryngoscope (freely available and widely used) than with fiberoptic scope (used infrequently in comparison).

There are also number of advantages of awake videolaryngoscope guided technique inherent with the device design and intubation technique [27]. First, videolaryngoscopes create space within the airway allowing for effective suctioning of secretions and blood from the airway under direct vision. Second, the created space within the airway aids administration of atomized local anaesthetic to the glottis and trachea under direct view from the videolaryngoscope. Third, there is no blind tube railroading associated with fibrescope guided intubations. When using a videolaryngoscope, the tube placement is observed throughout the intubation process, reducing the potential for airway trauma. Fourth, there is no 'diminution of view' [27] associated with fiberscope advance towards the glottis. Videolaryngoscopes provide a fixed wide view of the glottis that aids recognition of the airway landmarks, particularly relevant in patients with distorted airway anatomy. Listed advantages of this technique over awake FOI are likely to make this technique more user friendly and easier to learn. Although, there is a suggestion that a videolaryngoscope with the tube guide may offer an advantage over videolaryngoscopes with an anatomically shaped blade [28], further research is required in finding the most appropriate type of videolaryngoscope for awake intubation.

Perhaps most relevantly, awake VLI is an effective awake intubation technique for managing an anticipated difficult airway. There has been a number of case reports [2-7], case series [8-11] and five comparative studies looking at the awake videolaryngoscopy [12-16]. The use of a videolaryngoscope to facilitate an awake oral or nasal intubation has been shown to be of benefit in patients with a predicted difficult airway [2-16], in the obese population [9], and in patients with peri-glottic tumours [7, 11].

Five studies have directly compared videolaryngoscopes and fibrescopes for awake intubation [12-16]. Two found the two techniques to be comparable in time to securing the airway and operator experience [13, 14]. Three other studies [12, 15, 16] found that the intubation time was significantly shorter with the videolaryngoscope than the fibrescope, which is also our experience. Recently published comparison of the awake flexible fibrescope and the Pentax Airway Scope for awake oral intubation [12] found that the overall time (the sum of sedation

time, topical anaesthesia time and intubation time) was significantly shorter with the Airway Scope videolaryngoscope. September's issue of *Anaesthesia* has published a systematic review and meta analyses of all the studies comparing the awake videolaryngoscope guided intubation with the awake flexible scope guided intubation [28] and concluded that awake videolaryngoscopy is significantly faster. This review found no difference in the success rate, complication rate or patient satisfaction.

What about patients' comfort? Many anaesthetists cite this as a potential disadvantage of awake videolaryngoscopy. All five of the comparative studies [12-16], however, reported no difference in patients' satisfaction between the awake videolaryngoscope and awake fibrescope guided intubation. There is uncertainty about the level of sedation required to make awake intubation acceptable to patients. The safety of the awake video laryngoscope guided intubation and the level of patients' acceptance are likely to be more influenced by the adequacy of topical anaesthesia than the levels of sedation.

The difficult airway is a sign for a wide range of conditions. No single airway device will satisfy all clinical situations or operator preferences. Awake fibreoptic intubation still has a role but should not be considered the 1st choice technique any more. Awake videolaryngoscopy is a skill that is simple to learn and easy to maintain and is a more effective technique for managing an anticipated difficult airway than awake FOI. In addition, videolaryngoscopes have a number of design features making them potentially safer devices for managing an anticipated difficult airway. The time has come for awake videolaryngoscopy to be considered not only a suitable alternative to awake FOI, but should now be the 1st choice technique for managing the anticipated difficult airway.

## References

1. Ahmad I, Bailey CR. Time to abandon awake fibreoptic intubation? *Anaesthesia* 2016; 71: 12-16. doi: 10.1111/anae.13333
2. Uslu B, Damgaard Nielsen R, Kristensen BB. McGrath videolaryngoscope for awake tracheal intubation in a patient with severe ankylosing spondylitis. *Br J Anaesth* 2010; 104: 118-119. doi: 10.1093/bja/aep352
3. Xue FS, Xiong J, Yuan YJ, Wang Q, Asai T. Pentax-AWS videolaryngoscope for awake nasotracheal intubation in patients with a difficult airway. *Br J Anaesth* 2010; 104: 505-508. doi: 10.1093/bja/aeq042
4. Asai T. Pentax-AWS videolaryngoscope for awake nasal intubation in patients with unstable necks. *Br J Anaesth* 2010; 104: 108-111. doi: 10.1093/bja/aep316
5. Jarvi K, Hillermann C, Danha R, Mendonca C. Awake intubation with the Pentax Airway Scope. *Anaesthesia* 2011; 66: 314. doi: 10.1111/j.1365-2044.2011.06668.x
6. Jeyadoss J, Nanjappa N, Németh D. Awake intubation using Pentax AWS videolaryngoscope after failed fibreoptic intubation in a morbidly obese patient with a massive thyroid tumour and tracheal compression. *Anaesth Intensive Care* 2011; 39: 311- 312
7. Lambert C, Passant C, Hodzovic I. Awake videolaryngoscope-assisted intubation in a patient with stridor. *Eur J Anaesthesiol* 2013; 30: 258. doi: 10.1097/00003643-201306001-00809
8. Xue FS, Li CW, Zhang GH, Li XY, Sun HT, Liu KP, et al. Glide- Scope-assisted awake fibreoptic intubation: initial experience in 13 patients. *Anaesthesia* 2008; 61:1014-1015. doi: 10.1111/j.1365-2044.2006.04809.x
9. Dimitriou VK, Zogogiannis ID, Liotiri DG. Awake tracheal intubation using the Airtraq laryngoscope: a case series. *Acta Anaesthesiol Scand* 2009; 53: 964-967. doi: 10.1111/j.1399- 6576.2009.02012.x

10. Moore AR, Schrickler T, Court O. Awake videolaryngoscopy-assisted tracheal intubation of the morbidly obese. *Anaesthesia* 2012; 67: 232-235. doi: 10.1111/j.1365-2044.2011.06979.x
11. Markova L, Stopar-Pintaric T, Luzar T, Benedik J, Hodzovic I. A feasibility study of awake videolaryngoscope-assisted intubation in patients with periglottic tumour using the channelled King Vision® videolaryngoscope. *Anaesthesia* 2017; 72: 512- 518. doi: 10.1111/anae.13734
12. Mendonca C, Mesbah A, Velayudhan A, Danha R. A randomised clinical trial comparing the flexible fibrescope and the Pentax Airway Scope (AWS)® for awake oral tracheal intubation. *Anaesthesia* 2016; 71: 908-914. doi: 10.1111/anae.13516
13. Kramer A, Müller D, Pfortner R, Mohr C, Groeben H. Fibreoptic vs videolaryngoscopic (C-MAC® D-BLADE) nasal awake intubation under local anaesthesia. *Anaesthesia* 2015; 70: 400- 406. doi: 10.1111/anae.13016
14. Rosenstock CV, Thøgersen B, Afshari A, Christensen AL, Eriksen C, Gätke M. Awake Fiberoptic or Awake Video Laryngoscopic Tracheal Intubation in Patients with Anticipated Difficult Airway Management: A Randomized Controlled Trial. *Anesthesiology* 2012; 116: 1210-1216. doi: 10.1097/ALN.0b013e318254d085
15. Abdellatif AA, Ali MA. GlideScope videolaryngoscope versus flexible fibreoptic bronchoscope for awake intubation of morbidly obese patient with predicted difficult intubation. *Middle East J Anaesthesiol* 2014; 22: 385-392
16. Wahba SS, Tammam TF, Saeed AM. Comparative study of awake endotracheal intubation with Glidescope video laryngoscope versus flexible fiber optic bronchoscope in patients with traumatic cervical spine injury. *Egypt J Anaesth* 2012; 28: 257- 260. doi: 10.1016/j.egja.2012.05.002
17. Fiadjoe JE, Litman RS. Difficult Tracheal intubation: looking to the past to determine the future. *Anesthesiology* 2012; 116: 1181-1182. doi: 10.1097/ALN.0b013e318254d0a0
18. Rose DK, Cohen MM. The airway: problems and predictions in 18,500 patients. *Can J Anaesth* 1994; 41: 372-383. doi: 10.1007/BF03009858
19. Cook TM, Woodall N, Frerk C, editors. 4th National Audit Project: of The Royal College of Anaesthetists and The Difficult Airway Society: Major complications of airway management in the UK. London: Royal College of Anaesthetists; 2011: 114- 120
20. Peterson GN, Domino KB, Caplan RA, Posner KL, Lee LA, Cheney FW. Management of difficult airway: a closed claims analysis. *Anesthesiology* 2005; 103: 33-39. doi: 10.1097/0000542-200507000-00009
21. Heidegger T, Gerig HJ, Ulrich B, Schnider TW. Structure and process quality illustrated by fibreoptic intubation: analysis of 1612 cases. *Anaesthesia* 2003; 58: 734-739. doi: 10.1046/j.1365-2044.2003.03200.x
22. Mihai R, Blair E, Kay H, Cook TM. A quantitative review and meta-analysis of performance of non-standard laryngoscopes and rigid fibreoptic intubation aids. *Anaesthesia* 2008; 63: 745- 760. doi: 10.1111/j.1365-2044.2008.05489.x
23. Ray DC, Billington C, Kearns PK, Kirkbride R, Mackintosh K, Reeve CS, et al. A comparison of McGrath and Macintosh laryngoscopes in novice users: a manikin study. *Anaesthesia* 2009; 64: 1207-1210. doi: 10.1111/j.1365-2044.2009.06061.x
24. Cortellazzi P, Caldiroli D, Byrne A, Sommariva A, Orena EF, Tramacere I. Defining and developing expertise in tracheal intubation using a GlideScope for anaesthetists with expertise in Macintosh direct laryngoscopy: an in-vivo longitudinal study. *Anaesthesia* 2015; 70: 290-295. doi: 10.1111/anae.12878
25. Dreyfus SE. The five-stage model of adult skill acquisition. *Bull Sci Tech Soc* 2004; 24: 177-181. doi: 10.1177/0270467604264992
26. Fitzgerald E, Hodzovic I, Smith AF. 'From darkness into light': time to make awake intubation with videolaryngoscopy the primary technique for an anticipated difficult airway? *Anaesthesia* 2015; 70: 387-392. doi: 10.1111/anae.13042
27. Richardson PB, Hodzovic I. Awake tracheal intubation using videolaryngoscopy: importance of blade design. *Anaesthesia* 2012; 67: 798-799. doi: 10.1111/j.1365-2044.2012.07224.x
28. Alhomary M, Ramadan E, Curran E, Walsh SR. Videolaryngoscopy vs. fibreoptic bronchoscopy for awake tracheal intubation: a systematic review and meta analysis. *Anaesthesia* 2018; 73: 1151-1161. doi: 10.1111/anae.14297

## 01 May 2021-Saturday

11:40-12:55 | Panel 6: ANESTHESIA IV

Chairs: Dilek Kazancı, Fatma Sarıcaoğlu

**New Approaches for Pain Management in Major Abdominal Surgery;** Ismet Jusufi

**Current Approaches to Local Anesthetic Toxicity;** İlker İnce

**New Nerve Blocks;** Yavuz Gürkan

**Ultrasound Guided Chronic Pain Interventions;** Taylan Akkaya

### CURRENT APPROACHES TO LOCAL ANESTHETIC TOXICITY

*İlker İnce MD*

*Department of Anesthesiology and Reanimation,  
Atatürk University, Erzurum*

Local anesthetic systemic toxicity (LAST) is a serious life-threatening complication associated with local anesthetic usage. Although the LAST is not a common, the clinical results of this complication might be fatal and the clinical presentation and symptom of the LAST must be well-known. Before getting into the current approaches to the LAST, it is needed to refresh our knowledge that what local anesthetic (LA) drugs are, how local anesthetics effects the nerves, what LAST is, how it can be diagnosed and what the treatment or prevention strategy is. The local anesthetics are clasified into two groups. These are Amides and Esters. While ester local anesthetics are metabolized by plasma esterases in the circulation, amide local anesthetics are metabolized by cytochrome P450 enzymes in the liver. It is highly possible that patients who have liver disease or congestive cardiac failure have elevated blood local anesthetic levels. There is an increased risk of local anesthetic systemic toxicity with liver disease and congestive cardiac failure. The other important subject we have to know that how local anesthetics work. The LA agents effect the Na channel to prevent depolarization. Also, LAs may block K channels and Ca channels. LAs may prohibit action potential by blocking these channels. LAs are commonly used for regional anesthesia practice. Local anesthetic systemic toxicity (LAST) is a very serious advers event which can be harmful for patients. The clinical presentation of the LAST includes confusion, metallic taste, seizure, respiratory arrest in terms of central nerves system toxicity. On the other hand, the cardiovascular system toxicity might be presented with hypertension, tachycardia, hypotension, cardiac arrest. The recommendations for preventing LAST are that use of recommended dose, use of a test dose, incremental injections, aspirate before injection, communicate with the patient and monitoring of the vital signs. The clinical presentation of LAST is highly variable, As classically described in the literature, LAST occurs soon after injection of LA, and at first central nervous system excitation occurs, than central nervous system (CNS) inhibition, after that cardiovascular excitation, and in extreme cases, cardiovascular inhibition and arrest. However the order of the clinical presentation may vary. Any of this symptoms may occur at any time point after local anesthetic injection. LAST should be suspected whenever physiologic changes occur after administration of local anesthetic (LA). For treatment we can use guidelines and

checklist. There are some checklist which belongs to the societies. We prefer to use the ASRA guideline for local anesthetic systemic toxicity in our institution. Lipid emulsion is the only one drug which has been included in to the guidelines of LAST and can be safely used for toxicity according to the publications. There is no randomized trials regarding ethical concerns. But we have case reports and animal studies to show its efficacy. In future, local anesthetic alternatives such as neosaxitoxin may be a good option without any risk of local anesthetic-induced cardiotoxicity- and central nervous system toxicity. On the other hand, lipid-polymer hybrid nanoparticles may be helpful for toxicity by encapsulating local anesthetic within nanoparticles. Finally, pegylated liposomes may be a pioneer of specific local anesthetic antidote.



## 01 May 2021-Saturday

14:00-15:00 | Panel 7: ANESTHESIA V

Chairs: Hülya Başar, Dilek Özcengiz

Management of Peripartum Hemorrhage; Berrin Günaydın

Anesthesia for Maternal-Fetal Surgery; Onur Özlü

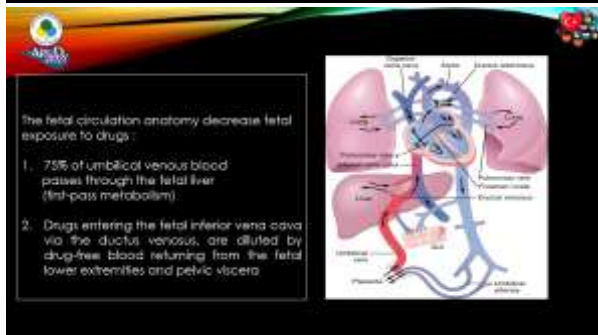
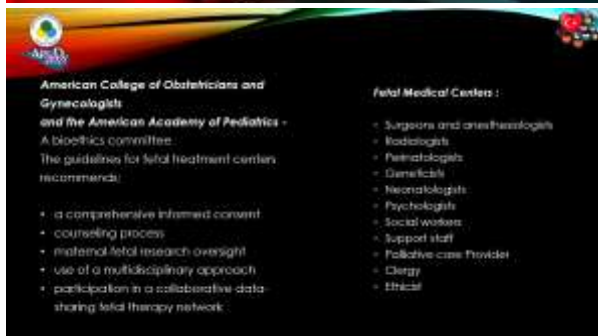
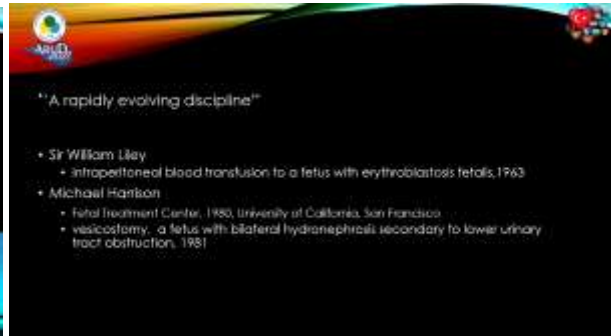
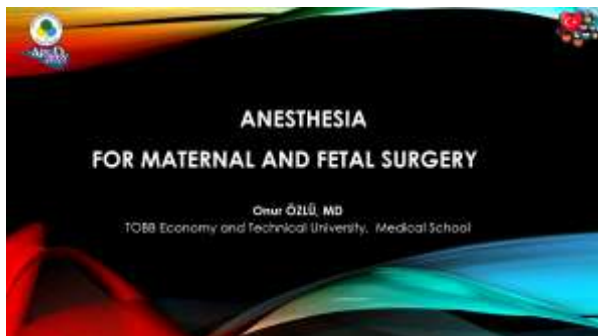
Anesthesia in Covid 19 Parturient for Normal and Operative Delivery; Atanas Sivevski

### ANESTHESIA FOR MATERNAL AND FETAL SURGERY

**Onur ÖZLÜ, MD**


TOBB ETÜ Medical School Hospital,

Department of Anesthesia, Intensive Care and Reanimation



### Twin-twin transfusion syndrome (TTTS)

Fetoscopic snare of the fetal surface of a monochorionic, twin placenta in the region of the vascular equator. Placental arteries from the donor twin communicate with placental veins of the recipient twin. Laser photocoagulation is performed for the communications.




- Twin-reversed arterial perfusion (TRAPS)
- Thoracoamniotic shunt placement/cystic lung lesions
- Cardiac catheterization and valvuloplasty in hypoplastic left heart syndrome
- Veicoloamniotic shunts for lower urinary tract obstruction
- Treatment of fetal sacrocaudal teratomas with radiofrequency ablation
- Endoscopic fetal MMC closure

### OPEN SURGICAL PROCEDURES

- Maternal laparotomy and hysterotomy
- Mid-gestation
- Greater maternal and fetal risks
- C/S delivery is required for all deliveries because of uterine dehiscence or rupture risks

- Bladder outlet obstruction
- Diaphragmatic hernia repairment
- Lung lesions: causing significant mass effect and hydrops
- Sacrocaudal teratomas: debulking
- Pericardial teratomas resection
- MMCs closure



Fetal Sacrocaudal Teratoma for Debulking

### EX UTERO INTRAPARTUM THERAPY (EXIT) PROCEDURES

- Do something to fetus while umbilical cord still attached; then deliver baby
- Gas exchange: continues across the placenta (placental bypass)
  - 1) Securing the airway by endotracheal intubation, bronchoscopy, or tracheostomy in fetuses with congenital airway obstruction or neck mass
  - 2) Performing invasive fetal procedures before delivery
- As a bridge to ECMO for a fetus with cardiopulmonary disease at risk for postnatal cardiac failure or failure of pulmonary gas exchange

### ANESTHESIA FOR MINIMALLY INVASIVE PROCEDURES

- Monitored Anesthetic Care with local anesthesia
  - Infiltration into the superficial tissues and abdominal wall
- Maternal analgesia and anxiolytic:
  - opioid, benzodiazepine
- Neuraxial techniques
  - multiple insertion sites are required
  - maternal immobility is crucial
  - a mini-laparotomy
  - adequate patient comfort or cooperation
- General anesthesia
  - rarely necessary
  - technical difficulty because of placental location and fetal orientation
  - uterine exteriorization: fetoscopic MMC repair

- fetal interventions on noninnervated tissues, such as the placenta (laser for TTTS):
  - Do not require additional fetal drug administration
- For invasive procedures:
  - ✓ intrauterine transfusion or cordocentesis
  - ✓ aortic balloon valvuloplasty
  - ✓ fetoscopic endoluminal tracheal occlusion
    - fetal analgesia and fetal immobilization is required
    - fetal immobility (opioid, muscle relaxant and atropine) using ultrasound guidance

### Opioid analgesics

- Maternal administration iv remifentanyl (0.1 µg/kg/min)
  - placental transfer
- IV umbilical cord administration
- IM fetal administration

### Muscle relaxants

In a single injection: opioid+anticholinergic+ muscle relaxant

- Maternal intravenous fluid administration
  - standard intraoperative requirements
- Maternal pulmonary edema
  - Pressurized uterine crystalloid irrigation into the amniotic cavity
- Maintenance of maternal euthermia

### Fetal monitoring

- Doppler ultrasonography
- Ultrasound imaging of umbilical artery flow
- Continuous fetal echocardiography during fetal cardiac interventions

### ANESTHESIA FOR OPEN PROCEDURES

- General anesthesia
- Profound uterine relaxation
- Additional fetal monitoring
- Significant maternal and fetal blood loss
- Maternal and fetal resuscitation
- Possible emergent delivery

- Uterine fasciatics preoperatively
- An epidural catheter preoperatively for postoperative analgesia

- Crossmatched blood should be available for:
  - maternal transfusion
  - fetal transfusion
- Fetal transfusion
  - O-negative, cytomegalovirus-negative, irradiated, leukocyte-depleted, maternally crossmatched
  - 5-10 ml/kg aliquots in case

- Atropine (20 µg/kg, im), Epinephrine (10 µg/kg, im), Fentanyl (10-20µg/kg)
  - weight-based doses
  - meticulous labeling
  - accurate dosing
- Muscle relaxants
  - Rocuronium :
    - 2.5 mg/kg im or 1.0 mg/kg iv
  - Vecuronium :
    - 0.25 mg/kg im or 0.1 mg/kg iv
  - Onset: 2-5 min, Duration : 1-2 h

**Before anesthetic induction:**

- Baseline FHR and cardiac echocardiography
- Ultrasound imaging of umbilical cord flow
- They are intermittently re-evaluated throughout the initial period of anesthesia to assess the effect of
  - maternal positioning
  - anesthetic administration
  - maternal hemodynamic changes on the fetus

**Induction:**

- Supine position with uterine displacement
- A rapid sequence induction, endotracheal intubation
- Standard ASA monitors, an arterial catheter, a second IV catheter, Foley catheter
- SBP: with in 5/10 of baseline value
- MAP > 65 mmHg
- ETCO<sub>2</sub>: 28-32 mmHg
- PO<sub>2</sub> > 50%
- Restricted intraoperative fluid (< 2L) : The risk of postop. maternal pulmonary edema

Before skin incision profound uterine relaxation is necessary:

1. Volatile agent 2-3 MAC
  - Fetal myocardium depression and increasing fetal acidosis
  - Moderate-to-severe left ventricular systolic fetal cardiac dysfunction with use of high desflurane concentrations
  - Fetal seizure activity
  - Nitroglycerine: small boluses (50-200 µg IV) or infusion (0.5-1 µg/kg/min IV)
2. Alternative technique:
  - 1.0-1.5 MAC volatile anesthetic (halothane) and propofol infusion
  - 1.0-1.5 MAC volatile anesthetic (halothane) infusion
3. Neuraxial technique: in conjunction with intravenous nitroglycerin in doses up to 20 µg/kg/min

- Fetal temperature
  - depends on maternal body temperature secondary to placental circulation and surrounding amniotic fluid
- Maintenance of maternal euthermia
  - forced air warming
- Intrauterine temperature is closely monitored to prevent hypothermia and associated fetal circulatory compromise
- Amnioinfusion
  - last amniotic fluid is replaced with warmed RL
  - maintains fetal euthermia
  - prevents decreased uterine volume
  - prevents placental separation
  - prevents spasm of the cord vessels

- Fetal analgesia and immobilization : fetal im cocktail
- A fetal IV catheter / Fetal transfusion : limb or umbilical vein catheter



**After completion of the fetal procedure:**

- The volatile anesthetic concentration is significantly decreased or discontinued
- Epidural anesthesia is initiated. Maternal anesthesia is maintained with epidural anesthesia and supplemented by iv opioid, inhaled anesthetics, and/or iv propofol.
- Prepare for extubation of mother
  - Dose epidural
  - Hemodynamic stability
  - Reverse muscle relaxant

**POSTOPERATIVE MANAGEMENT**

- Postoperative cesarean delivery management
  - pain management
  - prevention of venous thromboembolism
  - monitoring for hemorrhage
  - avoiding wound infection

**TOCOLYSIS**

- "Achilles heel of fetal surgery": Postoperative preterm labor
- Continuous uterine monitoring for 2 or 3 days
- Magnesium sulfate
  - Loading dose: 74-6 g, over 20 minutes, during uterine closure
  - Infusion rate: 1-2 g/h (24 hour or more postoperatively)
- Additionally:
  - Indomethacin
  - Terbutaline
  - Nifedipine

**Adequate postoperative pain control**

- Prevent postoperative preterm labor /pain increase plasma oxytocin level

**Fetal monitoring**

- Continuous **FHR** monitoring during the first 2-3 days
- Periodic fetal **echocardiography** : premature closure of the DA because of indomethacin

• Patients should remain near the fetal treatment center after discharge

- High risk for preterm PROM, preterm labor, infection, and uterine rupture

• C/S planned at 37 week

### ANESTHESIA FOR EX UTERO INTRAPARTUM TREATMENT PROCEDURE

- Primary goals:**
  - uterine relaxation
  - delaying placental separation
  - sustain placental-fetal perfusion
- General Anesthesia, most commonly**
- Preparations before entering the operating room should be completed:
  - fetal monitoring
  - airway management
  - fetal/neonatal resuscitation
  - postdelivery care

**Fetal monitoring**

- Fetal heart ultrasonography
- a sterile pulse oximeter probe
- end-tidal carbon dioxide indicator or gas analyzer

**Medications and devices**

- Atropine (20 µg/kg, IM) and epinephrine (1 µg/kg, IV),
- supplemental fetal anesthetic agents are prepared and transferred to the surgical field
- A sterile ventilation bag with an air/oxygen source and manometer
- Multiple ETI size
- Rigid and flexible bronchoscope,
- Catheters
- Crystalloids and blood

- Delivery of head and torso only
- Limit expiratory and fluid losses
- Warm irrigation of uterus



Reversal of fetal tracheal occlusion for congenital diaphragmatic hernia. Intubation of the neonate while placental umbilical circulation is maintained.

Chenot RH, de Carvalho FN, Bal BR. Role of Sonography in Fetal Procedures.

- Hbf saturation : 40% to 70%, ventilation of the fetal lungs < 90%
- No ventilation until the cord clamp | Placental support is lost |

**After umbilical cord clamping:**

- Volatile anesthetic agent is decreased or ceased to achieve uterine tone
- Opioid, propofol, N<sub>2</sub>O combination
- Nitroglycerin infusion is stopped
- Chlotoxin administration
- Epidural analgesia is initiated
- The trachea is extubated once the mother is fully awake

- Fetal therapy is an evolving and dynamic field
- Mutual respect, knowledge sharing, and understanding from all team members are vital components of a successful fetal therapy program.

Alto M, Imani, Debnath Chatterjee. Anesthesiology Clin (2020), 38: 605-19

**REFERENCES**

- Iran RM, Chatterjee D. New trends in fetal Anesthesia. Anesthesiology Clin 38 (2020) 605-19
- Chatterjee KA, McCullough LE. The ethics of maternal-fetal surgery Seminars in Fetal & Neonatal Medicine 22 (2018) 64-7
- Swagum HP, Kodali SS. Maternal Anesthesia for fetal Surgery Clin Perinatal 40 (2012) 413-27
- Henschel MB, Robins MD. Anesthesia for fetal surgery and Other fetal Therapies
- Chenot RH, de Carvalho FN, Bal BR. Role of Sonography in Fetal Procedures
- De Velde MW, De Buck F. Fetal and Maternal Analgesia/ Anesthesia for Fetal Procedures. Fetal Diagnosis and Therapy (31): 2012 201-9



---

**01 May 2021-Saturday**

---

**14:00-15:00 | Panel 7: ANESTHESIA V**

Chairs: Hülya Başar, Dilek Özcengiz

Management of Peripartum Hemorrhage; Berrin Günaydın

Anesthesia for Maternal-Fetal Surgery; Onur Özlü

Anesthesia in Covid 19 Parturient for Normal and Operative Delivery; Atanas Sivevski

---

**ANESTHESIA IN COVID-19 PARTURIENT FOR  
NORMAL AND OPERATIVE DELIVERY****Atanas Sivevski***University Clinic of Gynecology and Obstetrics,**Dept. of Anesthesia and Intensive Care, Clinical Center Mother Teresa, Skopje, Macedonia*

SARS-CoV-2 is a novel coronavirus causing a global pandemic of a severe respiratory disease known as COVID-19. The effect of SARS-CoV-2 on pregnancy has not been clear yet. There is no evidence that pregnant women would be more susceptible to COVID-19 infection or more prone to develop severe pneumonia than the general population. Until now, the clinical manifestation of COVID-19 in pregnant women seems to remain the same as in non-pregnant population. There are no data on complications of SARS-CoV-2 infection before the third trimester, but there are reports suggesting that COVID-19 can cause premature rupture of membranes, premature labor and fetal distress in the third trimester. COVID-19 infection is an indication for delivery if necessary to improve maternal oxygenation (1). Decision on delivery mode should be individualized. Vertical transmission of coronavirus from the pregnant woman to the fetus has not been proven.

This article summarizes current knowledge about COVID-19 parturient undergoing anesthesia procedures and emphasizes a series of practical experience for the anesthetic management of pregnant women for normal or operative delivery with suspected or confirmed viral infection.

**Labor analgesia**

Although exposure for the anesthesiologist during neuraxial labor analgesia is low, health staff should wear droplet precautions - surgical mask and eye protection is minimal personal protective equipment (PPE). The patient should wear a surgical mask at all times. It is also important to limit the number of personnel present in the room during the performing of the procedure (2).

There is no evidence that neuraxial analgesia in labor is contraindicated in the presence of coronavirus. Based on literature available, neuraxial techniques- spinal, combined spinal-epidural or epidural, all are acceptable and the risk of neurologic complications (encephalitis

or meningitis) as a result of seeding with viremic blood is extremely rare. Even more, there is recommendation for COVID-19 parturient to be administered neuraxial analgesia (epidural catheter) in established labor because this practice may reduce the need for intubation for general anesthesia in a case of conversion to Cesarean delivery (3).

The management of suspected or confirmed COVID-19 parturient should include complete blood count, as mild thrombocytopenia ( $< 100,000 \times 10^6 /L$ ) appeared to be common in non-pregnant COVID-19 population, independently from the clinical symptoms (36% according to Chinese study). It is generally safe to perform neuraxial procedures at platelet counts of  $70,000 \times 10^6/L$  or above in accordance with the protocols (4,5). We suggest a platelet count on admission without the need to check serial counts before needle placement unless there is a major change in clinical symptoms (6).

Increasing the concentration of neuraxial medications for labor analgesia (0.125%) or epidural intermittent bolus volume from 5 to 8 mL, shortening the interval dose-period to 30 min or adding neuraxial adjuvants (epidural clonidine), all maneuvers are required option with the aim to minimize intrapartum breakthrough pain requiring epidural top-up.

Data and recommendations on the use of nitrous oxide for labor analgesia suggest that there is insufficient information of potential aerosolization of nitrous oxide in the setting of COVID-19 thus delivery units should consider suspending use. On the other hand, it is recommended nitrous oxide should be provided if requested to women who are defined as positive for COVID-19, as long as all other standard precautions (PPE) are being followed (7). The practice of high-flow oxygen for fetal distress does not appear to improve fetal outcomes and should be suspended due to the risk of aerosolization.

In general, the most experienced anesthesiologist has to perform the procedure to ensure adequate placement of epidural catheter and reduce the risk of accidental dural puncture that may require an epidural blood patch.

### **Anesthesia for cesarean delivery**

Patients with suspected or confirmed COVID-19 infection who are scheduled for elective cesarean delivery should be primary assessed for respiratory symptoms because of risk stratification. Routine monitoring should include vital signs and pulse oximetry (Spo<sub>2</sub>) in a compromised patients, Spo<sub>2</sub> goal should be an oxygen saturation  $\geq 95\%$ . Early warning criteria systems specific for obstetric patients may aid in early detection and prompt escalation of care. Women requiring supplemental oxygen, who develop increasing oxygen requirements or worsening hypoxia (Spo<sub>2</sub>  $< 95\%$ ), should have frequent clinical reassessment to guide the requirement for escalation of care. The care of the patient with respiratory distress or hypoxemia should be discussed with the intensive care team for possible ICU admission.

Neuraxial technique is less resource-intensive compared to general anesthesia and is the preferred mode of anesthesia choice in the COVID-19 parturient. The benefit in the setting are two-fold: (1) it will help the patients to avoid exacerbation of respiratory disease seen

with mechanical ventilation and is less resource-intensive compared to general anesthesia, (2) avoids aerosol-generating procedures and reduces the risk of viral transmission in the health care workers. In terms of the risk of neuraxial complications, we should keep on mind that neuraxial hematoma is very rare complication and the much higher risk of respiratory complications as a result of general anesthesia is possible. From that point of view, neuraxial procedures at even lower platelet counts ( $<70,000 \times 10^6/L$ ) could be considered (6).

According to the current observation, hypotension caused from neuraxial anesthesia in Covid-19 patients, seems not to be more pronounced than in healthy population. Information about significant drops of blood pressure (probable reason binding of SARS CoV 2 with the angiotensin converting enzyme II receptor) and increased dosage of vasopressors in Covid-19 parturient has not been exactly noted, but an adequate prophylactic strategy, such as a phenylephrine infusion, is recommended (8,9) .

General anesthesia (GA) is not preferred choice for operative delivery because it represents the highest risk of viral exposure primarily during tracheal intubation and extubation. For those reasons, GA is recommended only for standard indications or in situations with failed neuraxial blockade. GA with mechanical ventilation could also be detrimental to the worsening of the respiratory parameters, therefore should be avoided whenever possible. On the other hand, intubation and GA may become indicated in severely compromised patients with deterioration of maternal respiratory function (desaturation  $Spo_2 < 93\%$ ) presented for emergency caesarean delivery (3,4).

In a cases where GA is inevitable, the anaesthesia team should consider strategy to minimize aerosol exposition and maximize first-pass intubation success. For that manner, closed suction system and video- laryngoscopy rather than direct laryngoscopy should be used. Moreover, a protective box placed over patients face is recommended to be used, which can additionally decrease the risk of viral transmission. After proper pre-oxygenation and stable hemodynamics to maintain optimal placental perfusion, rapid sequence induction is done as per usual practice. It is important to give a full dose of neuromuscular relaxant in order to reduce coughing, so rapid neuromuscular block with rocuronium 1.2mg/kg or succinylcholine 1 mg/kg should be performed.

A recent analysis has evaluated a variety of agents (dexmedetomidine, remifentanil, fentanyl, intra-cuff or intravenous lidocaine and lidocaine via tracheal or topical application) to minimize emergence coughing after tracheal intubation by what dexmedetomidine was ranked the most effective (13).

Extubation also exposes staff to a significant risk of contamination. Strategies to minimize this risk must be employed- at this time, enhanced PPE is necessary required for the procedure, with N95 or FFP2 mask, face shield, gown, and gloves (preferably long gloves). If manual ventilation is required, only small tidal volumes should be applied.

With COVID-19 infection, additional coagulation changes may occur, which may mirror the disease severity although extensive data is still lacking. There is emerging evidence suggesting that individuals admitted to hospital with COVID-19 infection are hypercoagulable. This, coupled with the hypercoagulability to pregnancy, would suggest that pregnant women with COVID-19 are more vulnerable of thrombotic complications (11). Generally recommendation are that all pregnant women admitted with COVID-19 infection (or suspected to COVID-19) should receive prophylactic low molecular weight heparin unless birth is expected within 12 h.

Postoperative analgesia: acetaminophen should be considered at first medication line, alone or in combination with NSAIDs as part of multimodal analgesia, although there are reports about link between usage of NSAIDs and worsening the clinical symptoms of COVID –19 patients (11). However, this evidence remain controversial. At this point NSAIDs can continue be used as the opioids likely poses more side effects. Caution must be observed due to liver toxicity at high doses of paracetamol. However, one must keep on mind the antipyretic effect of both paracetamol and NSAIDs may mask the symptoms associated with COVID-19.

### Conclusion

To provide safe obstetric anesthesia in setting of pandemic, we discuss the most important clinical features and different anesthetic and analgesic regimens of COVID-19 parturient undergoing normal or operative delivery. We emphasize safety and efficiency of different available practice for obstetric anesthesia and care related to COVID-19. Moreover, we need a constant review of the criteria and protocols according to the recommendation of professional societies to enhance the management of this population in pandemic.

### References

1. Rajewska A, Mikołajek-Bedner V, Lebdowicz-Knul J, Sokołowska M, Kwiatkowski S. COVID-19 and pregnancy – where are we now? *J. Perinat. Med.* 2020; 48(5): 428–434. <https://doi.org/10.1515/jpm-2020-0132>.
2. Laurence E. Ring, Rebecca Martinez, Kyra Bernstein\*, and Ruth Landau. What obstetricians should know about obstetric anesthesia during the COVID-19 pandemic . *Seminars in perinatology* 44 (2020) 151277. <https://doi.org/10.1016/j.semperi.2020.151277> 0146.
3. Bauer M E, Bernstein K., Dinges E. Obstetric Anesthesia During the COVID-19 Pandemic. *Anesth Analg* 2020;131:7–15. DOI: 10.1213/ANE.0000000000004856.
4. Ismail S, Aman A. Anesthesia and analgesia for parturient in COVID 19 pandemic. *Journal of Obstetric Anaesthesia and Critical Care*.Vol 10:2 (2020). DOI:10.4103/joacc.JOACC\_50\_20.
5. Van Veen JJ, Nokes TJ, Makris M. The risk of spinal haematoma following neuraxial anaesthesia or lumbar puncture in thrombocytopenic individuals. *Br J Haematol* 2010;148:15 25.
6. Agrawal P., Wadhwa B, Gaba P, Saxena K. Neuraxial Anesthesia in a COVID -19 Positive Pre-Eclamptic Parturient with Thrombocytopenia for Emergency Cesarean
7. Section: An Anaesthetic Challenge 2020. *Critical Care Obstetrics and Gynecology*. Vol.6 No.5:17. DOI: 10.36648/2471-9803.6.5.17.
8. D’Souza R, Asfrai R, Rowe H, Zipursky,Clarfield L.Pregnancy and COVID-19: pharmacologic considerations,*Ultrasound Obstet Gynecol* 2021; 57: 195–203.DOI: 10.1002/uog.23116.
9. Zhou D, Cai W, Zhang W. An adaptive wavelet method for nonlinear circuit simulation. *IEEE Trans Circuits Syst I Fundam Theory Appl* 1999;46:931 8.



10. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: Implications for virus origins and receptor binding. *Lancet* 2020;395:565-74.
11. S.N. El-Tallawy SN, Nalamasu R, Pergolizzi JV. Pain Management During the COVID-19 Pandemic. *Pain Ther* (2020) 9:453–466. <https://doi.org/10.1007/s40122-020-00190-4>.
12. Middeldorp S, Coppens M, van Haaps TF, Foppen M, Vlaar AP, Muller MCA, Bouman CCS, Beenen LFM, Kootte RS, Heijmans J, Smits LP, Bonta PI, van Es N. Incidence of venous thromboembolism in hospitalized patients with COVID-19. *J Thromb Haemost* 2020; 18: 1995–2002.
13. Manping Yang, Hailong Dong and Zhihong Lu Role of anesthesiologist during the COVID-19 outbreak in China. *British Journal of Anaesthesia*, 124 (6): 666-669 (2020) doi: 10.1016/j.bja.2020.03.022.

## 01 May 2021-Saturday

---

16:00-17:15 | Panel 8: PAIN

Chairs: İbrahim Aşık, Filiz Tüzüner

Prevention of Postsurgical Chronic Pain; İbrahim Aşık

Current Perspectives in Local Anesthetic Doses for Peripheral Nerve Blocks; Perihan Ekmekçi

Possibility of Improving Postoperative Pain Management By Improving Daily Practices; Adem Bytyqi

Pain Management in ICU; Suna Akın Takmaz

---

### POSSIBILITY OF IMPROVING POSTOPERATIVE PAIN MANAGEMENT BY IMPROVING DAILY PRACTICES

**Adem Bytyqi MD, EDPM<sup>1</sup>**

**Prof. Dr. Fadil Kryeziu<sup>2</sup>**

**Violeta Kryeziu, MD, PhD<sup>2</sup>**

**Agron Bytyqi MSc<sup>3</sup>**

<sup>1</sup>Anesthesiology & Intensive Care, General Hospital of Prizren, Kosova.

<sup>2</sup>National Institute of Public Health, Prizren, Kosova,

<sup>3</sup>Center for Continuing Professional Education, General Hospital of Prizren, Kosova

#### Introduction

Postoperative pain has been poorly managed for decades. Persistent postoperative pain is common after most surgical procedures.<sup>1</sup> The burden of untreated postoperative pain is high.<sup>2</sup> There is good quality evidence that supports many of the common agents utilized in multimodal therapy, however, there is a lack of evidence regarding optimal postoperative protocols or pathways.<sup>3</sup> Multimodal pain management provides additional pain relief until the fourth postoperative day, improves patient satisfaction at discharge, and reduces total narcotic consumption for postoperative pain management.<sup>4</sup>

#### Methods

The study was quantitative approach. The research was conducted from December 2014 - June 2019. Data were collected from 1924 patients in surgery, urology, orthopedics, ENT, ophthalmology, and gynecology/obstetrics. Prizren Regional Hospital has 521 beds; is the second largest hospital in Kosovo. Data about pain-related Patient Reported Outcomes (PROs) and process data were collected on the first postoperative day (POD1) using the methodology developed by PAIN OUT ([www.pain-out.eu](http://www.pain-out.eu)). PAIN OUT is an international registry, providing standardized and validated tools to assess pain management after surgery.

#### Results

Findings were obtained from 608 patients at general surgery, 475 patients at obs/gyn, 231 patients at ENT, 219 patients at urology, 199 patients at orthopedy and 192 patients at ophthalmology. From 1924 patients 1270 (66.2%) were females and 33.8% were males. From them reported that mean of maximum pain was 5.38/10 and minimum pain was 1.17/10.

Regarding to wards general surgery patients reported the worst pain (maxpain 6.06/10) and less pain was in Ophtalmology (maxpain 1.94/10). All patients gave consent to participate in study. General anesthesia was the most common form of anesthesia. During general survey of postoperative pain management many daily clinical practices was needed to be improvement. From the key findings can be mentioned the pharmacologic treatment of pain in combination with non-pharmacologic treatment, the evaluation of the pain, the continuous documentation, giving of analgesics according to the description and not "as needed" etc. After this stage was done interventional phase with recommendations regarding the improvement of daily practices, it has been noted that postoperative pain management has been improved to be reflected by decreasing the degree of postoperative pain and increasing patient satisfaction. After a period of time, a survey of postoperative pain management has been conducted and it has been seen that most of the everyday practices have become the old practices, so changing the daily clinical practice or habits has been seen as a challenge for health professionals.

### **Conclusion**

Patients after surgical procedures reported severe pain-related outcomes. It is needed to evaluation the pain in the sheet of vital signs monitoring. Based on these findings we recommend implementation of pain management programs and care policies to build pain management into standing orders, protocols and patient charts.

### **References**

1. Rawal N. Current issues in postoperative pain management. *Eur J Anaesthesiol.* 2016 Mar;33(3):160-71. doi: 10.1097/EJA. PubMed PMID: 26509324.
2. Zaslansky R, Chapman CR, Baumbach P, Bytyqi A, Castro Lopes JM, Chetty S, Kopf A, Li L, Ern Ming L, Olawoye O, Rizza Parico J, Soyannwo O, Stamenkovic D, Wang H, Meissner W. Improving perioperative pain management: a preintervention and postintervention study in 7 developing countries. *Pain Rep.* 2019 Jan 25;4(1):e705. doi: 10.1097/PR9.0000000000000705. PMID: 30801045; PMCID: PMC6370144.
3. Devin CJ, McGirt MJ. Best evidence in multimodal pain management in spine surgery and means of assessing postoperative pain and functional outcomes. *J Clin Neurosci.* 2015 Jun;22(6):930-8. doi: 10.1016/j.jocn.2015.01.003. Epub 2015 Mar 9. Review. PubMed PMID: 25766366.
4. Kang H, Ha YC, Kim JY, Woo YC, Lee JS, Jang EC. Effectiveness of multimodal pain management after bipolar hemiarthroplasty for hip fracture: a randomized, controlled study. *J Bone Joint Surg Am.* 2013 Feb 20;95(4):291-6. doi: 10.2106/JBJS.K.01708. PubMed PMID: 23302898.

## 01 May 2021-Saturday

---

16:00-17:15 | Panel 8: PAIN

Chairs: İbrahim Aşık, Filiz Tüzüner

Prevention of Postsurgical Chronic Pain; İbrahim Aşık

Current Perspectives in Local Anesthetic Doses for Peripheral Nerve Blocks; Perihan Ekmekçi

Possibility of Improving Postoperative Pain Management By Improving Daily Practices; Adem Bytyqi

Pain Management in ICU; Suna Akın Takmaz

---

### PAIN MANAGEMENT IN INTENSIVE CARE

**Prof. Dr. Suna Akın Takmaz**

*SBÜ. Ankara Training and Research Hospital*

*Anesthesiology and Reanimation Clinic / Algology Department*

Pain is a common problem in intensive care. Despite sufficient evidence of adverse clinical effects, pain is still infrequently assessed in the intensive care unit (ICU) and continues to be poorly managed (1). It is estimated that the pain is as high as 50% even in patients at rest, and this rate increases up to 80% during routine care procedures (2). In a study conducted by Ringdal et al. With 239 trauma intensive care patients, pain was expressed as the most common intensive care experience (3). During the intensive care period, patients experience pain for many reasons. Invasive and noninvasive procedures for diagnosis and treatment, prolonged immobility, surgical interventions, mechanical ventilation, endotracheal aspiration, rehabilitation practices, daily dressings and position changes or pre-existing chronic pathologies cause moderate to severe pain. Therefore, in intensive care patients, pains of different types (nociceptive, neuropathic) and characteristics (acute, intermittent, persistent, chronic) are encountered in relation to multifactorial causes and the underlying neurophysiological mechanisms. Intensive care also includes many additional problems that further increase the perception of pain, such as inability to move, not communicate, cold environment, and insomnia.

Pain causes numerous unfavorable physiological changes in most organ systems and leads to psychological consequences (4,5). The pain-induced stress response can lead to undesirable consequences, including increased concentrations of catecholamines, vasoconstriction, impaired tissue perfusion and decreased partial pressure of oxygen in the tissues. Another negative factor triggered by pain is hypermetabolism, which leads to hyperglycemia, lipolysis or protein catabolism, which causes impaired wound healing and increases the risk of infection. Pain leads to immune system disorders by inhibiting the NK cell activity, decreasing the cytotoxic T lymphocyte count and reducing the phagocytic activity of neutrophils. Inadequate control of pain also leads to impaired respiratory and cardiac functions, suppression of the immune system, sleep disturbance, exacerbation of delirium and agitation,

increased incidence of post traumatic stress disorder, prolonged stay in intensive care unit, and increase mortality. Studies report that prevalence rates of chronic pain between six months and two years after discharge from intensive care are between 33% and 56%. The importance of effective pain control together with early mobilization and rehabilitation to prevent chronic pain after ICU is obvious (6). For all these reasons effective management of pain in intensive care is extremely important on the healing process.

Assessment of pain in intensive care patients continues to be a challenge for clinicians, especially in sedated, intubated, and mechanically ventilated patients. Comprehensive and accurate assessment of pain is the first step in achieving effective pain management. Regular evaluation of pain in the intensive care unit is very important to preventing complications, decreasing mortality and morbidity, and increasing patient comfort. With regular evaluation of pain in intensive care patients; In addition to a reduction in pain, a shortened duration of mechanical ventilation and a reduction in the incidence of nosocomial infections have been demonstrated (7). Observation of physiological parameters (heart rate, arterial pressure, respiration rate) of pain is misleading as they can depend on the underlying cause of exacerbation (e.g. sepsis, haemorrhage, hypoxia). Also as shown, these parameters are not correlated with the patient's assessment of pain and results of behavioural tests (8). Therefore, they should not be used as a basis for the assessment of the presence and intensity of pain in patients in ICUs. The gold standard for the assessment of pain intensity is the patient's self-reporting using the visual analogue scale: VAS or numeric rating scale: NRS, which, however, assume patient cooperation. Although both scales are clinically easy to use and effective, in a study comparing five scales designed for this purpose, it was reported that the most reliable in assessing pain severity was NRS (7). In certain groups of patients, e.g. little children, patients who cannot communicate verbally (sedative drug use, mechanical ventilation support, change in levels of consciousness..), those with dementia or patients with mental illness, tools are those based on patients self-assessment are not suitable. The use of behavioral scales is recommended for these patients who are unable to self-report their pain experiences (9). Current studies show that the use of behavioral scales improves nursing and therapeutic interventions in critically ill patients, offers more effective pain management, reduces the consumption of analgesics and sedatives, and shortens the duration of mechanical ventilation (10). Numerous behavioral pain scales have been developed. However, in a study in which 6 different behavioral scales were analyzed, it was reported that the Behavioral Pain Scale (BPS) and Critical Care Pain Observation Tool (CPOT) were the most reliable and most validated behavioral scales (11). Both scales require only a short training, they can be easily used in clinical practice (12,13) (Table 1-2).

Pain management in intensive care poses significant challenges due to a number of problems specific to the patient population here. Pharmacodynamic and kinetic changes, acid-base imbalance, decreases in organ reserves, and currently existing comorbidities are included of these. Critically ill patients have a high risk of drug-drug, drug-patient and unexpected side effects and toxicity. Therefore pain management in intensive care patients whose

physiological and general health status changes on a dynamic basis should be personalized according to the pathology and condition of each patient. For this purpose, a multimodal, multidisciplinary approach that includes non pharmacologic treatments and regional analgesia methods with systemic opioids, which continue to be the first-line treatment in intensive care patients, should be planned. The guideline (Pain, Agitation and Delirium Management in Adult Patients in the Intensive Care Unit) published by the Intensive Care Association in 2013, was updated in 2018 (PADIS: Clinical Practice guideline for the prevention and management of Pain, Agitation / Sedation, delirium, inactivity and sleep disturbance in Adult Patients in the Intensive Care unit) (14). In this guideline, an evaluation-driven protocol-based analgo-sedation targeted multimodal analgesic approach is recommended. Analgo-sedation has been defined as analgesia before sedation or analgesia-based sedation. Detailed recommendations for the use of non-pharmacological modalities and analgesics included in the multimodal approach are also included in this guide.

Although not included in this guide, regional methods in pain management in intensive care units have been increasingly used in recent years, but they are still not used sufficiently. The application of regional methods in intensive care patients poses a unique set of difficulties compared to the application in elective surgery. First of all, the conditions required for a successful regional application (suitable position, good anatomical marking, patient cooperation, etc.) are limited in intensive care conditions. However, regional techniques applied with the right indication and appropriate timing can improve the clinical course of the patients and accelerate their discharge from the ICU. In a multimodal analgesia regimen, both neuraxial (NA) and various regional techniques significantly improve pain management while reducing opioid-associated side effects. These regional techniques include paravertebral block, intercostal blocks, Plan blocks (transversus abdominis plane block, serratus plane block, erector spine plane block..), all kinds of peripheral nerve blocks of the upper and lower extremities, sympathetic blocks. The risk of developing infections due to regional techniques is low and can be reduced by a single dose of antibiotic prophylaxis and tunneling of the catheters (15-17). Immunosuppression is not a contraindication for RA, but requires strict hygienic precautions and shorter catheterization times. When bacteremia or sepsis is present, continuous catheter techniques should not be used unless there is an absolute indication. In addition, PNB should not be applied in case of an open dirty wound or local infection in the planned area. There is some concern that patients with reduced consciousness due to therapeutic sedation may cause nerve damage from RA blocks. However, the risk of complications in these patients can be minimized by combining ultrasound guidance with nerve stimulation. The use of neuraxial techniques is limited due to findings such as coagulopathy, hypovolemia, hemodynamic instability, neurological deficit or increased intracranial pressure, which often accompany intensive care patients. In addition, complications such as deep hypotension due to local anesthetics and late respiratory depression due to opioids, which require intense monitoring after neuraxial block, have also constituted a significant disadvantage. Therefore, in intensive care patients, the risk-benefit

analysis should always be done individually, considering RA guidelines, and the risk of complications should be minimized by combining ultrasound guidance and nerve stimulation.

## References

1. Payen JF, Chanques G, Mantz J et al. Current practices in sedation and analgesia for mechanically ventilated critically ill patients: a prospective multicenter patient-based study. *Anesthesiology* 2007; 106: 687–95
2. Kohler M, Chiu F, Gelber KM, Webb CA, Weyker PD. Pain management in critically ill patients: a review of multimodal treatment options. *Pain Management*. 2016 Nov;6(6):591-602.
3. Ringdal M, Johansson L, Lundberg D, Bergbom I. Delusional memories from the intensive care unit: experienced by patients with physical trauma. *Intensive Crit Care Nurs* 2006; 22(6): 346-54
4. Blakely WP, Page GG. Pathophysiology of pain in critically ill patients. *Crit Care Nurs Clin North Am* 2001;13:167-79
5. Chapman CR, Tuckett RP, Song CW. Pain and stress in a systems perspective: reciprocal neural, endocrine, and immune interactions. *J Pain*. 2008; 9(2): 122–145
6. Kohler M, Chiu F, Gelber KM, Webb CA, Weyker PD. Pain management in critically ill patients: a review of multimodal treatment options. *Pain Manag* 2016;6:591–602.
7. Chanques G, Viel E, Constantin J-M, et al. The measurement of pain in intensive care unit: comparison of 5 self-report intensity scales. *PAIN* 2010;151(3):711-21.
8. Gélinas C, Arbour C. Behavioral and physiologic indicators during a nociceptive procedure in conscious and unconscious mechanically ventilated adults: similar or different? *J Crit Care*. 2009; 24(4): 628.
9. Li D, Puntillo K, Miaskowski C. A review of objective pain measures for use with critical care adult patients unable to self-report. *J Pain*. 2008; 9(1): 2–10
10. Payen JF, Bosson JL, Chanques G, et al. DOLOREA Investigators. Pain assessment is associated with decreased duration of mechanical ventilation in the intensive care unit: a post Hoc analysis of the DOLOREA study. *Anesthesiology*. 2009; 111(6): 1308–1316
11. Carrothers KM, Barr J, Spurlock B, et al. American College of Critical Care Medicine. Clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit. *Crit Care Med*. 2013; 41(1): 263–306
12. Gélinas C, Fillion L, Puntillo KA, et al. Validation of the critical-care pain observation tool in adult patients. *Am J Crit Care*. 2006; 15(4): 420–427
13. Payen JF, Bru O, Bosson JL, et al. Assessing pain in critically ill sedated patients by using a behavioral pain scale. *Crit Care Med*. 2001; 29(12): 2258–2263
14. Devlin JW, vd. et al. Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. *Crit Care Med*. 2018 Eyl; 46 (9): e825-e873.
15. Hebl JR, Niesen AD. Bölgesel anestezinin bulaşıcı komplikasyonları. *Curr Opin Anaesthesiol* 2011; 24: 573 - 80.
16. Bombarg H, Krotten D, Kubulus C, Wagenpfeil S, Kessler P, Steinfeldt T, ve diğerleri. Bölgesel Anesteziye Tek Doz Antibiyotik Profilaksisi: Geriye Dönük Kayıt Analizi. *Anesteziyoloji* 2016; 125: 505 - 15.
17. Bombarg H, Kubulus C, Herberger S, Wagenpfeil S, Kessler P, Steinfeldt T, ve diğerleri. Torasik epidural kateterlerin tünellenmesi, kateterle ilişkili daha az enfeksiyonla ilişkilidir: geriye dönük bir kayıt analizi. *Br J Anaesth* 2016; 116: 546 - 53.

Table 1. Critical-Care Pain Observation Tool (CPOT) (Gelin et al. (11), 2006)


<b>Facial expression</b>  Caroline Arbout, RN, B.Sc., PhD (student) School of Nursing, McGill University	Relaxed, neutral	0	No muscle tension observed
	Tense	1	Presence of frowning, brow lowering, orbit tightening and levator contraction or any other change (e.g. opening eyes or tearing during nociceptive procedures)
	Grimacing	2	All previous facial movements plus eyelid tightly closed (the patient may present with mouth open or biting the endotracheal tube)
<b>Body movements</b>	Absence of movements or normal position	0	Does not move at all (doesn't necessarily mean absence of pain) or normal position (movements not aimed toward the pain site or not made for the purpose of protection)
	Protection	1	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements
	Restlessness/agitation	2	Pulling tube, attempting to sit up, moving limbs/thrashing, not following commands, striking at staff, trying to climb out of bed
<b>Compliance with the ventilator (intubated patients)</b> or <b>Vocalization (extubated patients)</b>	Tolerating ventilator or movement	0	Alarms not activated, easy ventilation
	Coughing but tolerating	1	Coughing, alarms may be activated but stop spontaneously
	Fighting ventilator	2	Asynchrony: blocking ventilation, alarms frequently activated
<b>Compliance with the ventilator (intubated patients)</b> or <b>Vocalization (extubated patients)</b>	Talking in normal tone or no sound	0	Talking in normal tone or no sound
	Talking in normal tone or no sound	1	Sighing, moaning
	Crying out, sobbing	2	Crying out, sobbing
<b>Muscle tension</b> Evaluation by passive flexion and extension of upper limbs when patient is at rest or evaluation when patient is being turned	Relaxed	0	No resistance to passive movements
	Tense, rigid	1	Resistance to passive movements
	Very tense or rigid	2	Strong resistance to passive movements or incapacity to complete them
Total		-/8	

Table 2. Behavioral Pain Scale (Payen et al. (12), 2001)

Item	Description	Score
Facial expression	Relaxed	1
	Partially tightened (e.g., brow lowering)	2
	Fully tightened (e.g., eyelid closing)	3
	Grimacing	4
Upper limb movements	No movement	1
	Partially bent	2
	Fully bent with finger flexion	3
	Permanently retracted	4
Compliance with mechanical ventilation	Tolerating movement	1
	Coughing but tolerating ventilation for the most of time	2
	Fighting ventilator	3
	Unable to control ventilation	4

BPS score ranges from 3 (no pain) to 12 (maximum pain)



---

## 01 May 2021-Saturday

---

17:25-18:40 | Panel 9: ICU II

Chairs: Lulzim Emini, Murat Sayin

Management of Acute Respiratory Failure in ICU; Alma Cani

Hyperbaric Oxygen Therapy-Current Situation and Perspectives; Hristo Bozov

Early Mobilization and Rehabilitation in The Intensive Care Unit; Mirjana Shosholcheva

Sedation and Delirium in ICU; Sibel Temur

---

### EARLY MOBILIZATION AND REHABILITATION IN THE INTENSIVE CARE UNIT

**Prof. Mirjana Shosholcheva**

*Faculty of Medicine University "Ss. Cyril and Methodius"  
Skopje, Republic of North Macedonia*

#### Introduction

Modern medicine and advanced technology provide life-sustaining treatment and may improve outcome and return to a quality life in critically ill patients from Intensive care Unit (EIL). However, prolonged stay in EIL with bed rest is associated with negative physical and psychological effects. Survivors of ICU admission experience a lot of problems in the so-called post intensive care syndrome (PICS) which is a result of a number of stressors such as medical interventions, disturbed sleep, anxiety, inability to communicate, uncertain prognosis, and inability to predict events. PICS involves physical functioning, cognition and mental health (1). Physically, PICS manifests as ICU-acquired weakness, deconditioning, ICU polyneuromyopathy and pulmonary dysfunction, while depression, anxiety post-traumatic stress syndrome and difficulties with attention and memory are disorders of mental health and cognition. ICU-acquired weakness in patients who are critically ill commonly manifests in three ways: polyneuropathy, myopathy, and/or muscle atrophy. Muscle atrophy as a result of immobilization whose mechanism is complex and involves multiple processes such as local and systemic inflammation, decreased protein synthesis, and muscle catabolism can lead to persistent functional disability. Patients on mechanical ventilation (MV) are particular target group that may have muscle wasting and weakness one year after discharge from EIL (2).

#### Implementing and sustaining an early rehabilitation in ICU

It is essential to change attitudes towards performing early rehabilitation in EIL, and especially to mobilize patients on mechanical ventilation. Barriers to early mobilization of critically ill patients owe to a lack of priority for mobilization, that is, an understanding that the rest is better, as well as a restriction on patients' activities while they are in EIL. Multidisciplinary strategies vary drastically in different countries, and there is a lack of coordination which is the main problem. Early mobilization in patients on MV is an integral part of their rehabilitation (3).

NICE recommendations for rehabilitation programs for critically ill patients are constantly updated (4). Rehabilitation should start on the day of EIL admission in the first 24 hours and yet everyone agrees and recommend that early rehabilitation should begin immediately after physiological stabilization (neurological, respiratory, and cardiovascular stability). In patients on MV for more than 7 days, rehabilitation therapy with early mobilization protocol improves outcome, reduce number of MV days and provide a faster departure from EIL. But still, despite this knowledge

and the improvement of intensive care, early mobilization and rehabilitation do not seem to follow this development. More barriers are the reason for this: cultural barriers, sedation, endotracheal tubes, various connected devices and no less important, lack of resources, lack of trained staff and cost. At least, physical therapy may not be familiar to most medical staff in EIL, or EIL may not be a familiar environment for the rehabilitation team (lots of equipment, devices, monitors etc.)

Rehabilitation strategies for the period of residency in EIL are specific and depend on dominant disease / injury. Patients should be promptly evaluated clinically to determine the patient's risk of developing physical and non-physical morbidity and a comprehensive clinical assessment to identify their rehabilitation needs has to be conducted. This should include health professionals with work experience in EIL and rehabilitation.

There are some general restrictions on mobilization in patients on MV and consideration should be given to postponing rehabilitation until the condition allows. These include major laboratory abnormalities, recent change in ventilatory mode, dysrhythmia, new acute myocardial infarction, new vasopressor administration, MAP < 65 Hg, PO<sub>2</sub> < 88% or temperature > 38°C. Finally, the cardiopulmonary condition will determine the extent of mobilization activities. For some patients only passive chest physiotherapy is sufficient rehabilitation, but for some not even sitting on the bed will meet the requirements for good rehabilitation. Transcutaneous electrical stimulation combined with passive exercise may be used in patients with severe instability. There is controversy over the use of chest physical therapy in deep-seated and mechanically ventilated patients (hemodynamic stress). No major benefit of prophylactic physiotherapy has been proven in patients on mechanical ventilation unless they have pneumonia (5). Attitudes about active rehabilitation and outcome are contradictory in patients with sepsis (6). For example, contraindication for early mobilization may be if it is perceived that the exercises will cause exacerbation of inflammation. The enigma is when to start mobilization activities in patients with inflammation? Careful assessment is required, e.g. reduction in cytokine values.

It is proved that physiotherapy can maintain overall functional status by reducing inflammatory damage to skeletal and respiratory muscles (7). Finally, rehabilitation in septic patients might not decrease ICU mortality, but might improve quality of life. Many potential contraindications can prevent the positive effect of the early rehabilitation but in general, the

recommendations are early physical activity in order to prevent complications of prolonged bed rest, sedation, and immobilization.

### **How to mobilize safely intubated patient on mechanical ventilation?**

Factors that affect patient mobilization are patient condition before morbidity, sedation level (the degree of awareness), cardiopulmonary and neuromuscular status, generalized muscle strength, as well as need for vasopressors. Safety measures for the mobilization of critically ill are adequate cardiac and pulmonary reserve and stability, and protocol combination of daily cessation of sedation ("conscious sedation") with mobilization activities.

Cardiopulmonary responses to mobilization activities are of great importance. Monitoring (tidal volume, minute volume and tensio arterialis) is required in different positions: lying down, sitting on the bed, turning (assisted by Ambu). "Passive" chest therapy (tapping) improves gas exchange (assessment according to A-B status).

Combination chest physiotherapy, passive movement of the lower extremities or electrostimulation improves cardiopulmonary reserve and improves muscle strength.

### **Conclusion**

The benefits of early mobilization and rehabilitation in EIL patients are unquestionable. The length of stay in the EIL is shortened and the occurrence of PICS is reduced. Patients on mechanical ventilation, although they seem difficult and unsuitable for mobilization, also have benefited greatly not only from the time spent on the mechanical ventilation but also from weaning.

### **References:**

1. Held, Natalie, and Marc Moss. "Optimizing Post-Intensive Care Unit Rehabilitation." *Turkish thoracic journal* vol. 20,2 147-152. 1 Apr. 2019, doi:10.5152/TurkThoracJ.2018.18172
2. Herridge MS et al; Canadian Critical Care Trials Group. One-year outcomes in survivors of the acute respiratory distress syndrome. *N Engl J Med.* 2003 Feb 20;348(8):683-93. doi: 10.1056/NEJMoa022450. PMID: 12594312.
3. Eakin MN, Ugbah L, Arnautovic T, Parker AM, Needham DM. Implementing and sustaining an early rehabilitation program in a medical intensive care unit: A qualitative analysis. *J Crit Care.* 2015 Aug;30(4):698-704. doi: 10.1016/j.jcrc.2015.03.019. Epub 2015 Mar 21. PMID: 25837800.
4. NICE (National Institute for health and Care Excellence). Rehabilitation after critical illness in adults. Clinical guideline, 2009. [www.nice.org.uk/guidance/cg83](http://www.nice.org.uk/guidance/cg83)
5. Spapen HD, De Regt J, Honoré PM. Chest physiotherapy in mechanically ventilated patients without pneumonia-a narrative review. *J Thorac Dis.* 2017;9(1):E44-E49. doi:10.21037/jtd.2017.01.32
6. Taito S, Taito M, Banno M, Tsujimoto H, Kataoka Y, Tsujimoto Y. Rehabilitation for patients with sepsis: A systematic review and meta-analysis [published correction appears in *PLoS One.* 2019 Aug 21;14(8):e0221224]. *PLoS One.* 2018;13(7):e0201292. Published 2018 Jul 26. doi:10.1371/journal.pone.0201292
7. Hickmann CE, Castanares-Zapatero D, Deldicque L, et al. Impact of Very Early Physical Therapy During Septic Shock on Skeletal Muscle: A Randomized Controlled Trial. *Crit Care Med.* 2018;46(9):1436-1443. doi:10.1097/CCM.0000000000003263

## 01 May 2021-Saturday

18:50-20:05 | PANEL 10: ICU III

Chairs: Işıl Özkoçak Turan, Yeşim Batıslam

Deceased Organ Transplantation During Covid-19 Pandemic; Maja Mojsova

Intensive Care Management in Transplantation; Pınar Zeyneloğlu

Pulmonary Hypertension and Anesthesia; Maja Sostaric

Patient Oriented Transfusion Management; Dilek Ünal

### PULMONARY HYPERTENSION AND ANESTHESIA

**Assoc. Prof. Dr. Maja Sostaric, MD**

University Medical Centre Ljubljana, Slovenia

Faculty of Medicine, University of Ljubljana, Slovenia

maja.sostaric@kclj.si

#### Abstract

Pulmonary hypertension (PH) is a disease characterized by changes in the pulmonary vessel vascular wall. The causes of PH are different and despite advances in diagnosis, the treatment is still aimed at alleviating symptoms and it is rarely possible to eliminate the cause of PH. Mortality of the patients with PH is still high. Patients with PH who need surgery are special challenge for anaesthesiologist. For the success of surgical treatment a multidisciplinary approach is essential and the cooperation of a pulmonologist, surgeon, anaesthesiologist, intensivist, cardiologist and other medical staff is required.

#### Introduction

Postoperative mortality of patients with PH after non-cardiac surgery is between 1% -18% and postoperative morbidity is between 14%-42%. The most common postoperative complications are: respiratory and cardiac failure, cardiac arrhythmias, acute renal failure, sepsis and myocardial infarction.

#### Definition of pulmonary hypertension

PH is defined as mean pulmonary arterial pressure > 25 mmHg measured during right heart catheterization. PH is not an independent disease, but an abnormal hemodynamic measurement resulting from various diseases.

#### Classification of pulmonary hypertension

The World Health Organization (WHO) classification has divided PH into 5 groups on the basis of similarities and pathophysiology, clinical presentation, and therapeutic options.

Group 1	Pulmonary arterial hypertension
Group 2	Pulmonary hypertension due to left-sided heart disease
Group 3	Pulmonary hypertension due to lung diseases and/or hypoxia
Group 4	Chronic thromboembolic pulmonary hypertension
Group 5	Pulmonary hypertension with unclear or multifactorial aetiology

**Pathology**

Although there are many causes of PH and they differ from each other, the processes that develop lead to a final change in the vascular wall of the pulmonary vessels, which is the main cause of pathophysiological events in patients with PH. Vascular endothelial damage leads to vasoconstriction and remodelling of the vascular wall. Various active substances and mediators play an important role in vascular wall remodelling, vascular wall cell proliferation and vasoconstriction. Thus, PH is characterized by an imbalance in the concentrations of the vasodilatory agent prostacyclin and the vasoconstrictor agents thromboxane A2 and endothelin. Thromboxane A2 increases platelet aggregation, and endothelin increases smooth muscle cell proliferation in the vascular wall. Decreased nitric oxide (NO) concentration, which acts as a vasodilator and reduces cell proliferation in the vessel wall, has been observed in patients with PH. All these changes and imbalances cause a narrowing of the pulmonary vessels, increase the resistance and the afterload of the right ventricle.

**Diagnosis**

The symptoms of pulmonary hypertension are non-specific and mainly related to the progressive right ventricular failure. Patients are often tired, with shortness of breath and their functional capacity decreases. The diagnostic algorithm starts with the suspicion of PH.

The diagnosis is confirmed by different laboratory tests, imaging investigation and functional tests. At the end the diagnosis should be confirmed or rejected and the underlying disease should be also identified.

**Treatment**

Treatment is non-specific and aimed at relieving the symptoms of dyspnoea and heart failure. In recent years, specific drugs that act vasodilatory on the pulmonary vessels and reduce platelet aggregation have also been introduced into the clinical practice.

It is important to maintain patient's good psychophysical condition and prevent infections.

Patients with idiopathic PH are taking anticoagulant drugs to prevent thrombotic angiopathy. Anticoagulant drugs only improve survival in patients with idiopathic PH.

Drugs from the group of calcium channel blockers are often used because they have a vasodilatory effect. Due to heart failure, patients receive diuretics. Oxygen reduces pulmonary vascular resistance, but there is no evidence that chronic oxygen therapy prolongs the survival of patients with PH.

Specific drugs for the treatment of PH are, in addition to calcium channel blockers, synthetic prostacyclin analogues: epoprostenol, iloprost and treprostinil. Epoprostenol is in i.v. form and is given as a continuous infusion due to its short half-life.

Another group of specific drugs are endothelin receptor blockers: bosentan, ambrisentan, and macitentan. They are all for oral use and improve the physical abilities of patients with PH. Recently, many drugs from the group of phosphodiesterase-5 inhibitors have been prescribed: sildenafil and tadalafil, which also improve the functional capacity of patients.

Preoperative assessment of patients with PH before non-cardiac surgery

Despite advances in perioperative treatment of a patient with PH, mortality in the postoperative period is still between 7% and 18%. Preoperative optimization of the patient's medical condition is important for the success of surgical treatment. The frequency of postoperative complications and mortality are affected by: type of the surgery, patient's functional status, PH level, right ventricular function, and the presence of other comorbidities. An accurate medical history and clinical status are required prior to surgery. Among the anamnestic data, we are mainly interested in patient's functional capacity and presence of dyspnoea at rest. Dyspnoea at rest, syncope and unconsciousness are particular poor predictors of postoperative outcome. Before the operation the laboratory tests should be performed: hemogram, biochemistry; elevated proBNP is a poor prognostic factor and indicates heart failure.

Before surgery, it is necessary to optimize medical treatment. Patients should receive specific medications.

Patients with COPD should be given oxygen, bronchodilators, and antibiotics if infection is suspected.

If patients are already receiving specific drugs to reduce pulmonary vascular resistance, these drugs should be continued, otherwise consultation with a pulmonologist is required to initiate appropriate drugs before surgery.

The risk of postoperative complications is associated with a type of surgery. Surgery should be limited to the most urgent and appropriate surgical technique should be selected. It is important to shorten surgery time, prevent greater blood loss, and choose less invasive surgical techniques.

### **Interoperative period**

During the anaesthetic procedures additional increase in pulmonary vascular resistance and worsen the performance of right ventricle should be avoided. Induction of anaesthesia, intubation, positive-pressure mechanical ventilation, and pain affect pulmonary vascular resistance and contribute to right ventricular failure. Spontaneous breathing has the least effect on pulmonary hemodynamic, intubation and positive pressure ventilation increase the pulmonary resistance as well as hypoxemia and hypercapnia.

Isoflurane, sevoflurane, oxidul and desflurane reduce right ventricular contractility. All of the listed inhalation anaesthetics except sevoflurane increase the resistance in the pulmonary vessel and should be used with caution.

Etomidate has the least effect on right ventricular contractility and vascular resistance and can be safely used for induction of anaesthesia in patients with PH. Thiopental, propofol and ketamine reduce the contractility of the right ventricle, pulmonary vascular resistance is affected by propofol, which lowers it, and ketamine, which increases pulmonary vascular resistance in adults and decreases it in children.

Opioid analgesics do not affect pulmonary vascular resistance and right ventricular contraction and are used safely in patients with PH.

Spinal and epidural anaesthesia are not contraindicated in patients with PH. Due to the effect of spinal and epidural anaesthesia on peripheral vascular resistance, a decrease in preload, leading to a decrease in cardiac output this technique should be performed carefully. Whenever possible, peripheral nerve block is appropriate for patients with PH.

Invasive arterial and central venous pressure are measured in all patients to detect the slightest disturbance in hemodynamic. The use of a pulmonary catheter is appropriate in major surgeries and in patients with severe PH. Transoesophageal ultrasound is a less invasive method and is now mandatory for monitoring heart function during surgery in patients with severe PH.

#### **Inotrops and vasoactive drugs**

Many factors in the perioperative period affect the cardiovascular system and can cause hypotension, cardiac ischemia, and heart failure. Various drugs are used to stabilize the cardiovascular system. Noradrenaline and vasopressin with a vasoconstrictor effect increase perfusion pressure and blood flow through the right coronary artery, which is important to prevent right ventricular failure due to ischemia. Dobutamine, adrenaline and levosimendan are used to improve the contractility of the right ventricle. Milrinone increases the contractility of the right ventricle, it also has a vasodilatory effect, which is more pronounced on the pulmonary than on the systemic vessel.

To avoid the systemic effect of drugs that reduce pulmonary vascular resistance, they are administered as inhalations. iNO, epoprostenol and iloprost are the most commonly used as inhalators. After discontinuation of iNO, a “rebound phenomenon” may occur, characterized by vasoconstriction and right ventricular failure. The “rebound phenomenon” is less common with iloprost, which can also be given to a non-intubated patient via a special inhaler.

#### **Postoperative treatment**

Postoperative treatment must be planned before the surgery. In the early postoperative period the fluid optimisation with crystalloids or blood in case of blood loss is essential for hemodynamic stabilization. Spontaneous breathing, avoidance of hypoxemia and hypercarbia decrease pulmonary resistance. Postoperative respiratory failure is one of the most common complications and worsens treatment outcome.

The same vasoactive and inotropic drugs are continued in the postoperative period and are gradually discontinued according to the hemodynamic state. The risk of heart failure persists for several days after surgery.

With multimodal postoperative analgesia plan pain could be successfully controlled. Untreated postoperative pain lead to activation of the sympathetic nervous system and hemodynamic instability.

### **Conclusion**

Successful surgical treatment of a patient with PH requires team approach. Usually, the pulmonologist treating the patient has the task of coordinating the entire team and optimally preparing the patient for surgery. The surgeon must choose a less invasive surgical technique, the operation must be as short as possible and with good surgical haemostasis. Anaesthesia technique should not affect pulmonary vascular resistance and right ventricular function. Already before surgery, postoperative analgesia and postoperative recovery should be planned with good monitoring of the patient's medical condition.

### **References**

1. Pilkington SA, Taboada D, Martinez G. Pulmonary hypertension and its management in patients undergoing non-cardiac surgery. *Anaesthesia* 2015; 70: 56-70.
2. Lai HC, Wang KY, Lee WL, Ting CT, Liu TJ. Severe pulmonary hypertension complicates postoperative outcome of non-cardiac surgery. *Br J Anaesth* 2007; 99:184-90.
3. Archer SL, Weir EK, Wilkins MR. Basic science of pulmonary arterial hypertension for clinicians: new concepts and experimental therapies. *Circulation* 2010; 121:2045-66.
4. Sitbon O, Humbert M, Jais X, et al. Long-term response to calcium channel blockers and idiopathic pulmonary arterial hypertension. *Circulation* 2005; 111: 3105-11.
5. Fisher LG, Van Aken H, Bürkle H. Management of pulmonary hypertension: physiological and pharmacological considerations for anesthesiologists. *Anesthesia and Analgesia* 2003; 96: 1603-16.



---

## 01 May 2021-Saturday

---

18:50-20:05 | PANEL 10: ICU III

Chairs: Işıl Özkoçak Turan, Yeşim Batislam

**Deceased Organ Transplantation During Covid-19 Pandemic;** Maja Mojsova

**Intensive Care Management in Transplantation;** Pınar Zeyneloğlu

**Pulmonary Hypertension and Anesthesia;** Maja Sostaric

**Patient Oriented Transfusion Management;** Dilek Ünal

---

### PATIENT CENTRED BLOOD TRANSFUSION

***Dilek Ünal, MD***

*SBÜ. Dışkapı Yıldırım Beyazıt Training and Research Hospital  
Anesthesiology and Reanimation Clinic*

Since the first blood transfusion in 1818 until 1970's the major concern was the production of standard blood components and avoiding blood shortage. The 1980's was the period of the HIV epidemic. Safe blood transfusion - Rational use of blood - Bloodless surgery became the new transfusion approach and avoiding transfusion became the new focus of the transfusion practice. Later in the era of, The Appropriate Clinical use of Blood, blood conservation methods were introduced into practice. Many Transfusion guidelines were released to aid the decision of transfusion. All the scientific evidence gathered from these transfusion approaches introduced a new transfusion era; in 2007 Patient Blood Management (PBM) was first mentioned and the transfusion practice shifted from the blood component to the patient's own blood as a source. In 2010 the World Health Organization (WHO) advised member countries to implement PBM.

This presentation aims to summarize the principles of PBM, anemia and its management, current transfusion guidelines, coagulation management, and discuss the concept of physiologic transfusion triggers.

PBM is a combination of evidence based individualized multidisciplinary multimodal strategies based on three pillars; prevention of anemia, reducing blood loss and tolerating anemia by optimizing physiologic reserves.

First the prevent anemia pillar. The risk of preoperative anemia is established with many studies; preoperative hematocrit (Htc) lesser than 29% is associated with increased risk of surgical complications, even mild anemia can lead to significantly increased risk of mortality medical complications and unplanned hospital readmissions. Preoperative anemia also increases the risk of receiving a red blood cell (RBC) transfusion. Loo et al. evaluated 9144 patients over 5 year time; patients were divided in 4 groups, Htc  $\geq 25$  with or without transfusions and Htc  $\leq 25$  with or without transfusion; markers of end-organ dysfunction, myocardial infarction, renal and hepatic failure, neurologic complications, duration of

ventilatory support in hospital mortality, length of stay, long-term survival, glomerular filtration rate and troponin levels were compared, and the worst outcomes were observed in patient having both anemia and receiving transfusion. The incidence of preoperative anemia is high, Pre-operative anemia is present in one-third of patients scheduled for major elective surgery. The first problem with the approach to preoperative anemia is the definition. WHO defines preoperative anemia as a hemoglobin (Hb) concentration lesser than 12 in females and 13 in males. This definition is also problematic because women have a lower circulating blood volume compared to men however they lose the same amount of blood during the same surgical procedures, thus a higher proportion of circulating blood is lost. Preoperative anemia should be defined as a Hb concentration lesser than 13 for both sexes. In 2017 a consensus statement providing a simple approach to perioperative anemia management was released. According to this statement 60% of preoperative anemia is iron deficiency anemia and can be diagnosed with ferritin, transferin, C-reactive protein and vitamin B12 and folate measurements. Preoperative treatment of anemia depends on the timing of surgery, and intravenous iron (IV) treatment is advised for those having limited time. The safety and effectiveness of IV iron treatment are the two major concerns of this treatment. The safety of IV iron treatment is demonstrated with several studies and it was concluded that the benefits of IV iron treatment exceeds the risks when used appropriately.

The effectiveness of iron treatment is however a more complex issue. The IRONMAN study showed that in patients admitted to the intensive care unit (ICU) who were anemic, IV iron, compared with placebo, did not result in a significant lowering of RBC transfusion requirement. However, Hb concentrations were higher in those receiving IV iron, compared with placebo. Similarly the PREVENTT study showed that preoperative IV iron was not superior to placebo to reduce need for blood transfusion when administered to patients with anemia 10-42 days before elective major abdominal surgery. This brings us to the debate of delaying surgery for the treatment of preoperative anemia. Despite transfusion guidelines recommend delaying surgery in those having preoperative anemia, evidence demonstrates an uncertainty whether IV iron reduces transfusion. This option should be considered in relation to the urgency of surgery, the amount of expected blood loss and of course patient's consent.

Secondly the tolerate anemia pillar. This pillar may seem controversial to the prevent anemia pillar but this pillar is defined by optimizing physiological reserves.

In normovolemic anemia, compensatory mechanisms prevent tissue hypoxia. Blood loss leads to sympathetic activation and consequent increase in coronary blood flow, heart rate, cardiac output and capillary circulation and decrease in vascular resistance and blood viscosity, the blood is redistributed to vital organs, and tissue oxygenation is preserved or increased. All these mechanisms explain how transfusion triggers can be so low provided that normovolemia is maintained.

Current transfusion guidelines recommend a restrictive transfusion strategy. The American Society of Anesthesiologists (2015), describes this restrictive strategy as RBC transfusion when

Hb <8 g/dL and Htc <%25, and if Hb is 6-10 g/dL the decision should be based on the amount of ongoing bleeding, probability of bleeding, rate of bleeding the volume status, risk of end organ ischemia and the cardiopulmonary reserve of the patient.

The Australian PBM perioperative guideline(2009) recommend that if Hb >10 g/dL, transfusion must be avoided and that in patients having myocardial ischemia transfusion may be appropriate if Hb is 7-10 g/dL and RBC transfusion should not be dictated by Hb concentration alone but, should also be based on assessment of the patient's clinical status.

The European Society of Anesthesiologists (2013) recommended that the target Hb concentration should be 7-9 g/dL during active bleeding.

The American Association of Blood Banks (2016) recommends that in hospitalized stable patients – including ICU- transfusion is not indicated for those with Hb above 7 g/dL a restrictive trigger of 8 g/dL is appropriate for those having cardiovascular disease.

A recent editorial from J L Vincent brings the danger of guideline based transfusion decision to attention. According to Vincent, in studies comparing restrictive vs. liberal transfusion strategies patients with a likelihood of benefit from a transfusion are already transfused and the patients with an unknown benefit probability are randomized in the restrictive or liberal arms and that this may cause bias.

Chong et al. performed a meta-analysis of randomized controlled trials (RCT) concerning transfusion triggers in ICU patients and patients undergoing surgery. Restrictive strategy was RBC transfusion when Hb was 7-8 g/dL and liberal strategy when Hb was 9-10 g/dL. The analysis included 27 RCTs, 12 ICU patients and 15 perioperative patients; 30 day mortality, late mortality, myocardial infarction, infection, stroke, transfusion reaction were the outcomes. The results were in favor of the liberal strategy for perioperative patients, higher mortality was detected with a restrictive strategy. The authors highlighted the methodological issues of previous meta-analyses and concluded that surgical patients have different perioperative risk factors such as surgical blood loss, vasoregulatory alterations due to anesthesia, volume shifts caused by major complex surgery and that this may change the perioperative oxygen supply-demand balance.

To summarize the guideline recommendations, transfusion is rarely indicated if Hb is >10 g/dL, usually indicated if Hb is <7 g/dL and depends on the patient if Hb is 7-10 g/dL.

This “depends on the patient” requires further discussion. Several RCTs reported transfusion thresholds defined for certain patient populations. Based on the Hb concentration transfusion should be commenced in symptomatic patient if <10 g/dL: asymptomatic hospitalized patient if 7 to 8 g/dL; pre-existing coronary artery disease if 8 g/dL; acute coronary syndrome (including MI) and ongoing ischemia, hemodynamic instability if <8 g/dL, considered if 8-10 g/dL and Hb should be maintained  $\geq$ 10 g/dL if the patient has ongoing ischemia, hemodynamic instability; heart failure if 7-8 g/dL; ICU/septic shock if 7 g/dL; acute bleeding if 7- 9 g/dL; non-

cardiac surgery, hip surgery if 8 g/dL; cardiac surgery, 7.5 to 8 g/dL; chronic kidney disease, 10 to 11.5 g/dL and in oncology patient if receiving myelosuppressive chemotherapy, 7 to 8 g/dL and terminal cancer or palliative care patients should be transfused on a case-by-case basis.

The last pillar of PBM is the management of coagulation and bleeding. It is well known that bleeding leads to increased morbidity and mortality in surgical patients and increases intra operative blood transfusion. Aside from complications of transfusion, bleeding leads to renal failure, neurological and pulmonary complications and sepsis and death. Risk classifications for the prediction of surgical bleeding are well defined for cardiac surgery; age, gender, body weight, surgical technique, urgency of surgery, the creatinin and Htc levels appear to be determinants of increased bleeding. Most of these risk factors are also valid for other surgeries. A study conducted in patients undergoing shoulder arthroplasty demonstrated that low weight, female gender and age over 70 years were risk factors for RBC transfusion. Patients on antitrombotics –anticoagulants should be managed according to the risk of bleeding and thrombosis and the urgency and complexity of surgery. Also blood conservation methods should be used in selected cases when indicated.

Thus the transfusion decision should be patient centered and include anemia management, coagulation management, blood conservation when appropriate and a patient specific transfusion trigger should be used. Although experience is very important, transfusion decision should not be based on habits or intuition.

In consideration of a patient specific transfusion trigger, this trigger should be based on signs of decreased tissue perfusion.

Tissue oxygenation is the net product of oxygen delivery and oxygen consumption.

$$O2ER = VO2/DO2$$

$$DO2= Q \times [Hb \times 1.39 \times SaO2] + (PaO2 \times 0.003]$$

$$VO2= Q \times CaO2 -[Hb \times 1.39 \times SvO2] + (PvO2 \times 0.003)]$$

[O2ER, oxygen extraction; DO2, oxygen delivery; CO, cardiac output; Hb, hemoglobin; SaO2, arterial oxygen saturation; PaO2, partial pressure of oxygen in the arterial blood; CaO2, arterial oxygen content; VO2, oxygen consumption; ScvO2, central venous oxygen saturation; CcvO2, central venous oxygen content; PcvO2, central venous partial pressure of oxygen]

The heart, circulatory system and blood-as the oxygen reservoir are the key elements of oxygen delivery. Oxygen delivery is evaluated with the monitoring of these key elements. Heart rate and stroke volume are determinants of cardiac output and values of preload, afterload, contractility, vascular resistance and the volume status can either be measured calculated or estimated and as a result it can be assured that the patient is normovolemic. At the organ or tissue level oxygenation can be evaluated with several monitors who are

currently used only for investigations with an exception for near infrared spectroscopy (NIRS). The Hb concentration is the cardinal determinant of oxygen delivery.

In a 70 kg healthy resting adult, with a 5 L/min cardiac output 1,000ml/min oxygen is delivered and 250 ml/min is consumed which corresponds to an O<sub>2</sub>ER of (250 ml/min/1,000 ml/min) 25%. When the arterial oxygen content and DO<sub>2</sub> decrease the O<sub>2</sub>ER is increased to provide enough VO<sub>2</sub>. At some point, VO<sub>2</sub> becomes dependent on DO<sub>2</sub>, and O<sub>2</sub>ER cannot be further increased which is the critical DO<sub>2</sub>. The aerobic metabolism cannot be continued further and anaerobic metabolism leads to a drop in venous oxygen saturation, hyperlactatemia, and metabolic acidosis. These metabolic changes can serve as physiologic triggers for transfusion.

Measurement of mixed venous oxygen saturation (SvO<sub>2</sub>) can be an indirect index of tissue oxygenation in the entire body. Blood is withdrawn from a pulmonary arterial catheter (PAC). Normal SvO<sub>2</sub> is 68–77% lesser values are indicative of increased oxygen consumption. The use of PAC became unpopular; by contrast, insertion of a central venous catheter (CVC) is considered standard care in critically ill patients. Similar to SvO<sub>2</sub>, the measurement of ScvO<sub>2</sub> has been advocated in order to detect global tissue hypoxia. Monitoring of ScvO<sub>2</sub> may be therefore an alternative to that of SvO<sub>2</sub>. ScvO<sub>2</sub> has an oxygen saturation of 73–82%.

Pearse et al. used ScvO<sub>2</sub> guided goal directed therapy in patients admitted to the intensive care unit (ICU) after major surgery and reported an uncomplicated postoperative course for patients with ScvO<sub>2</sub> >64.4% as compared to those with ScvO<sub>2</sub> <64.4%.

In a prospective observational study in hemodynamically stable patients with a CVC insitu, the decision to transfuse was made if ScvO<sub>2</sub> before blood transfusion was < 70% ≥. Blood transfusion provided a significant and approximately similar increase in Hb concentration for all patients but the ScvO<sub>2</sub> value increased significantly only in patients with ScvO<sub>2</sub> <70%. The authors concluded that transfusion is appropriate if <70% ScvO<sub>2</sub>, Hb is <10 and Htc is <30 while central venous pressure is 8-12 mmHg.

In a RCT involving patients undergoing major abdominal surgery, the transfusion decision was based on ScvO<sub>2</sub> <75% or a decrease more than 3% and mean arterial pressure <60 mmHg. The results demonstrated that the number of patients receiving RBC was higher in the ScvO<sub>2</sub> arm and those patients had a better postoperative period with improved oxygenation.

A ScvO<sub>2</sub> cut off value of 65% in cardiothoracic surgery was also demonstrated with an observational study.

A-V Oxygen difference (A-V O<sub>2</sub>diff) is the difference in the oxygen content of the arterial blood and the venous blood. It is an indication of how much oxygen is removed from the blood in capillaries. Arterial and venous blood, oxygen contents are 20 mL/100 mL and 15 mL/100 mL respectively and A-V O<sub>2</sub>diff is 5 mL/100 mL at rest and 16 mL/100 mL during exercise. A-V O<sub>2</sub>diff increases with sepsis, heart failure, and severe hypovolemia.

Fogagnolo et al. defined appropriate transfusion strategy as RBC transfusion if Hb 7-10 and A-V O<sub>2</sub>diff >3.7mL and reported that this protocol decreased postoperative 90 day mortality.

Lactate is the end product of anaerobic glycolysis. Lactate levels increase when Hb decrease to a level that the oxygen demand cannot be met and tissue hypoxia occur. Although measuring lactate levels is easy and cost effective in trauma related bleeding or sepsis related anemia, the lactate levels increase slowly, Weiskopf demonstrated that lactate increases after a Hb decrease to 5 g/dL. This limits the use of lactate as a transfusion trigger.

Ootaki et al. investigated a criterion driven transfusion protocol in pediatric patients undergoing cardiac surgery, with low Hct bypass. Criteria for RBC transfusion included anemia Hct < 15% during bypass and 20% after bypass, SvO<sub>2</sub> <50% during bypass and persistent postoperative hemodynamic instability. The authors demonstrated that the arterial lactate levels 6 hours after the admission to the ICU for the non-transfused patients were higher than with the transfused patients, 4.3 ±3.0 vs. 2.5±1.5 mmol/L.

Near Infrared Spectroscopy (NIRS), provides regional Hb oxygenation status with a technique similar as pulse oximetry. NIRS expresses full tissue Hb oxygenation whereas pulse oximetry expresses pulsatile data. NIRS represents the regional oxygenated to total Hb ratio (rSO<sub>2</sub>) for a combination of arterial, capillary, and venous Hb. Cerebral NIRS monitoring is most frequently studied, monitoring of renal, splanchnic, and/or peripheral muscle rSO<sub>2</sub> has been reported as well. There are numerous applications for NIRS monitoring especially in neonatal ICU setting. However evidence regarding the utilization of NIRS guided transfusion management during surgery is limited. A study involving the neurocritically ill, patients were transfused either according to a Hb value alone or Hb value plus rSO<sub>2</sub> value below 60, the results demonstrated a significant decrease in transfusion in the NIRS arm. A prospective, observational study involving 26 trauma patients where regional tissue oxygen saturation (StO<sub>2</sub>) in skeletal muscle was monitored with NIRS, the need for blood transfusion within 24 hours of injury was evaluated. The need for blood transfusion within 24 hours of arrival was not predicted by hypotension, tachycardia, arterial lactate, base deficit, or Hb. A minimum StO<sub>2</sub> less than 70 % correlated with the need for blood transfusion with a sensitivity of 88% and specificity of 78%.

To conclude, preoperative anemia increases the risk of RBC transfusion. A patient centered transfusion approach should include the management of preoperative anemia and coagulation. Currently a Hb value-based transfusion trigger is widely used. A patient specific Hb trigger should be determined according to co-morbidities of the patient and using SvO<sub>2</sub>/ SvcO<sub>2</sub> /A-V O<sub>2</sub>diff /Lactate and NIRS in combination with this trigger may be useful to guide a patient oriented transfusion decision.

## References

- 1- J.P. Isbister .Best Practice & Research Clinical Anaesthesiology 27 (2013) 69–84.
- 2- Kouyoumdjian A, Trepanier M, Al Shehhi R, Cools-Lartigue J, Ferri LE, Lee L, Mueller CL. The Effect of Preoperative Anemia and Perioperative Transfusion on Surgical Outcomes After Gastrectomy for Gastric

- Cancer. *J Surg Res.* 2021 Mar;259:523-531. doi: 10.1016/j.jss.2020.10.003. Epub 2020 Nov 25. PMID: 33248671.
- 3- Grosso MJ, Boddapati V, Cooper HJ, Geller JA, Shah RP, Neuwirth AL. The Effect of Preoperative Anemia on Complications After Total Hip Arthroplasty. *J Arthroplasty.* 2020 Jun;35(6S):S214-S218. doi: 10.1016/j.arth.2020.01.012. Epub 2020 Jan 16. PMID: 32019689.
  - 4- Jans Ø, Jørgensen C, Kehlet H, Johansson PI; Lundbeck Foundation Centre for Fast-track Hip and Knee Replacement Collaborative Group. Role of preoperative anemia for risk of transfusion and postoperative morbidity in fast-track hip and knee arthroplasty. *Transfusion.* 2014 Mar;54(3):717-26. doi: 10.1111/trf.12332. Epub 2013 Jul 5. PMID: 23829298.
  - 5- Loor G, Rajeswaran J, Li L, Sabik JF 3rd, Blackstone EH, McCrae KR, Koch CG. The least of 3 evils: exposure to red blood cell transfusion, anemia, or both? *J Thorac Cardiovasc Surg.* 2013 Dec;146(6):1480-1487.e6. doi: 10.1016/j.jtcvs.2013.06.033. Epub 2013 Aug 30. PMID: 23998782.
  - 6- Unal D, Senayli Y, Polat R, Spahn DR, Toraman F, Alkis N. Peri-operative blood transfusion in elective major surgery: incidence, indications and outcome - an observational multicentre study. *Blood Transfus.* 2020 Jul;18(4):261-279. doi: 10.2450/2020.0011-20. PMID: 32697928; PMCID: PMC7375885.
  - 7- Muñoz M, Acheson AG, Auerbach M, et al. International consensus statement on the peri-operative management of anaemia and iron deficiency. *Anaesthesia* 2017; 72: 233-47.
  - 8- Kozek-Langenecker SA, Ahmed AB, Afshari A, et al. Management of severe perioperative bleeding: guidelines from the European Society of Anaesthesiology: first update 2016. *Eur J Anaesthesiol* 2017; 34: 332-95. 6. American Society of Anesthesiologists Task Force on Perioperative Blood Management. Practice guidelines for perioperative blood management: an updated report by the American Society of Anesthesiologists task force on perioperative blood management. *Anaesthesiology* 2015; 122: 241-75.
  - 9- Chertow GM. *Nephrology Dialysis and Transplantation Journal* 2006
  - 10- Serious Hazards of Transfusion Report, 2015. <http://www.shotuk.org/report-summary-supplement-2015/> European Medicines Agency. [http://www.ema.europa.eu/ema/index.jsp?curl\\_rampton.D.Haematologica](http://www.ema.europa.eu/ema/index.jsp?curl_rampton.D.Haematologica) 2014.
  - 11- Goodnough LT. NATA guidelines. *British Journal of Anaesthesia* 2011
  - 12- National Blood Authority. Patient Blood Management Guidelines: Module 2 – Peri-operative. <https://www.blood.gov.au/pbm-module-2> (accessed 17/08/2016).
  - 13- Kozek-Langenecker SA. Management of severe perioperative bleeding: guidelines from the European Society of Anaesthesiology.
  - 14- Kotze A. *British Journal of Anaesthesia* 2012 ; Beattie WS. *Anesthesiology* 2009 ;Musallam KM. *Lancet* 2011 ; Leichtle SW. *Journal of the American College of Surgeons* 2011
  - 15- Ranucci M. *Annals of Thoracic Surgery* 2012; Jans Ø, Jørgensen C,. *Transfusion* 2014; Fowler AJ. *British Journal of Surgery* 2015; Elhenawy AM. *Systematic Reviews* 2015
  - 16- Chong MA, Krishnan R, Cheng D, Martin J. Should Transfusion Trigger Thresholds Differ for Critical Care Versus Perioperative Patients? A Meta-Analysis of Randomized Trials. *Crit Care Med.* 2018 Feb;46(2):252-263. doi: 10.1097/CCM.0000000000002873. PMID: 29189348; PMCID: PMC5770109.
  - 17- Molnar Z, Nemeth M. Monitoring of Tissue Oxygenation: an Everyday Clinical Challenge. *Front Med (Lausanne).* 2018 Jan 16;4:247. doi: 10.3389/fmed.2017.00247. PMID: 29387683; PMCID: PMC5775968.
  - 18- Tomic Mahecic T, Dünser M, Meier J. RBC Transfusion Triggers: Is There Anything New? *Transfus Med Hemother.* 2020 Oct;47(5):361-368. doi: 10.1159/000511229. Epub 2020 Sep 24. PMID: 33173454; PMCID: PMC7590774.
  - 19- Vincent JL. Transfusion thresholds: the dangers of guidelines based on randomized controlled trials. *Intensive Care Med.* 2020 Apr;46(4):714-716. doi: 10.1007/s00134-019-05889-3. Epub 2020 Jan 7. PMID: 31912204.
  - 20- Richards T, Baikady RR, Clevenger B, Butcher A, Abeyisiri S, Chau M, Macdougall IC, Murphy G, Swinson R, Collier T, Van Dyck L, Browne J, Bradbury A, Dodd M, Evans R, Brealey D, Anker SD, Klein A. Preoperative intravenous iron to treat anaemia before major abdominal surgery (PREVENTT): a

- randomised, double-blind, controlled trial. *Lancet*. 2020 Sep 4;396(10259):1353–61. doi: 10.1016/S0140-6736(20)31539-7. Epub ahead of print. PMID: 32896294; PMCID: PMC7581899.
- 21- IRONMAN Investigators, Litton E, Baker S, Erber WN, Farmer S, Ferrier J, French C, Gummer J, Hawkins D, Higgins A, Hofmann A, De Keulenaer B, McMorrow J, Olynyk JK, Richards T, Towler S, Trengove R, Webb S; Australian and New Zealand Intensive Care Society Clinical Trials Group. Intravenous iron or placebo for anaemia in intensive care: the IRONMAN multicentre randomized blinded trial : A randomized trial of IV iron in critical illness. *Intensive Care Med*. 2016 Nov;42(11):1715-1722. doi: 10.1007/s00134-016-4465-6. Epub 2016 Sep 30. PMID: 27686346.
  - 22- Carson JL, Terrin ML, Noveck H, et al. Liberal or restrictive transfusion in high-risk patients after hip surgery. *N Engl J Med* 2011; 365:2453.
  - 23- Carson JL, Brooks MM, Abbott JD, et al. Liberal versus restrictive transfusion thresholds for patients with symptomatic coronary artery disease. *Am Heart J* 2013; 165:964.
  - 24- Ducrocq G, Gonzalez-Juanatey JR, Puymirat E, et al. Effect of a Restrictive vs Liberal Blood Transfusion Strategy on Major Cardiovascular Events Among Patients With Acute Myocardial Infarction and Anemia: The REALITY Randomized Clinical Trial. *JAMA* 2021; 325:552.
  - 25- Cooper HA, Rao SV, Greenberg MD, et al. Conservative versus liberal red cell transfusion in acute myocardial infarction (the CRIT Randomized Pilot Study). *Am J Cardiol* 2011; 108:1108.
  - 26- Kansagara D, Dyer E, Englander H, et al. Treatment of anemia in patients with heart disease: A systematic review. *Ann Intern Med* 2013; 159:746.
  - 27- Sherwood MW, Wang Y, Curtis JP, et al. Patterns and outcomes of red blood cell transfusion in patients undergoing percutaneous coronary intervention. *JAMA* 2014; 311:836.
  - 28- Docherty AB, O'Donnell R, Brunskill S, et al. Effect of restrictive versus liberal transfusion strategies on outcomes in patients with cardiovascular disease in a non-cardiac surgery setting: systematic review and meta-analysis. *BMJ* 2016; 352:i1351.
  - 29- Hébert PC, Wells G, Blajchman MA, et al. A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. Transfusion Requirements in Critical Care Investigators, Canadian Critical Care Trials Group. *N Engl J Med* 1999; 340:409.
  - 30- Hébert PC, Yetisir E, Martin C, et al. Is a low transfusion threshold safe in critically ill patients with cardiovascular diseases? *Crit Care Med* 2001; 29:227.
  - 31- Holst LB, Haase N, Wetterslev J, et al. Lower versus higher hemoglobin threshold for transfusion in septic shock. *N Engl J Med* 2014; 371:1381.
  - 32- Hébert PC, Carson JL. Transfusion threshold of 7 g per deciliter--the new normal. *N Engl J Med* 2014; 371:1459.
  - 33- Villanueva C, Colomo A, Bosch A, et al. Transfusion strategies for acute upper gastrointestinal bleeding. *N Engl J Med* 2013; 368:11.
  - 34- Jairath V, Kahan BC, Gray A, et al. Restrictive versus liberal blood transfusion for acute upper gastrointestinal bleeding (TRIGGER): a pragmatic, open-label, cluster randomised feasibility trial. *Lancet* 2015; 386:137.
  - 35- Carson JL, Sieber F, Cook DR, et al. Liberal versus restrictive blood transfusion strategy: 3-year survival and cause of death results from the FOCUS randomised controlled trial. *Lancet* 2015; 385:1183.
  - 36- Gu WJ, Gu XP, Wu XD, et al. Restrictive Versus Liberal Strategy for Red Blood-Cell Transfusion: A Systematic Review and Meta-Analysis in Orthopaedic Patients. *J Bone Joint Surg Am* 2018; 100:686.
  - 37- de Almeida JP, Vincent JL, Galas FR, et al. Transfusion requirements in surgical oncology patients: a prospective, randomized controlled trial. *Anesthesiology* 2015; 122:29.
  - 38- Mazer CD, Whitlock RP, Fergusson DA, et al. Six-Month Outcomes after Restrictive or Liberal Transfusion for Cardiac Surgery. *N Engl J Med* 2018; 379:1224.
  - 39- Murphy GJ, Pike K, Rogers CA, et al. Liberal or restrictive transfusion after cardiac surgery. *N Engl J Med* 2015; 372:997.
  - 40- Bracey AW, Radovancevic R, Riggs SA, et al. Lowering the hemoglobin threshold for transfusion in coronary artery bypass procedures: effect on patient outcome. *Transfusion* 1999; 39:1070.



- 
- 41- Hajjar LA, Vincent JL, Galas FR, et al. Transfusion requirements after cardiac surgery: The TRACS randomized controlled trial. *JAMA* 2010; 304:1559.
- 42- Koch CG, Sessler DI, Mascha EJ, et al. A randomized clinical trial of red blood cell transfusion triggers in cardiac surgery. *Ann Thorac Surg* 2017; 104:1243.
- 43- Laine A, Niemi T, Schramko A. Transfusion Threshold of Hemoglobin 80 g/L Is Comparable to 100 g/L in Terms of Bleeding in Cardiac Surgery: A Prospective Randomized Study. *J Cardiothorac Vasc Anesth* 2018; 32:131.
- 44- Webert KE, Cook RJ, Couban S, et al. A multicenter pilot-randomized controlled trial of the feasibility of an augmented red blood cell transfusion strategy for patients treated with induction chemotherapy for acute leukemia or stem cell transplantation. *Transfusion* 2008; 48:81.
- 45- Ponce BA, Yu JC, Menendez ME, Oladeji LO. Analysis of Predictors and Outcomes of Allogenic Blood Transfusion After Shoulder Arthroplasty. *Am J Orthop (Belle Mead NJ)*. 2015 Dec;44(12):E486-92. PMID: 26665249.
- 46- Pearse R, Dawson D, Fawcett J, Rhodes A, Grounds RM, Bennett ED. Early goal-directed therapy after major surgery reduces complications and duration of hospital stay. A randomised, controlled trial [ISRCTN38797445]. *Crit Care*. 2005;9(6):R687-93. doi: 10.1186/cc3887. Epub 2005 Nov 8. PMID: 16356219; PMCID: PMC1414018.
- 47- Adamczyk S, Robin E, Barreau O, Fleyfel M, Tavernier B, Lebuffe G, Vallet B. Apport de la saturation veineuse centrale en oxygène dans la décision transfusionnelle postopératoire [Contribution of central venous oxygen saturation in postoperative blood transfusion decision]. *Ann Fr Anesth Reanim*. 2009 Jun;28(6):522-30. French. doi: 10.1016/j.annfar.2009.03.013. Epub 2009 May 20. PMID: 19467825.
- 48- Mikor A, Trásy D, Németh MF, Osztrólczki A, Kocsi S, Kovács I, Demeter G, Molnár Z. Continuous central venous oxygen saturation assisted intraoperative hemodynamic management during major abdominal surgery: a randomized, controlled trial. *BMC Anesthesiol*. 2015 Jun 4;15:82. doi: 10.1186/s12871-015-0064-2. PMID: 26041437; PMCID: PMC4453106.
- 49- Jones AE, Shapiro NI, Trzeciak S, Arnold RC, Claremont HA, Kline JA; Emergency Medicine Shock Research Network (EMShockNet) Investigators. Lactate clearance vs central venous oxygen saturation as goals of early sepsis therapy: a randomized clinical trial. *JAMA*. 2010 Feb 24;303(8):739-46. doi: 10.1001/jama.2010.158. PMID: 20179283; PMCID: PMC2918907.
- 50- Fogagnolo A, Taccone FS, Vincent JL, Benetto G, Cavalcante E, Marangoni E, Ragazzi R, Creteur J, Volta CA, Spadaro S. Using arterial-venous oxygen difference to guide red blood cell transfusion strategy. *Crit Care*. 2020 Apr 20;24(1):160. doi: 10.1186/s13054-020-2827-5. PMID: 32312299; PMCID: PMC7171832.
- 51- Zeroual N, Samarani G, Gallais J, Culas G, Saour M, Mourad M, Gaudard P, Colson PH. ScvO<sub>2</sub> changes after red-blood-cell transfusion for anaemia in cardiothoracic and vascular ICU patients: an observational study. *Vox Sang*. 2018 Feb;113(2):136-142. doi: 10.1111/vox.12610. Epub 2017 Oct 29. PMID: 29082579.
- 52- Ootaki Y, Yamaguchi M, Yoshimura N, Oka S, Yoshida M, Hasegawa T. Efficacy of a criterion-driven transfusion protocol in patients having pediatric cardiac surgery. *J Thorac Cardiovasc Surg*. 2004 Apr;127(4):953-8. doi: 10.1016/s0022-5223(03)01318-7. PMID: 15052189.

## 01 May 2021-Saturday

---

20:15-21:30 | Panel 11: ANESTHESIA VI

Chairs: Sema Turan, Hasib Lukac

**Resuscitation of Very Low Birth Weight Neonate Born to Mother with Confirmed Sars-Cov-2 Infection;** Ivana Budic

**New Approach to CPR During Covid-19;** Antigona Hasani

**New Guidelines of Cardiopulmonary Resuscitation in Pediatric Patient;** Ünase Büyükkoçak

**Recent Improvements in Intravenous Anesthesia and Anesthetics;** Gülbin Sezen

---

### RESUSCITATION OF VERY LOW BIRTH WEIGHT NEONATE BORN TO MOTHER WITH CONFIRMED SARS-COV-2 INFECTION

*Ivana Budic<sup>1,2</sup>, Ivica Nakev<sup>3</sup>, Vesna Marjanovic<sup>1,2</sup>, Marija Stevic<sup>4,5</sup>, Dusica Simic<sup>4,5</sup>*  
*1 Clinic for Anesthesiology and Intensive Care, University Clinical Centre Nis, Serbia*  
*2 Medical Faculty, University of Nis, Serbia*  
*3 Pediatric Clinic, University Clinical Centre Nis, Serbia*  
*4 University Children's Hospital, Belgrade, Serbia*  
*5 Medical Faculty, University of Belgrade, Serbia*

#### Summary

Current recommendations on the management of suspected or confirmed COVID-19 mothers and their infants are based on limited and incomplete data, requiring continuous and comprehensive updates. Critically ill pregnant women infected by SARS-Cov-2 may develop severe respiratory distress syndrome and multiple organ failure that could affect the fetus and have impact on the newborn. Although evidence is still very limited, every effort should be done to ensure healthcare providers' safety that is of paramount importance to continue offering the best care possible to these vulnerable groups of patients.

#### Introduction

The novel coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome–coronavirus-2 (SARS-CoV-2) is a highly infectious disease that was first described by Huang et al.<sup>1</sup> whose report focused primarily on the main characteristics and outcomes of nonpregnant adults. There is still much unknown regarding the impact of the disease on pregnancy, differences in clinical course, and outcomes in this population, the risk of vertical transmission as well as newborn condition. Physiological changes during pregnancy, such as reduced functional residual volumes, diaphragm elevation, and altered cell immunity, lead to increased susceptibility to viral infections and worse outcomes.<sup>2</sup> It is also well known that age above thirty, overweight and gestational diabetes are notable aggravating factors. Meta-analyses indicate that the incidence of preterm birth at < 37 weeks' gestational age (WGA) is increased in women infected with SARS-CoV-2. Additionally, a higher rate of perinatal fetal distress and admission to the NICU has been identified in neonates born to mothers infected

with SARS-CoV-2. Despite apparent perinatal complications, the majority of these neonates are negative for SARS-CoV-2 infection. Placenta has low expression of canonical receptors necessary for viral entry, which may explain the rarity of vertical transmission of the virus.<sup>3</sup> The frequency of hemodynamic fluctuations in a critically ill obstetric patient may warrant more frequent fetal assessment both for reassurance of fetal well-being, assessment for evidence of labor in the intubated and sedated patient, and to titrate hemodynamic parameters to ensure fetal perfusion. One must keep in mind the potential effects of sedative medications on the fetal assessment in women who are intubated.<sup>4</sup> Alzamora et al.<sup>5</sup> reported a severe clinical presentation of COVID-19 during pregnancy, leading to respiratory failure, mechanical ventilation, and preterm delivery. One of the most difficult yet crucial issues of the management is the determination of delivery timing, especially in the severe and critically ill cases.

It is commonly accepted, based on extremely limited data, that delivery does not improve the respiratory status of pregnant patients with acute respiratory failure.<sup>6</sup> Infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) also caused pregnant patient to suffer multiple organ dysfunction, including heart, liver, and kidneys. In cases which the fetus is not mature enough to survive, especially less than 24 weeks, and the maternal cardiopulmonary conditions are unstable, the decision to proceed toward delivery may be deferred to avoid the mother's condition deteriorated further. If the pregnant patient's respiratory status is so dire to manage, especially after 28 weeks of gestation, proceeding with a controlled delivery (like cesarean) is recommended to avoid the occurrence of fetal death and achieve possible improvement in maternal cardio-pulmonary function. But before the pregnancy termination, it should be necessary to monitor the fetal condition closely due to an extremely high rate of fetal death in the setting of severe systemic infection. According to a meta-analysis performed by Bellos et al.<sup>7</sup>, that included 44 case reports/series and 16 observational studies, preterm birth occurred in 29.7 % and 16 % in data obtained from case series and observational studies, respectively. Stillbirth occurred in 3 cases and 2 neonatal deaths were observed. There are conflicting data on the risk for preterm delivery associated with COVID-19 in pregnancy. In study of Romagano et al.<sup>8</sup>, 7 of 8 women with critical respiratory illness required preterm delivery with the goal of reducing respiratory compromise by decreasing oxygen requirements and enhancing diaphragmatic excursion.

### **Case report**

Before the emergency delivery, due to the deterioration of the mother's vital parameters, two teams were prepared. One consisted of gynecologists and two anesthesiologists, and the other consisted of a neonatologist, a pediatrician, and an anesthesiologist. One operating room was prepared for a caesarean section and the other, right next to it, for resuscitation of a newborn. The child's mother was intubated, critically ill and resuscitated immediately before the caesarean section. The male newborn was estimated by neonatologists for 27 gestational weeks, his birth weight was 920g. After birth, he had a livid skin color, bradycardic, without spontaneous respirations and without muscular tone, Apgar score was 2/3/5. Oxygen

saturation was immeasurable. He was aspirated and ventilated by the pediatric and anesthesiology team. Cardiac action was soon established, and occasional spontaneous respirations were registered. The peripheral venous route was established, intravenous hydration was started. He was intubated with tube No 2.5, ventilated all the time, placed in a transport incubator and transferred to the intensive care unit of the children's COVID ward, where mechanical ventilation was started. Vital parameters were stable during the transport.

### **Discussion**

Trevisanuto et al.<sup>9</sup> published perspective aims to provide practical indications for the management of mothers and neonates before, during, and after delivery. Multidisciplinary management is mandatory, involving midwives, obstetricians, anesthesiologists, and neonatologists. Simulation training should be conducted on regular basis in all hospitals for preparing healthcare caregivers to provide care for patients infected with high-consequence pathogens. A protocol focused on equipment and the correct use of personal protective equipment (PPE) including correct donning, doffing, and disposal of PPE should be provided. For cesarean sections, general anesthesia should be considered in women developing severe respiratory insufficiency.<sup>10</sup> Next to the delivery room (DR), a room or area equipped with an infant warmer should be available. As an alternative, the infant warmer could be arranged in the DR, however > 6 feet (2 m) from the mother. Routine neonatal protocols will guide management of healthy newborns or of those in need of resuscitation. COVID-19 infection is not an indication for changing established guidelines on neonatal resuscitation/stabilization. The procedure should be performed by an expert provider. Disposable laryngoscopes should be preferred, and intubation by using a videolaryngoscope can be also considered in order to increase the distance between the provider and the neonate. Despite limited evidence on their efficacy, viral filters on the expiratory limb of the ventilator circuit and closed suctioning systems could be also used, as reported in previous experiences. Sick preterm and term infants born to mothers testing positive for SARS-CoV-2 are kept isolated in a dedicated area of the NICU ("quarantine zone"), where parents are not allowed, and physicians and nurses have to wear PPE according to guidelines.<sup>11</sup>

### **Conclusion**

With emerging evidence, recommendations for management of perinatal COVID-19 continue to evolve. The current approaches provide flexibility and allow perinatal health care providers to determine the best options based on the assessment of risks and benefits, available personnel, space, case load, and resources. It should be noted that manual procedures when all protective equipment are used are difficult to be performed and it is obviously difficult to work when there is an increased level of stress due to the struggle for the life of mother and child.

### **References**

1. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395 (10223):497–506.

2. Dashraath P, Jing Lin JeslynW, Mei Xian Karen L, et al. Coronavirus Disease 2019 (COVID-19) Pandemic and Pregnancy. *Am J Obstet Gynecol* 2020;0(00):S0002-9378(20)30343-4.
3. McCarty KL, Tucker M, Lee G, et al. Fetal Inflammatory Response Syndrome Associated With Maternal SARS-CoV-2 Infection. *Pediatrics*. 2021; 147(4):e2020010132.
4. Oxford-Horrey C, Savage M, Prabhu M, Abramovitz S, Griffin K, LaFond E, Riley L, Easter SR. Putting It All Together: Clinical Considerations in the Care of Critically Ill Obstetric Patients with COVID-19. *Am J Perinatol*. 2020;37(10):1044-1051.
5. Alzamora MC, Paredes T, Caceres D, Webb CM, Valdez LM, La Rosa M. Severe COVID-19 during Pregnancy and Possible Vertical Transmission. *Am J Perinatol*. 2020;37(8):861-865.
6. Lapinsky SE. Management of acute respiratory failure in pregnancy. *Semin Respir Crit Care Med* 2017;38:201-207.
7. Bellos I, Pandita A, Panza R. Maternal and perinatal outcomes in pregnant women infected by SARS-CoV-2: A meta-analysis. *Eur J Obstet Gynecol Reprod Biol*. 2021;256:194-204.
8. Romagano MP, Spillane N, Kayaalp E, Smilen SW. Perinatal outcomes in critically ill pregnant women with coronavirus disease 2019. *AJOG MFM* 2020;2(3):Suppl. 100151.
9. Trevisanuto D, Moschino L, Doglioni N, Roehr CC, Gervasi MT, Baraldi E. Neonatal Resuscitation Where the Mother Has a Suspected or Confirmed Novel Coronavirus (SARS-CoV-2) Infection: Suggestion for a Pragmatic Action Plan. *Neonatology*. 2020; 117(2):133-140.
10. College of Obstetricians & Gynecologists. Coronavirus (COVID-19) Infection in Pregnancy. Information for healthcare professionals. Version 2. Published Friday 13 March 2020. Available from: <https://www.rcog.org.uk/globalassets/documents/guidelines/coronavirus-covid-19-infection-in-pregnancyv2-20-03-13.pdf>
11. Chandrasekharan P, Vento M, Trevisanuto D, Partridge E, Underwood MA, Wiedeman J, Katheria A, Lakshminrusimha S. Neonatal Resuscitation and Postresuscitation Care of Infants Born to Mothers with Suspected or Confirmed SARS-CoV-2 Infection. *Am J Perinatol*. 2020; 37(8):813-824.

## 01 May 2021-Saturday

---

20:15-21:30 | Panel 11: ANESTHESIA VI

Chairs: Sema Turan, Hasib Lukac

Resuscitation of Very Low Birth Weight Neonate Born to Mother with Confirmed Sars-Cov-2 Infection; Ivana Budic

New Approach to CPR During Covid-19; Antigona Hasani

New Guidelines of Cardiopulmonary Resuscitation in Pediatric Patient; Ünase Büyükköçak

Recent Improvements in Intravenous Anesthesia and Anesthetics; Gülbin Sezen

---

### NEW APPROACH TO CPR DURING COVID-19

**Antigona Hasani**

*Professor of Anesthesiology and Reanimation, Faculty of Medicine, University of Prishtina,  
Department of Anesthesiology and Reanimation, KOSOVA*

Sixteen months ago the world was shocked from unknown virus SARS-CoV-2 or so called "invisible murder". The coronavirus disease called, COVID-19, has been identified as the cause of an outbreak of respiratory illness in Wuhan, Hubei Province, China in December 2019. The virus SARS-CoV-2 originated from wild animals sold in the market (bats). SARS CoV-2 is a beta-coronavirus. How this virus moved from animal to human populations is yet to be determined, however it is widely accepted that SARS-CoV-2 originated in bats. Angiotensin-converting enzyme II (ACE2) was known to be the cell receptor for SARS-CoV-2 and replicates fast in primary human epithelial cells within the lung.

COVID-19 is spreading like a fire, in all over countries in the world. In January 30, WHO declared the SARS-CoV-2 outbreak as a Public Health Emergency of International Concern (PHEIC). Nowadays there are more than 140 million confirmed cases and near the 3 million deaths in the world. Fatality rate has been estimated at around 2%. Being at the frontline, the healthcare workers were soon considered as one of the groups with the highest risk of exposure to COVID-19 infection. Infected health care workers could potentially contribute to exacerbating the chain of transmission in hospitals and outside health facilities, and also contribute to in hospital staff shortages.

Therefore proper protection against COVID-19 through mandating protective protocols had to be prioritized. In April, 2020 European Resuscitation Council (ERC) launched the cardiopulmonary resuscitation (CPR) guidelines in patients with COVID-19.

Hypoxic failure, myocardial injury and shock are the main causes of cardiac arrest in COVID 19 patients. Most cardiac arrests in these patients are present with a non-shockable rhythm caused by hypoxemia and dehydration, hypotension and sepsis. A shockable rhythm may be associated with drugs causing prolonged-QTsyndrome (e.g. chloroquine, azithromycin) or caused by myocardial ischemia.

The main route of transmission is from the respiratory tract via respiratory secretions (droplets and aerosols) or indirectly by touching contaminated surfaces.

Cardiopulmonary resuscitation is done in the standard manner, with the following precautions to minimize spread of infection to the staff and accompanying people.

#### **Basic Life Support (BLS) in adults for suspected or confirmed COVID-19**

- Cardiac arrest is identified if a person is unresponsive and not breathing normally.
- Responsiveness is assessed by shaking the person and shouting. Do not open the airway and do not place your face next to the victims' mouth / nose.
- Call the emergency medical services if the person is unresponsive and not breathing normally.
- Lay rescuers should consider placing a cloth/towel over the person's mouth and nose before performing chest compressions and public-access defibrillation.
- Perform chest compressions-only CPR
- As soon as AED arrives – switch it on and follow instructions.
- After providing CPR, lay rescuers should, as soon as possible, wash their hands thoroughly with soap and water or disinfect their hands with an alcohol-based hand-gel and contact the local health authorities to enquire about screening after having been in contact with a person with suspected or confirmed COVID-19.

#### **Advanced Life Support (ALS) in adults for suspected or confirmed COVID-19**

- If a patient is unresponsive and not breathing normally shout for help/pull emergency bell.
- Check for signs of life/pulse. DO NOT listen for breaths or place your cheek near to the patient's face.
- Send someone to place a COVID cardiac arrest call (local number), and to bring a defibrillator
- Personal Protective Equipment (PPE) must be available to protect staff during resuscitation attempts. It is acknowledged that this may cause a brief delay to starting chest compressions, but the safety of staff is crucial. Chest compressions generate aerosols and airway interventions are aerosol-generating procedures. Healthcare staff should therefore put on airborne-precaution personal protective equipment (PPE) before starting chest compressions and /or airway interventions; as a minimum a FFP3 mask (FFP2 or N95 if FFP3 not available), eye and face protection, long-sleeved gown, and gloves before undertaking these procedures. Do not proceed with chest compressions or airway interventions without airborne-precaution PPE.
- Restrict the number of staff in the room or at the bedside.
- If no signs of life, start chest compressions (continuous until bag-mask device arrives).
- Experienced airway staff should insert a supraglottic airway or intubate the trachea early so that the period of bag-mask ventilation is minimised. Consider videolaryngoscopy for tracheal intubation.

- Consider stopping CPR early if treatable reversible causes of cardiac arrest have been addressed. If there is a need for prolonged CPR, consider the use of a mechanical chest compression device in those settings that are familiar with its use.
- Ensure the safe removal of PPE to prevent self-contamination.
- Undertake a team debrief.

**References:**

1. Wuhan City Health Committee. Wuhan Municipal Health and Health Commission's briefing on the current pneumonia epidemic situation in our city 2019 [updated 14 January 2020]. Available from: <http://wjw.wuhan.gov.cn/front/web/showDetail/2019123108989> 2.
2. Chinese Center for Disease Control and Prevention. 585 environmental samples from the South China Seafood Market in Wuhan, Hubei Province, China. 2020.[http://www.chinacdc.cn/yw\\_9324/202001/t20200127\\_211469.html](http://www.chinacdc.cn/yw_9324/202001/t20200127_211469.html). Accessed 1 Feb 2020.
3. World Health Organization (2021) Coronavirus disease 2019 (COVID-19). <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>. gclid=EAlaIqobChMlr6eG2\_zy6QIVeZQYCh3FpAtSEAAAYASAAEgLODfD\_BwE.
4. European Resuscitation Council COVID-19 Guideline, 24 April 2020.



## 01 May 2021-Saturday

20:15-21:30 | Panel 11: ANESTHESIA VI

Chairs: Sema Turan, Hasib Lukac

Resuscitation of Very Low Birth Weight Neonate Born to Mother with Confirmed Sars-Cov-2 Infection; Ivana Budic

New Approach to CPR During Covid-19; Antigona Hasani

New Guidelines of Cardiopulmonary Resuscitation in Pediatric Patient; Ünase Büyükköçak

Recent Improvements in Intravenous Anesthesia and Anesthetics; Gülbin Sezen

### RECENT IMPROVEMENTS IN INTRAVENOUS ANESTHESIA AND ANESTHETICS

**Assoc Prof Gülbin Sezen,**

*Department of Anesthesiology and Reanimation,*

*Duzce University, Turkey*

In the last 20 years, the improvements in patient safety, technological developments in patient follow-up monitoring, the increase in the number of trained specialist anesthesiologists, better understanding of the effect profiles of the drugs used have decreased anesthesia-related mortality and morbidity. Despite these developments, improvements in intravenous anesthetics seem more limited than in the past decades (1).

Researchers continue to develop both new formulations of existing agents and new chemical entities in strides to improve safety, predictability, efficacy, onset, and recovery profile and to minimize side effects. Novel drug development is challenging, costly, and risky. Only 1 in 10 drugs in phase I development will go on to obtain Food and Drug Administration (FDA) approval, and some drugs are withdrawn from the market, even after approval, because of unanticipated limitations and drawbacks (2).

Drug innovations are primarily focused on modifying the chemical structures of existing drugs or drug classes with intent to improve their pharmacodynamic, pharmacokinetic, and side effect properties (2).

#### **Benzodiazepine-like drugs**

Benzodiazepines are widely used in clinical anesthesiology as anxiolytics, amnestics, and sedative–hypnotics (3). They are less commonly used as anesthetic induction agents because at the doses typically required to produce anesthesia, cardiovascular depression may be significant and recovery prolonged (4).

#### *Remimazolam (CNS 7056)*

Remimazolam is an analogue of midazolam that utilizes the metabolically labile ester design approach to produce an ultra-short–acting benzodiazepine. It is ester-based anesthetic agent that allows for rapid esterase-mediated metabolism independent of hepatic or renal enzymes

and function. As the name implies, remimazolam combines the properties of two unique drugs already established in anesthesia: midazolam and remifentanil. Remimazolam is rapidly hydrolyzed by nonspecific esterases to the carboxylic acid CNS 7054, which has an in vitro affinity for human GABAA receptors that is 400-fold lower than remimazolam (1).

In the case of midazolam, the context-sensitive half-time (the time required for blood concentrations to decrease by half after infusion termination) is predicted to increase dramatically with midazolam infusion length, reaching 60 min after a simulated 8-h infusion. In contrast, the predicted context-sensitive half-time of remimazolam reaches a maximum of only 7-8 min for infusions longer than 2 hours (5).

The sedation function was initially observed at the dose of 0.05 mg/kg remimazolam. Doses of  $\geq 0.075$  mg/kg exerted a peak sedation effect within 1-2 min after injection, resulting in a deeper and more rapid sedation. For general anesthesia, an induction dosage of 0.2 mg/kg/min and a maintenance dosage of 1 mg/kg/h can achieve a satisfactory efficacy effect (6).

Remimazolam sedation may be completely reversed by the benzodiazepine antagonist flumazenil. Sedation was reversed within 1 min by flumazenil 0.5 mg without subsequent re-sedation (7).

In the EU, it is undergoing development for general anesthesia in patients undergoing non-cardiac and cardiac surgery, including intensive care unit (ICU) sedation for up to 24 hours after the operation. In Japan, a clinical phase III program in anesthesia has also been conducted. Remimazolam doses of 0.075 to 0.2 mg/kg showed good effect in a phase I trial for safety and efficacy. Dosages for bolus or infusion are awaited (2)

Remimazolam has potentially important clinical applications owing to its rapid offset of action and maintenance of stable hemodynamics. Most of the current trials involved infusions of bolus or duration infusions; thus, additional information is required to determine how metabolism is affected by prolonged infusions or repeat boluses. Additional studies are required to provide more data on diverse patient populations (weight, age range, and comorbidities, including renal and hepatic insufficiency) (2).

Remimazolam is approved in the US, the EU/EEA and China for procedural sedation and in Japan and South Korea for general anesthesia. In addition to procedural sedation and general anesthesia, intensive care unit (ICU) sedation is under evaluation for remimazolam.

Development and testing of inhaled agents such as remimazolam open the door to delivery of sedatives without the placement of an invasive IV line. This may be desirable for short procedures or may help facilitate placement of an IV line, particularly in children. Studies show that combination delivery of inhaled remifentanil and remimazolam are efficacious while being nonirritating to rodent airways (8).

*JM-1232 (-) (MR04A3)*

JM-1232 (-) has a nonbenzodiazepine structure, it allosterically modulates GABAA receptor in a manner that seems to be identical to benzodiazepines and its activity can be inhibited by flumazenil, strongly suggesting that it binds to the same site on the GABAA receptor as classic benzodiazepines (9).

In addition to its sedative–hypnotic actions, JM-1232 (-) has been shown in animals to possess antinociceptive properties and have a therapeutic index of  $\approx 38,5$  which indicates a safety margin that is greater than propofol, midazolam, thiopental, and even etomidate (9).

The results of human safety and efficacy trials of MR04A3, a 1% aqueous solution of JM-1232 (-), were published in early 2012. MR04A3 was found to have quick onset of action with a dose-dependent hypnotic effect and minimal hemodynamic depression at clinically relevant doses. Based on this initial study, further study of MR04A3 seems warranted, as its pharmacokinetics could be faster than midazolam and its higher therapeutic index in rats may portend greater safety in humans (10).

Central nervous system effect was seen at 0.05- 0.8 mg/ kg dose concentrations with larger doses of MR04A3 producing a deeper and longer reduction in bispectral index. Ramsay sedation scores were increased with higher doses causing sedation and then unresponsiveness. The adverse event profile of subjects receiving MR04A3 was similar to that of subjects given placebo except that some subjects receiving MR04A3 developed upper airway obstruction while sedated. This responded to simple maneuvers (ie, chin lift). Changes in systolic arterial blood pressure and heart rate were minimal (10).

Preclinical studies suggested that the drug produces antinociception and provides neuroprotection. These positive features are suggesting that further development of MR04A3 might be promising (11).

*ADV6209*

A novel formulation of oral midazolam is currently under investigation, with phase I and II trials now started in both adults and children. This innovative 0.2% aqueous midazolam solution has been formulated by combining a sweetener (sucralose), an aroma (orange aroma), and  $\gamma$ -cyclodextrin with a citric acid solution of midazolam. This formulation also appears to improve the longevity of the oral formulation's shelf-life (slower degradation) (2).

A recent study examined the pharmacokinetic characteristics of the ADV6209 oral formulation in children from 6 months to 18 years old, showing that the measured pharmacokinetic parameters of ADV6029 were close to those reported in the literature with other midazolam formulations, such as extemporaneous oral solutions or syrups (12).

**Etomidate derivatives**

Etomidate is an imidazole-based anesthetic agent. Originally developed as a potential antifungal agent, it was found to have potent hypnotic activity and a high therapeutic index when tested in rats. It was introduced into clinical practice in 1972 and gained in popularity as an anesthetic agent in the operating room and a sedative in the intensive care unit because it produced minimal cardiovascular depression (9).

Its side effects include pain at injection site, myoclonus, and nausea and vomiting. The most serious side effect of prolonged etomidate infusions is increased mortality in the critically ill, which is a consequence of the inhibition of  $11\beta$ -hydroxylase activity and suppression of adrenocortical steroid synthesis. Further studies uncovered that the R(+)- enantiomer of etomidate was much more potent than S(-)- etomidate. Hence, in 1972, the R(+)-enantiomer was advanced into clinical practice. Etomidate is hydrophobic at physiological pH. It is formulated as a 0.2% solution either in 35% propylene glycol (Amidate; Hospira Inc, Lake Forest, IL) or lipid emulsion (Etomidate-Lipuro; Braun Melsungen, Germany) (11).

*Methoxycarbonyl (MOC)-etomidate*

(MOC)-etomidate was a prototype of a series of soft etomidate derivatives. Similar to remifentanyl, it contains a metabolically labile ester component that is rapidly cleaved by esterases. MOC-etomidate showed hypnotic properties during animal testing, but was less potent than etomidate. After bolus injection, the hypnotic effect was extremely brief and adrenocortical toxicity was not detectable. However, after longer infusions accumulation of metabolites markedly slowed recovery from anesthesia (2).

*Cyclo Propyl Methoxycarbonyl Metomidate (CPMM) ABP-700*

During animal testing, cyclo propyl methoxycarbonyl metomidate (CPMM) was identified as the most promising compound. Its hypnotic potency was similar to that of etomidate and it was rapidly metabolized, but slower than MOC-etomidate. Continuous infusion of CPMM produced adrenocortical suppression, but recovery was significantly faster than after etomidate (13).

A recent study showed that CPMM (as opposed to MOC-etomidate) infusion is context insensitive because its metabolite fails to reach concentrations in either the blood or the cerebrospinal fluid which are sufficient to have a hypnotic effect (14).

In August 2017, the Medicines Company announced that it has discontinued the development of ABP- 700 because findings from completed animal studies did not support phase III development of the candidate (2).

*Carboetomidate*

Another strategy to keep etomidate's anesthetic properties while mitigating adrenocortical suppression is to reduce its affinity for  $11\beta$ -hydroxylase. Carboetomidate is an analogue of etomidate in which this critical imidazole nitrogen has been replaced with a methylene group that cannot form a bond with iron. But, this change also substantially reduces aqueous

solubility. This low solubility may account for carboetomidate's relatively slow onset of action and implies that formulation will be more challenging than with etomidate.

Carboetomidate retains etomidate's minimal effect on cardiovascular function, but unlike etomidate, carboetomidate neither inhibits steroid synthesis nor enhances proinflammatory cytokine production in a rat model of endotoxemia. These findings suggest that it may be most suited for maintaining sedation or anesthesia in critically ill patients with sepsis (9).

### **New propofol derivatives and alternatives**

Propofol has been a transformative anesthetic agent since its introduction 40 years ago and is still considered to be a near-ideal anesthetic agent. Its success in the clinical setting is a result of its rapid onset, short duration of action, and minimal side effects. However, propofol is associated with a number of important disadvantages: its oil emulsion adds a risk of bacterial contamination and hyperlipidemia. There may be significant pain upon IV injection and a potentially fatal risk of propofol infusion syndrome (PIS). With these challenges, attention has now shifted to the development of new formulations and alternatives to improve the pharmacologic profile and overcome some of the disadvantages (11).

#### *Modifications of emulsions*

The problems of infection risk, pain on injection, hyperlipidemia, and emulsion instability, arise from the lipid solution used for solubilizing propofol. Thus, it is not surprising that several emulsion modifications were developed. Propofol emulsions may contain oil droplets 0.15–0.5  $\mu\text{m}$  (fine macroemulsion, e.g. Diprivan, Lipuro) or less than 0.1  $\mu\text{m}$  (microemulsion, e.g. Aquafol) in size. Microemulsion propofol did not increase serum triglyceride levels during administration, but caused more severe and more frequent pain on injection (15).

Recently, a novel micro to macro (M2M) approach of destabilizing a microemulsion immediately prior to injection was developed (16-17).

Propofol nanoemulsions were studied using novel semifluorinated surfactants (18). Semifluorinated surfactant-based emulsions also were used for intravenous delivery of the inhalational anesthetic sevoflurane. Three out of four novel propofol formulations showed efficacy in causing anesthesia similar to Diprivan. But no results from human studies are yet available (11).

*Additional note: Hemifluorinated dibranched polymers can be used to generate exceptionally stable sevoflurane nanoemulsions, as required of formulations intended for clinical use. In this study result; intravenous delivery of the emulsion in rats resulted in induction of anesthesia with rapid onset and smooth and rapid recovery (19).*

2,6-Disubstituted alkylphenols (Haisco HSK3486) are the result of a new propofol modification and seem to possess promising anesthetic properties. The sedation evaluation of this new formulation demonstrated its better potency as well as faster onset and recovery compared to propofol (20).

Clinical studies of candidate compound 6 (Haisco HSK3486) as a general anesthetic are being performed in Australia and China. The potency of HSK3486 is relevant in part because a 1% formulation provides less lipid exposure for a given effect, which could reduce the risk of injection pain associated with propofol in the aqueous phase. While lipid toxicity is extremely unlikely with a single dose, it is more relevant should the drug be considered for maintenance of anesthesia or sedation in the intensive care unit (ICU). The incidence of treatment emergent adverse events (TEAEs) and the most frequently reported TEAEs in HSK3486 cohorts for male and female subjects were not significantly different compared to propofol (21).

#### *Nonemulsion formulations*

Nonemulsion formulations of propofol have also been developed. One alternative to oil emulsions is the use of cyclodextrins. Cyclodextrins are capable of forming inclusion complexes with drugs having lipophilic properties while maintaining aqueous solubility. Pharmacodynamic studies of propofol cyclodextrin formulations showed reduced induction times and longer duration of action in rats compared with the standard propofol emulsion. The first-in-human propofol cyclodextrin formulation study used a sulfobutylether beta-cyclodextrin formulation called Captisol (Ligand Pharmaceuticals, La Jolla, CA, USA), showing no difference in the onset and duration of anesthesia but increased incidence of pain upon injection with the cyclodextrin formulation. Other concerns with cyclodextrin formulations include potential renal toxicity, hemolysis, and potential binding of co-administered lipophilic drugs such as rocuronium (22).

#### *Propofol Prodrugs*

Another approach to solving the propofol formulation problem has been the development of propofol prodrugs that are water-soluble and can be converted to propofol in vivo. Many propofol esters have been developed, such as propofol hemisuccinate, propofol hemiglutarate, propofol hemiadipate, monopropofol phosphate, and dipropofol phosphate. However, only fospropofol disodium has been approved by the US Food and Drug Administration for monitored anesthesia care in adults under the brand name Lusedra (Eisai Co, Ltd, Tokyo, Japan), previously known as Aquavan (22).

*Fospropofol* was recently discontinued in the USA; the likely reasons include its delayed onset of effect (peak effect is in 8 minutes with clinical effect in 4–13 minutes) and slower recovery compared to propofol and its significant associated perineal paresthesia and pruritus. In 2010, six studies characterizing the pharmacokinetics of fospropofol were retracted because of possible errors in propofol assays. Production of the drug was discontinued in the early 2010s before the completion of clinical trials on its use for induction of general anesthesia (2,22).

*HX0507* is another water-soluble prodrug of propofol that was found to have anesthetic effects similar to those of propofol. However, in the first-in-human study in 2009, HX0507 caused QT interval prolongation in a dose-dependent linear manner. Further safety evaluations of this agent are necessary (22).

### *Propofol Alternatives*

#### AZD-3043

AZD-3043 (previously named THRX-918661) is a structural analog of propanidid, an agent, introduced by Bayer in 1963. In a study including 123 human subjects, AZD-3043 caused sedation and hypnosis with no pain on injection. The pharmacokinetic properties were determined from bolus injections and 30-min infusions. A rapid onset and fast recovery of sedation or hypnosis was observed. These findings were consistent with a high clearance and a low apparent volume of drug distribution. Clinically relevant changes in respiratory rate or arterial blood pressure were not observed and ventilation was maintained. However, these studies also reported some undesirable effects. Most important, AZD-3043 induced allergic-type reactions (erythema, chest discomfort and dyspnea) in three subjects. Another disadvantage is that the drug is formulated in a lipid, so the respective problems known from propofol emulsion possibly come into play (23).

#### **Neurosteroid-based anesthetics**

Steroids synthesized in the brain have been called neurosteroids and are responsible for a number of physiological effects even if their full functional significance remains to be established (11). The region-specific synthesis of neurosteroids in turn is responsible for the modulation of neurotransmitter function in distinct brain areas involved in sensory, motor, cognitive and emotional functions. Additionally, neurosteroids are also developmentally regulated and synthesized sex specifically according to the genomic regulation. The biosynthesis of neurosteroids is controlled by the translocator protein (18 kDa) (TSPO) (11). Steroids active at GABAA receptors are active as sedative hypnotics, anticonvulsants, and anxiolytics in animal models and  $3\alpha,5\alpha$ -THPROG and  $3\alpha,5\alpha$ -THDOC produce potent anesthetic effects. Interestingly, progesterone which was known to induce rapid anesthesia does not affect GABA-evoked currents (24).

The sulfated neuroactive steroids pregnenolone sulfate and dehydroepiandrosterone sulfate (DHEAS), which are NAMs at GABAA receptors, induce anxiogenic and proconvulsant effects (24). However, also other mechanisms e.g via NMDA and  $\sigma_1$  receptors have been described. In cortical neurons,  $3\alpha,5\alpha$ -THPROG, together with either propofol or barbiturates, synergistically potentiates GABAA receptors. This co-application of neurosteroids with other PAMs may be seen as a beneficial concept in general anesthesia and intensive care medicine to reduce anesthetic dose requirements and, in turn avoid undesired anesthetic induced side effects (11).

As outlined above, neuroactive steroids are potent modulators of GABAergic neurotransmission and mediate anesthesia, analgesia and can act also as anxiolytics. These pharmacological suggest them as potentially interesting for their clinical usage in general and/or perioperative anesthesia in combination with frequently used anesthetics (11).

### *Ganaxolone*

Ganaxolone is a 3-methylated analogue of  $3\alpha,5\alpha$ -THPROG and, at nanomolar concentrations, acts as a PAM whereas at higher concentrations directly activates GABAA receptors (11).

Currently, ganaxolone is undergoing clinical evaluation as adjunctive therapy in female children with PCDH19 mutations suffering from infantile spasms. In adults with uncontrolled partial-onset seizures ganaxolone as an adjunctive therapy reduced seizure frequency. In 2015 Marinus Pharmaceuticals conducted a randomized, placebo-controlled, phase 2 clinical trial evaluating the effect of ganaxolone on behaviours associated with Fragile X syndrome children. However, no significant improvements in the outcome measures were reported. (25). Although the most striking adverse effect in non-clinical and clinical studies was reported to be a dose-dependent but reversible sedation, somnolence, dizziness and fatigue no further studies followed up to test ganaxolone as an anaesthetic (11).

### *Alphaxalone / Phaxan*

The pregnane steroid alphaxalone, an analogue of progesterone and its metabolite  $3\alpha,5\alpha$ -THPROG, is also a synthetic neurosteroid which potentiates GABAergic function with high selectivity. The compound has anxiolytic, sedating, anesthetic, anticonvulsant, and neuroprotective properties and was formulated as a mixture, together with alphadolone, to Althesin® (or Alfathesin®) which was commercially marketed after approval in Europe in the 1970s (11).

The product was a versatile short-acting IV anesthetic used in clinical practice in many countries. This mixture showed a wide safety margin with minor cardiovascular and respiratory depression and was characterized by rapid onset and offset of hypnotic effect. No progestational, estrogenic, mineralocorticoid or thymolytic activity was described. Due to a rare but serious, mainly histaminoid reaction in humans to the vehicle Cremophor®, a non-ionic surfactant additive and used to formulate Althesin®, it has been withdrawn from clinical studies (26).

However, alfaxolone (Alfaxan® or Saffan®) is still used in veterinary medicine. Currently, alphaxalone has been re-formulated as Phaxan® in 7-sulfobutylether  $\beta$ cyclodextrin (SBECD), an excipient devoid of producing hypersensitivity which has been used for dissolution of hydrophobic drugs for IV injections (27).

Phaxan® was also slightly superior to propofol regarding safety margin. In a phase 1c human, randomized and double blind-study the Phaxan® was compared with the standard lipid preparation of propofol in common clinical use. The new aqueous formulation showed a similar potency to Althesin and a similar onset and offset time course for sedation as propofol whereas the cognitive function recovered more rapidly. At equipotent doses, the side effect profile of Phaxan® was much more beneficial than that of propofol, regarding especially some of the disadvantages of propofol such as pain on injection, cardiorespiratory depression, and risk of solvent toxicity (28). Even though further trials are required, Phaxan may have the



potential to match propofol in performance as a fast-onset, fast-offset IV anesthetic with a more beneficial side effect profile (11).

### **New innovations in drug delivery**

#### *Target-controlled infusion*

The TCI systems are identified as open- and closed-loop systems. In the open-loop systems, the providers select a specific drug and a specific pharmacokinetic or pharmacodynamic model from the drug library incorporated in the device. Published models have been embedded in the pumps for propofol, remifentanyl, sufentanyl, and alfentanil. A limitation of this delivery technique is that it lacks real-time feedback from the patient to the TCI delivery system. Thus, continuous clinical assessment of the patient and refining of the target is often required (29).

In comparison to the open-loop system, the closed-loop system may offer the advantages of more precise dosing, decrease in some workload functions, improved and standardized control of the depth of sedation and anesthesia, decreased consumption of drug, improved hemodynamic stability, faster postoperative recovery, and minimized individual operator variability in titration of the sedative agent (2).

Because TCI systems rely on an internal PK or PK-PD model to calculate drug administration, it is imperative that the model reflect the true characteristics of each individual as accurately as possible. Otherwise, misprediction of drug concentrations and infusion rates can cause patient drug concentrations to vary over time, making accurate patient treatment more difficult. These systems typically individualize the models based on patient weight but may also use age, sex, BMI, or membership in special populations (30).

### **Computer-assisted personalized sedation system**

Initially, there was optimism that Sedasys could revolutionize the field of non-operating room sedation by integrating continuous physiologic monitoring with patient feedback (response to auditory stimuli) to control the depth of sedation. The physiologic monitoring includes non-invasive arterial blood pressure, pulse oximetry, capnography, and electrocardiogram, all consistent with the American Society of Anesthesiologists (ASA) Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists and ASA Standards for Basic Anesthetic Monitoring. This closed-loop system was intended to maintain sedation and minimize the risks of respiratory depression, cardiovascular instability, and loss of responsiveness. The first-to-market product (FDA approval 2013) in the CAPS category is the SEDASYS®. Although SEDASYS provided a higher degree of patient and clinician satisfaction and fewer adverse events compared to any other standard-of-care delivery regimens (fentanyl and versed). Ethicon, Inc, announced in March 2016 that it would no longer market Sedasys (2).

Some technological innovations initially offered promise. However, as with any new innovation, some devices and drugs disappointed. The lack of success of these agents and devices could be related to safety, quality of anesthesia delivery, or financial reasons (2).

New innovations in drug development and delivery contribute to continued improvement in anesthesia. Large clinical trials are needed to provide the greatest level of evidence and safety prior to widespread clinical implementation.

## References

1. Chitilian HV, Eckenhoff RG, Raines DE. Anesthetic drug development: Novel drugs and new approaches. *Surg Neurol Int.* 2013 Mar 19;4(Suppl 1):S2-S10.
2. Mahmoud M, Mason KP. Recent advances in intravenous anesthesia and anesthetics. *F1000Res.* 2018 Apr 17;7:F1000 Faculty Rev-470.
3. Saari TI, Uusi-Oukari M, Ahonen J, Olkkola KT. Enhancement of GABAergic activity: Neuropharmacological effects of benzodiazepines and therapeutic use in anesthesiology. *Pharmacol Rev* 2011;63:243-67.
4. Choi YF, Wong TW, Lau CC. Midazolam is more likely to cause hypotension than etomidate in emergency department rapid sequence intubation. *Emerg Med J* 2004;21:700-2]
5. J. Robert Sneyda and Ann E. Rigby-Jones. Remimazolam for anaesthesia or sedation *Curr Opin Anesthesiol* 2020, 33:506–511
6. X Sheng, Y Liang, X Yang, L Li, X Ye, X Zhao ,Y Cui. Safety, pharmacokinetic and pharmacodynamic properties of single ascending dose and continuous infusion of remimazolam besylate in healthy Chinese volunteers. *European Journal of Clinical Pharmacology* 2020, 76, 383–391.
7. Worthington MT, Antonik LJ, Goldwater DR, et al. A phase Ib, dose-finding study of multiple doses of remimazolam (CNS 7056) in volunteers undergoing colonoscopy. *Anesth Analg* 2013; 117:1093–1100.
8. Bevans T, Deering-Rice C, Stockmann C, Rower J, Sakata D, Reilly C. Inhaled Remimazolam Potentiates Inhaled Remifentanyl in Rodents. *Anesth Analg* 2017 May;124(5):1484-1490.
9. Kliot M. Neurosurgical developments on the horizon. *Surg Neurol Int.* 2013 Mar 19;4(Suppl 1):S1.
10. Sneyd JR, Rigby-Jones AE, Cross M, Tominaga H, Shimizu S, Ohkura T, Grimsehl K. First human administration of MR04A3: a novel water-soluble nonbenzodiazepine sedative. *Anesthesiology.* 2012 Feb;116(2):385-95.
11. Antkowiak B, Rammes G. GABA(A) receptor-targeted drug development -New perspectives in perioperative anesthesia. *Expert Opin Drug Discov.* 2019 Jul;14(7):683-699.
12. Marçon F, Guittet C, Manso MA, et al.: Population pharmacokinetic evaluation of ADV6209, an innovative oral solution of midazolam containing cyclodextrin. *Eur J Pharm Sci.* 2018; 114: 46–54.
13. Valk BI, Absalom AR, Meyer P, et al. Safety and clinical effect of i.v. infusion of cyclopropyl-methoxycarbonyl etomidate (ABP-700), a soft analogue of etomidate, in healthy subjects. *Br J Anaesth.* 2018 Jun;120(6):1401–1411.
14. Pejo E, Liu J, Lin X, et al.: Distinct Hypnotic Recoveries After Infusions of Methoxycarbonyl Etomidate and Cyclopropyl Methoxycarbonyl Metomidate: The Role of the Metabolite. *Anesth Analg.* 2016; 122(4): 1008–14.
15. Wu Q, Zhang N, Shen Y, et al.: Influence of polyvinyl chloride infusion extension tube on propofol injection pain: a randomised controlled study. *Eur J Anaesthesiol.* 2014; 31(12);663-8.
16. Robert Damitz, Anuj Chauhan Kinetically stable propofol emulsions with reduced free drug concentration for intravenous delivery. *International Journal of Pharmaceutics* 486 (2015) 232–241.
17. Robert Damitz, Anuj Chauhan. Micro to macro (M2M)”—A novel approach for intravenous delivery of propofol *International Journal of Pharmaceutics* 494 (2015) 218–226.
18. Parks CL, Tucker W, Amlong CA, et al. Lipid-free fluoropolymer-based propofol emulsions and lipid reversal of propofol anesthesia in rats. *Anesthesiology.* 2016 Jun;124(6):1328–1337.
19. Jee JP, Parlato MC, Perkins MG, et al. Exceptionally stable fluoruous emulsions for the intravenous delivery of volatile general anesthetics. *Anesthesiology.* 2012 Mar;116(3):580–585.
20. Qin L, Ren L, Wan S, et al.: Design, Synthesis, and Evaluation of Novel 2,6-Disubstituted Phenol Derivatives as General Anesthetics. *J Med Chem.*2017; 60(9):3606-17.

21. Ludbrook G, Li F, Sleight J, Liang Y. Assessments of Onset and Duration of Drug Effects and Pharmacokinetics by Dose Level of HSK3486, a New Sedative-Hypnotic Agent, in Healthy Female/Male Subjects: A Phase I Multiarm Randomized Controlled Clinical Trial. *Anesth Analg*. 2021 Jan 15.
22. Feng AY, Kaye AD, Kaye RJ, Belani K, Urman RD Novel propofol derivatives and implications for anesthesia practice. *J Anaesthesiol Clin Pharmacol*. 2017 Jan-Mar;33(1):9-15.
23. Björnsson MA, Norberg Å, Kalman S, Simonsson US. A Recirculatory Model for Pharmacokinetics and the Effects on Bispectral Index After Intravenous Infusion of the Sedative and Anesthetic AZD3043 in Healthy Volunteers *Anesth Analg*. 2015 Oct;121(4):904-13.
24. Peters JA, Kirkness EF, Callachan H, et al. Modulation of the GABAA receptor by depressant barbiturates and pregnane steroids. *Br J Pharmacol*. 1988 Aug;94(4):1257–1269.
25. Ligsay A, Van Dijck A, Nguyen DV, et al. A randomized double-blind, placebo-controlled trial of ganaxolone in children and adolescents with fragile X syndrome. *J Neurodev Disord*. 2017 Aug 2;9(1):26.
26. Radford SG, Lockyer JA, Simpson PJ. Immunological aspects of adverse reactions to althesin. *Br J Anaesth*. 1982 Aug;54 (8):859–863.
27. Colin S. Goodchild, Juliet M. Serrao, John W. Sear, and Brian J. Anderson Pharmacokinetic and Pharmacodynamic Analysis of Alfaxalone Administered as a Bolus Intravenous Injection of Phaxan in a Phase 1 Randomized Trial, *BJ.Anesth Analg*. 2020 Mar;130(3):704-714.
28. Monagle J, Siu L, Worrell J, et al. 1c trial comparing the efficacy and safety of a new aqueous formulation of alphaxalone with propofol. *Anesth Analg*. 2015 Oct;121(4):914–924.
29. M. Ghita et al.: Closed-Loop Control of Anesthesia: Survey on Actual Trends, Challenges and Perspectives. *IEEEAccess* 2020;8: 206264-79.
30. Eleveld DJ. Target-controlled-infusion for special populations: How different is different enough? *Acta Anaesthesiol Scand*. 2019 Apr;63(4):422-423.

**02 May 2021-Sunday**

---

**08:30-09:35 | SPECIALIST'S SESSION I**

**Chairs:** Nurdan Bedirli, Raif Kaya

**Anaesthesia Management for Non-Obstetric Surgery During Pregnancy;** Volkan Baytaş

**Bedside Bleeding Coagulation Monitoring;** Ülkü Ceren Köksoy

**Prevention of Acute Kidney Injury and Protection of Renal Function in Intensive Care Unit;** Hakan Yılmaz

**Anesthesia in Non-Operating Procedures in Pediatric Patients;** Nilgün Şahin

**Diaphragmatic Pacing- An Overview;** Gülten Ütebey

**Epidural Analgesia for Labor and Delivery;** Mehmet Yalvaç

**Anesthesia for The Obese Patients;** Zübeyir Cebeci

---

## **ANAESTHESIA MANAGEMENT FOR NON OBSTETRIC SURGERY DURING PREGNANCY**

***Dr. Volkan Baytaş***

*Ankara Üniversitesi Tıp Fakültesi Anesteziyoloji ve Reanimasyon AD*

### **ABSTRACT**

It is estimated that the frequency of nonobstetric surgery during pregnancy reaches 2%. Nonobstetric surgeries are 23% in the first trimester, 35% in the second trimester and 42% in the third trimester. In the first trimester, surgery due to apendectomy and cholecystectomy is most commonly required.

Teratogenic agents should be avoided, maternal hypotension should be prevented, uteroplacental perfusion should be maintained, preterm delivery should be prevented and intraoperative and postoperative fetal heart rate and uterine tonicity should be applied.

There is no anesthetic with proven teratogenic effect after a single administration, or administration of acceptable clinical doses.

Although both regional and general anesthesia can be safely applied for operations performed for reasons not related to pregnancy during pregnancy, it is recommended to prefer regional techniques whenever possible.

The aim of nonobstetric surgical anesthesia during pregnancy is to prevent fetal hypoxia by providing adequate oxygenation, to provide normotension, normocapnia and normoglycemia, and to provide adequate postoperative analgesia.

### **INTRODUCTION**

It is estimated that the frequency of nonobstetric surgery during pregnancy reaches 2%. Nonobstetric surgeries are 23% in the first trimester, 35% in the second trimester and 42% in the third trimester. In the first trimester, surgery due to apendectomy and cholecystectomy is

most commonly required. The risk is higher in the fetus due to the teratogenic effects of drugs and radiation on the fetus, fetal hypoxia due to uteroplacental hypoperfusion, or premature termination of pregnancy with miscarriage or delivery. In addition, physiological changes in the mother during pregnancy also affect our anesthetic approach.

### **PRINCIPLES OF ANESTHESIA MANAGEMENT**

Teratogenic agents should be avoided, maternal hypotension should be prevented, uteroplacental perfusion should be maintained, preterm delivery should be prevented and intraoperative and postoperative fetal heart rate and uterine tonicity should be applied.

**Teratogenicity:** In the first 2 weeks of gestation, the pregnancy product exposed to external factors is either lost or the pregnancy continues without being affected at all. It is the organogenesis stage between the 3rd and 8th weeks of pregnancy and teratogenic substances cause serious structural anomalies. In the future, its effects occur in the form of functional impairment or growth retardation.

There is no anesthetic with proven teratogenic effect after a single administration, or administration of acceptable clinical doses.

**The Effect of Anesthetics on The Fetus:** The effects of none of the anesthetic drugs, placental perfusion and transitions on the fetus are unclear. All anesthetics pass through the placenta in certain proportions. Since nitrous oxide inhibits methionine synthetase, its use in pregnancy is controversial. It is recommended not to use it in the first trimester and then to apply it at a maximum concentration of 50%. It has been reported in various publications that drugs in the benzodiazepine group cause congenital anomalies. Despite retrospective data suggesting a relationship between maternal diazepam use and cleft palate formation, no teratogenicity has been reported with the use of a single dose of benzodiazepines. Midazolam can be used before propofol due to its strong anxiolytic and amnesic effect. The teratogenic effect of inhalation and local anesthetic drugs has not been shown. Propofol is a frequently preferred agent because it is easy to titrate, has a low incidence of nausea and vomiting in terms of early recovery. High doses of ketamine (> 100 mg) should be avoided during early pregnancy because it increases the tone of uterus. While the short-term use of opioids is safe, since they pass the placenta comfortably, withdrawal symptoms occur in the newborn after their long-term use. Since muscle relaxants do not cross the placenta at clinical concentrations, they can be used. In antagonism of muscle relaxants, neostigmine has effects on fetal bradycardia and atropine has effects on fetal tachycardia. Sugamadex can be used instead of neostigmine because it does not cross the placenta, but there is no data on its use in pregnancy. Since the use of ondansetron in the first trimester of pregnancy causes cleft palate and cleft lip anomaly, it should not be used during this period.

**Timing of Surgery:** It is recommended to postpone elective surgical interventions for 6 weeks after delivery. Due to teratogenic effects or adverse effects on organogenesis, first trimester

is a high risk period. The safest period for nonobstetric semi-elective interventions is the second trimester.

**Monitoring and Position:** According to the type of anesthesia selected in the peroperative period, the mother's heart rate, ECG, blood pressure, peripheral oxygen saturation, body temperature, ETCO<sub>2</sub> pressure and peripheral nerve stimulator are monitored first. On the other hand, preoperatively, in order to protect the pregnant from hypotensive attacks due to aortocaval compression in the supine position, with the aortocaval decompression provided by turning the operating table to the left about 15 ° during anesthesia induction, preservation of uteroplacental perfusion should be aimed. Hypoglycemia should be avoided. Hypoxia is perhaps the cause of many teratogenic effects and fetal distress during surgery. It may be necessary to increase FiO<sub>2</sub> and control and change the endotracheal tube. If hypotension has developed, fetal monitoring should be performed to evaluate uterine perfusion. There may be changes in fetal heart rate with barbiturates, narcotics and other agents. Even if the patient is recovered, this effect may continue until it is discharged from the fetus.

**Selection of Anesthesia Technique:** Although both regional and general anesthesia can be safely applied for operations performed for reasons not related to pregnancy during pregnancy, it is recommended to prefer regional techniques whenever possible. The major reasons for regional anesthesia are the safer maternal airway, less fetal drug exposure, and a more effective postoperative analgesia that reduces the need for systemic analgesic use. However, it should be kept in mind that there is a risk of developing sudden hypotension during regional anesthesia.

The aim of nonobstetric surgical anesthesia during pregnancy is to prevent fetal hypoxia by providing adequate oxygenation, to provide normotension, normocapnia and normoglycemia, and to provide adequate postoperative analgesia.

Preoperative sedative premedication should be avoided. Possible respiratory depression can lead to fetal dissection due to reduced functional residual capacity and the potential for rapid desaturation development. In addition to standard preoperative applications, aspiration prophylaxis, antibiotic prophylaxis, glucocorticoid prophylaxis, thrombophilia and prophylactic tocolytic administration should be considered in this patient group. It has been reported that glucocorticoid administration 24-48 hours before surgery in the 24th-34th weeks of pregnancy may decrease perinatal morbidity and mortality in case of preterm labor. Since hypercoagulation prevails during pregnancy, according to the guideline published in 2012, the American College of Chest Physicians recommends the use of mechanical or pharmacological thrombophilia in all patients undergoing surgery to prevent thrombosis development.

During general anesthesia, after 5 minutes of preoxygenation with 100% oxygen, after rapid intravenous induction with cricoid pressure, endotracheal intubation should be considered.

Inhalation anesthesia over 2 MAC should be avoided in the maintenance of anesthesia. During surgery, it should be ventilated with slightly high oxygen (FiO<sub>2</sub>: 0.5).

During pregnancy, the sensitivity of neural tissues to local anesthetics has increased. A lower dose (30%) of local anesthetics is required.

### **LAPAROSCOPIC INTERVENTIONS IN PREGNANT WOMEN**

Second trimester is the best time for laparoscopic surgery in pregnant women. The risk of abortus is less compared to the 1st trimester. Preterm birth rate is lower. Since the uterus size is smaller than in the third trimester, it is easier to see the surgery area and manipulate it. In addition, the risk of teratogenicity is lower in the second trimester.

General anesthesia is preferred as anesthesia method in laparoscopic procedures in pregnant women, and sedation is preferred for other procedures. Regional anesthesia is another less frequently preferred anesthesia application.

CO<sub>2</sub> gas used in laparoscopy increases intraabdominal pressure, reducing maternal venous rotation and cardiac flow. As a result, decreased uterine blood flow causes fetal hypoxia. Intraabdominal pressure should be kept below 15 mmHg to prevent maternal hypercarbia and fetal acidosis. Since the increasing uterus size after the end of the second trimester will prevent the visualization of intraabdominal organs, 26th – 28th weeks of pregnancy is the limit for successful laparoscopic operations.

### **POSTOPERATIVE ANALGESIA**

Pain can cause the release of endogenous catecholamines, decreased uteroplacental blood flow, and fetal hypoxia. For this reason, pain control comes to the fore in postoperative care. If the operation is performed with regional analgesia + anesthesia, an effective analgesia can be provided in the postoperative period. On the other hand, this application causes least FBD (Fibrocystic Breast Disease) variability in the perioperative period.

Only in patients under general anesthesia, systemic patient-controlled intravenous analgesia may be preferred in the postoperative period. Sometimes epidural catheterization can be performed for postoperative analgesia purposes along with general anesthesia. In this case, patient controlled epidural analgesia can also be performed. Plexus blocks, epidural analgesia and infiltration analgesia applied for analgesic purposes reduce the risk of developing opioid-related hypoventilation by reducing the need for opioids. Low doses of opioids and paracetamol can be used in pregnant women. However, its use should be avoided, especially in pregnancies older than 32 weeks, as the use of non-steroidal anti-inflammatory drugs lasting more than 48 hours can lead to early closure of the ductus artery and the development of oligohydramnios.

As a result; Knowing the characteristics of the procedure well, maternal and fetal monitoring, Appropriate positioning during the procedures, Drug selection that will not have toxic effects on the fetus, Drug titration according to the fetal heart rate, Preservation of uteroplacental perfusion, Radiation dose follow-up and protection of the fetus, Monitoring the newborn after the procedure are important factors.

## REFERENCES

1. Nejdlova M, Johnson T. Anaesthesia for non-obstetric procedures during pregnancy. *CEACCP*, 2012;12:203-6.
2. Van de Velde M. Nonobstetric Surgery during Pregnancy. In Chestnut's *Obstetric Anesthesia Principles and Practise*. 4th Ed. Philadelphia: Mosby Elsevier 2009:337-58.
3. Ni Mhuireachtaigh R, O'Gorman DA. Anesthesia in the pregnant patients for nonobstetric surgery. *J Clin Anesth* 2006;18:60-6. <http://dx.doi.org/10.1016/j.jclinane>
4. Carvalho B. Nonobstetric surgery during pregnancy. *IARS Review Course Lectures* 2006;23-30
5. Van De Welde M, De Buck F. Anesthesia for nonobstetric surgery in the pregnant patient. *Minerva Anesthesiol* 2007;73:235-40. PMID:17473818
6. Kuczkowski KM. Nonobstetric surgery during pregnancy: What are the risks of anesthesia? *CME Review Article Obstet Gynecol Survey* 2003;59:52-6. <http://dx.doi.org/10.1097/01.OGX.0000103191.73078.5F>
7. Fanzago E. Anesthesia for nonobstetric surgery in pregnant patients. *Minerva Anesthesiol* 2003;69:416-27. PMID:12768177
8. Marengo JE, Santos AC. Anesthesia for Nonobstetric Surgery During Pregnancy. In *Obstetric and Gynecologic Anesthesia: The Requisites in Anesthesia*. Braveman FR (Ed). Philadelphia: Mosby Elsevier 2006:18-24.
9. Günaydın B. Gebenin Gebeliği ile İlgili Olmayan Cerrahi Girişimlerinde Anestezi Yönetimi. *Türk Anest Rean Der Dergisi* 2012;40(1):1-10 (doi:10.5222/JTAICS.2012.001)
10. Garcia NIS, Morant JCG, Gonzales EH. Nonobstetric Surgery During Pregnancy, *Rev. Col. Anest.* 2011;39(3):360-373 (doi:10.5554/rca.v39i3.51)
11. ACOG committee opinion. Nonobstetric surgery in pregnancy. Number 284, August 2003. ACOG Committee on Obstetric Practice. *Int J Gynaecol Obstet* 2003;83:135. [http://dx.doi.org/10.1016/S0020-7292\(03\)00391-6](http://dx.doi.org/10.1016/S0020-7292(03)00391-6), PMID:20695826
12. ACOG Committee Opinion No. 474: Nonobstetric surgery during pregnancy. ACOG Committee on Obstetric Practice. *Obstet Gynecol* 2011;117:420-1., PMID:21252774
13. Morgan GE, Mikhail SM, Murray JM (ed), *Obstetric Anesthesia*. In: *Clinical Anesthesiology*. New York, McGraw-Hill Companies, 2002;pp 819-846
14. Anderson EL, Irving R. A Review of the Literature From 1941-2007, *Psychosomatic Medicine* 2009;71:235-42.
15. Reedy MB, Kallen B, Kuehl TJ. Laparoscopy during pregnancy: a study of five fetal outcome parameters with use of the Swedish Health Registry. *Am J Obstet Gynecol* 1997;177:673-9.
16. Curet MJ, Weber DM, Sae A, Lopez J. Effects of helium pneumoperitoneum in pregnant ewes. *Surg Endosc*, 2001;15:710-4.
17. Curet MJ. Special problems in laparoscopic surgery. *Surg Clin North Am*, 2000;80:1-14.
18. Upadya M, Saneesh PJ. Anaesthesia for non-obstetric surgery during pregnancy. *Indian J Anaesth* 2016;60: 234-41.
19. Reitman E, Flood P. Anaesthetic considerations for non-obstetric surgery during pregnancy. *Br J Anaesth* 2011;107:i72-8.
20. Bonnet MP. Sedation and anaesthesia for non-obstetric surgery. *Anaesth Crit Care Pain Med* 2016;35S, S35-41.



---

**02 May 2021-Sunday**

---

**08:30-09:35 | SPECIALIST'S SESSION I**

Chairs: Nurdan Bedirli, Raif Kaya

**Anaesthesia Management for Non-Obstetric Surgery During Pregnancy;** Volkan Baytaş**Bedside Bleeding Coagulation Monitoring;** Ülkü Ceren Köksoy**Prevention of Acute Kidney Injury and Protection of Renal Function in Intensive Care Unit;** Hakan Yılmaz**Anesthesia in Non-Operating Procedures in Pediatric Patients;** Nilgün Şahin**Diaphragmatic Pacing- An Overview;** Gülten Ütebey**Epidural Analgesia for Labor and Delivery;** Mehmet Yalvaç**Anesthesia for The Obese Patients;** Zübeyir Cebeci

---

**PREVENTION OF ACUTE KIDNEY INJURY AND  
PROTECTION OF RENAL FUNCTION IN INTENSIVE CARE UNIT*****Hakan Yılmaz, M.D.****Ufuk University Faculty of Medicine**Department of Anesthesiology and Reanimation**Ankara, TURKEY***ABSTRACT**

Acute kidney injury (AKI) in the intensive care unit is associated with significant mortality and morbidity. It is known that the most common causes of AKI in critically ill patients are sepsis, hypovolemia, nephrotoxic agents. Pre-existing comorbidities further increase the risk. Preventive measures against AKI are important and should taking into account the characteristics of each patient. In contrast, AKI is diagnosed by the changes in serum creatinine levels and urine amounts that are both late indicators. This causes delays in the diagnosis of AKI and its treatment via preventive measures.

In this presentation, I review the characteristics of AKI, the factors that amplify AKI risk and susceptibility, widely-accepted classifications used in its diagnosis, and strategies for preventing AKI and protecting renal functions in critically ill patients in intensive care (e.g.; volume expansion, diuretics, inotropes, vasopressors, vasodilators, hormones, statins, nutrition, sedatives).

**FULL TEXT****Introduction**

AKI is associated with long-term and short-term morbidity and mortality in as much as half of the critically ill patients with the most common causes being sepsis and hypovolemia.(1) Susceptibility to AKI increases with nephrotoxic agents, and pre-existing conditions.(1)

### **Acute kidney injury**

AKI is the acute loss of kidney's ability to filter solid (azotemia) and / or liquid (oliguria / anuria) substances. There may be some permanent reduction in kidney function. Glomerular filtration rate (GFR) and urine output are generally reduced. AKI emerges suddenly and its main symptoms are uremia, oliguria, anuria, hyperkalaemia, and pulmonary edema.

Septic shock and major surgeries are important contributing factors to AKI. Other factors are cardiogenic shock, hypovolemia, hepatorenal syndrome, obstructive uropathies, use of contrast agents, surgical or vascular manipulations, nephrotoxic drugs, physical trauma, infection, inflammation and toxicity.

AKI can arise in 3 types: prerenal, renal and postrenal. Prerenal AKI is associated with decreased systemic perfusion and renal blood flow (RBF), such as hypovolemic shock and congestive heart failure. Renal AKI is associated with renal parenchymal diseases such as tubulointerstitial nephritis, acute interstitial nephritis and nephrotoxicity. Postrenal AKI is caused by obstruction of urine flow. Prerenal and renal causes are more common compared to the postrenal causes that underly AKI.

### **Diagnosis and classification of acute kidney injury**

The most important limitations in the diagnosis of AKI are delayed serum creatinine increase after the real reduction in GFR that is defined as the plasma volume cleared from a substance in a certain time interval. It is difficult to directly calculate the GFR. Therefore, indirect calculations are performed using the rate at which creatinine is cleared from the blood. Creatinine clearance and GFR (using Cockcroft-Gault formula) can be calculated as below:

$$\text{Creatinine clearance (ml / min): } \frac{\text{Urine creatinine (mg / dl)} \times \text{Urine volume (ml)}}{\text{Serum creatinine (mg / dl)} \times 1440}$$

$$eGFR = (140 - \text{Age}) \times \text{Weight (kg)} / 72 \times \text{Serum Creatine (mg / dl)}$$

AKI is diagnosed by the changes in serum creatinine levels and urine amounts that are both late indicators. This causes delays in the diagnosis of AKI and its treatment via preventive measures. This is particularly common in elderly patients and patients that are in intensive care. To alleviate the problem, diagnosis and preventive measures against AKI should take into account the characteristics of each patient.

Many classification systems such as RIFLE (Risk, Injury, Failure, Loss of function, End-stage renal disease), AKIN (AKI Network) and KDIGO (Kidney Disease Improving Global Outcomes) have been developed for diagnosing AKI.

RIFLE was developed in 2004 by the ADQI (Acute Dialysis Quality Initiative) group as a consensus based on increased serum creatinine and decreased GFR relative to baseline and

urine volume. It assesses renal failure at each stage, revealing its potential correlation with mortality.

**Table 1.** Risk Injury Failure Loss and End-stage Kidney (RIFLE) classification(2)

Class	GFR criteria	Urine output criteria
Risk	Serum creatinine x 1.5	< 0.5 ml/kg/hour x 6 hours
Injury	Serum creatinine x 2	< 0.5 ml/kg/hour x 12 hours
Failure	Serum creatinine x 3, or serum creatinine $\geq$ 4 mg/dl with an acute rise > 0.5 mg/dl	< 0.3 ml/kg/hour x 24 hours, or anuria x 12 hours
Loss	Persistent acute renal failure = complete loss of kidney function > 4 weeks	
End-stage kidney disease	End-stage kidney disease > 3 months	

AKIN was adopted in 2007 to address the weaknesses in RIFLE such as high mortality rates associated with very small increases in serum creatinine, particularly at the R-risk stage. AKIN used 3 stages and more granular increases for serum creatinine levels for diagnosing AKI (as in Table 2 below), removed GFR criterion and lowered the event duration from 7 days to 48 hours. Urine output rates remained the same as in RIFLE.

**Table 2.** Acute Kidney Injury Network (AKIN) classification(3)

Stage	Serum creatinine	Urine output
<b>1 or R</b>	$\geq$ 0.3mg / dl or 1.5-2 fold increase from baseline	<0.5 ml / kg / h for 6-12 hours
<b>2 or I</b>	2-3 fold increase from baseline	<0.5 ml / kg / h for $\geq$ 12 hours
<b>3 or F</b>	> 3 fold or $\geq$ 4mg / dl (at least 0.5mg / dl acute increase) or RRT	<0.3 ml / kg / h for $\geq$ 24 hours or Anuria $\geq$ 12 hours

RRT: Renal replacement therapy

In March 2012, KDIGO guideline was developed with a single simple definition for clinical practice, research and public health based on the validity of RIFLE and AKIN criteria. According to KDIGO guidelines, basal serum creatinine level and urine output are used for the diagnosis of AKI, and similar to AKIN criteria, AKI is divided into 3 stages.

**Table 3.** The initial diagnosis and staging of AKI in adults according to KDIGO

Stage	Serum creatinine	Urine output
<b>1</b>	1.5–1.9 fold or $\times$ 0.3 mg/dl increase from baseline	<0.5 ml / kg / h for 6-12 hours
<b>2</b>	2-2.9 fold increase from baseline	<0.5 ml/kg/h for $\geq$ 12 hours
<b>3</b>	3 fold increase from basal value or > 4.0 mg / dl or RRT or <35 ml/min /1.73 m <sup>2</sup> reduction in eGFR in patients <18 years of age	<0.3 ml / kg / h $\geq$ 24 hours or Anuria $\geq$ 12 hours

Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. *Kidney Int Suppl.* 2012;2:1-138.

### Prevention strategies of acute kidney injury

Risk of AKI increases with the presence of factors such as chronic kidney disease, sepsis, circulatory shock, burns, trauma, cardiac surgeries, other major surgeries, nephrotoxic drugs, dehydration or volume depletion, advanced age, diabetes mellitus, cancer and anemia.

Identification of these factors are important for preventing and treating AKI. Primary focus should be on preventing renal damage in patients without acute renal dysfunction and preventing additional renal damage in patients with acute renal dysfunction. Non-pharmacological and pharmacological strategies can be applied for renal protection. Non-pharmacological strategies include expansion of intravascular volume–fluid therapy, maintenance of RBF and renal perfusion pressure, avoidance of nephrotoxic agents, tight glycemic control and appropriate management of postoperative complications. Pharmacological kidney protection strategies include the use of diuretics, inotropes, vasopressors, vasodilators, hormones, natriuretic peptides, antioxidants, statins, nutrition and sedatives.

### **Volume expansion**

An important risk factors for AKI is hypovolemia.(4) In order to prevent hypovolemia, circulation volume should be supported via crystalloids and colloids. This also helps with renal perfusion and the reduction of nephrotoxicity. However, fluids should be administered in a controlled manner to prevent an increase in renal interstitial edema and renal parenchymal pressure.(1, 5) One should be wary of using isotonic crystalloids that may result in renal vasoconstriction via hyperchloremia.(1, 6)

Although colloids provide greater plasma expansion compared to crystalloids, they increase interstitial edema in sepsis where vascular barrier integrity is damaged. This hampers with tissue oxygenation. In addition, colloids - in large volumes - may cause deterioration in glomerular filtration due to their hyperoncotic effects.(7) In those cases, the use of balanced crystalloids is more prudent.

Joannidis et al. cautions against the use of starches, gelatins and dextrans for fluid replacement and recommends the use of isotonic crystalloids in patients receiving intravascular contrast media for addressing hypovolemia and dehydration.(1) They also note that if chloride-rich solutions are administered, blood acid-base status and chloride levels should be monitored.(1) In patients with septic shock, use of human serum albumin is suggested if colloids are necessary.(1) However, at times of emergencies that require contrast agents, intervention should not be delayed.(1)

### **Diuretics**

Renal dysfunction is generally characterized with oliguria and anuria. Joannidis et al. suggests the controlled use of loop diuretics in patients with diuretic response to prevent fluid overload by preventing tubular occlusion, reduce medullary oxygen consumption and venous occlusion via increasing RBF.(1, 8) However, they note that loop diuretics should not be considered as a drug that prevents AKI.(1)

### **Vasopressors**

Glomerular blood flow is regulated by afferent and efferent sphincters, adjusting the glomerular filtration pressure. While renal autoregulation maintains RBF and GFR over a wide

range of perfusion pressures, it does not preserve urine flow, which is more pressure dependent. Autoregulatory responses are reset in patients with chronic hypertension, so higher blood pressure may be required to maintain RBF and GFR. In AKI, renal autoregulation may be impaired or lost in sepsis and cardiopulmonary bypass. Therefore, RBF becomes more pressure dependent. RBF and perfusion pressure relies on the maintenance of cardiac output and systemic arterial pressure.

The first course of action for improving renal perfusion is to reverse hypovolemia by fluid resuscitation which can increase cardiac output. If cardiac output remains low and systemic arterial hypotension exists, inotropic and vasopressor therapy should be started.

The optimal therapeutic goal of systemic arterial pressure for renal protection has not been well established. However, minimum mean arterial pressure, often 65–75 mmHg, is frequently used as a clinical target. A higher target (80–85 mmHg) can also be set for renal protection of septic patients with pre-existing chronic hypertension.

For patients in vasodilatory shock, norepinephrine is the preferred vasopressor for protecting renal functions along with the reversion of hypovolemia.(1, 9) There is no evidence that norepinephrine impairs renal, hepatic or gastrointestinal blood flow when used to treat arterial hypotension. In catecholamine resistant vasodilatory shock, vasopressin or terlipressin can be used.(1, 10)

### **Vasodilators**

There is no common consensus for the use of vasodilators for protecting the kidneys. For instance, dopamine is not found to prevent AKI in low doses.(1) An inadilator – levosimendan – is not suggested for use for hemodynamic support.(1) This applies to patients with sepsis and cardiac surgery patients with low left ventricular function who need hemodynamic support.(1) The use of fenoldopam and natriuretic peptides for renal protection in critically ill patients is debatable.(1)

### **Sedation**

Some animal studies show that propofol can lower oxidative stress in kidneys. They also find that dexmedetomidine increases RBF and GFR, providing renal protections.(11, 12) However, we also know that the prolonged use of propofol can cause myopathy and rhabdomyolysis, resulting in hyperkalaemia and AKI.(1, 13) In sum, use of sedation may have some benefits with respect to AKI but the evidence is not conclusive.(1)

### **Hormones**

It is known that there are inflammatory processes in pathogenesis of AKI. However, conclusive evidence has not been found regarding the benefits of steroids for renal protection.(1, 14, 15)

Studies noted that erythropoietin can help with neovascularization and tissue regeneration but there were no significant benefits in critically ill patients with AKI.(1, 16, 17)

It has been demonstrated that tight glucose control increases survival rate and reduces AKI requiring RRT and provides significant renal protection.(1, 18)

### **Metabolic interventions**

It is known that higher entereal protein consumption lowers tubular damage and helps AKI treatment and prevention despite parenteral nutrition such as amino acid infusion that increases tubular damage.(1, 19, 20)

The use of N-acetylcysteine in critically ill patients with contrast agent-related AKI is not recommended.(1) Also, the use of high dose intravenous selenium is not recommended for these patients.(1, 21)

### **Statins**

It is believed that statins can provide renal protection with their antioxidant, anti-inflammatory and antithrombotic effects, and were shown to benefit high-risk patients that are exposed to contrast agents.(1) However, their perioperative use at high doses was shown to be harmful to the kidneys.(22, 23)

### **Conclusions**

Supporting intravenous volume with fluids, and applications of vasopressors and inotropes are primary tools in preventing AKI. Intravenous volume should be supported in hypovolemic patients via the use of balanced crystalloids in a controlled fashion, and vasoconstrictors should be used if the patients remain hypotensive. In cases of hypovolemia, balanced crystalloids should be preferred against the colloids. If volume replacement with colloids is necessary for patients with septic shock, human albumin should be used. For patients in vasodilatory shock, norepinephrine is the preferred vasopressor for protecting renal functions along with the reversion of hypovolemia. Diuretics can be useful in certain situations but should not be considered as a drug that prevents AKI. Caution should be performed to avoid both hypoglycemia and significant hyperglycemia. Statins can provide renal protection and were shown to benefit high-risk patients that are exposed to contrast agents. Although some benefits are noted, there is no strong evidence on sedation's renal protection.

### **REFERENCES**

1. Joannidis M, Druml W, Forni LG, Groeneveld ABJ, Honore PM, Hoste E, et al. Prevention of acute kidney injury and protection of renal function in the intensive care unit: update 2017 : Expert opinion of the Working Group on Prevention, AKI section, European Society of Intensive Care Medicine. *Intensive care medicine.* 2017 Jun;43(6):730-49.
2. Bellomo R, Ronco C, Kellum JA, Mehta RL, Palevsky P, Acute Dialysis Quality Initiative w. Acute renal failure - definition, outcome measures, animal models, fluid therapy and information technology needs: the Second International Consensus Conference of the Acute Dialysis Quality Initiative (ADQI) Group. *Critical care.* 2004 Aug;8(4):R204-12.
3. Mehta RL, Kellum JA, Shah SV, Molitoris BA, Ronco C, Warnock DG, et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. *Critical care.* 2007;11(2):R31.

4. de Mendonca A, Vincent JL, Suter PM, Moreno R, Dearden NM, Antonelli M, et al. Acute renal failure in the ICU: risk factors and outcome evaluated by the SOFA score. *Intensive care medicine*. 2000 Jul;26(7):915-21.
5. Kellum JA, Chawla LS, Keener C, Singbartl K, Palevsky PM, Pike FL, et al. The Effects of Alternative Resuscitation Strategies on Acute Kidney Injury in Patients with Septic Shock. *American journal of respiratory and critical care medicine*. 2016 Feb 1;193(3):281-7.
6. Wilkes NJ, Woolf R, Mutch M, Mallett SV, Peachey T, Stephens R, et al. The effects of balanced versus saline-based hetastarch and crystalloid solutions on acid-base and electrolyte status and gastric mucosal perfusion in elderly surgical patients. *Anesthesia and analgesia*. 2001 Oct;93(4):811-6.
7. Rozich JD, Paul RV. Acute renal failure precipitated by elevated colloid osmotic pressure. *The American journal of medicine*. 1989 Sep;87(3):359-60.
8. Heyman SN, Rosen S, Epstein FH, Spokes K, Brezis ML. Loop diuretics reduce hypoxic damage to proximal tubules of the isolated perfused rat kidney. *Kidney international*. 1994 Apr;45(4):981-5.
9. De Backer D, Biston P, Devriendt J, Madl C, Chochrad D, Aldecoa C, et al. Comparison of dopamine and norepinephrine in the treatment of shock. *The New England journal of medicine*. 2010 Mar 4;362(9):779-89.
10. Serpa Neto A, Nassar AP, Cardoso SO, Manetta JA, Pereira VG, Esposito DC, et al. Vasopressin and terlipressin in adult vasodilatory shock: a systematic review and meta-analysis of nine randomized controlled trials. *Critical care*. 2012 Aug 14;16(4):R154.
11. Luo C, Yuan D, Li X, Yao W, Luo G, Chi X, et al. Propofol attenuated acute kidney injury after orthotopic liver transplantation via inhibiting gap junction composed of connexin 32. *Anesthesiology*. 2015 Jan;122(1):72-86.
12. Hsing CH, Lin CF, So E, Sun DP, Chen TC, Li CF, et al. alpha2-Adrenoceptor agonist dexmedetomidine protects septic acute kidney injury through increasing BMP-7 and inhibiting HDAC2 and HDAC5. *American journal of physiology Renal physiology*. 2012 Nov 15;303(10):F1443-53.
13. Krajcova A, Waldauf P, Andel M, Duska F. Propofol infusion syndrome: a structured review of experimental studies and 153 published case reports. *Critical care*. 2015 Nov 12;19:398.
14. Whitlock RP, Devereaux PJ, Teoh KH, Lamy A, Vincent J, Pogue J, et al. Methylprednisolone in patients undergoing cardiopulmonary bypass (SIRS): a randomised, double-blind, placebo-controlled trial. *Lancet*. 2015 Sep 26;386(10000):1243-53.
15. Dieleman JM, Nierich AP, Rosseel PM, van der Maaten JM, Hofland J, Diephuis JC, et al. Intraoperative high-dose dexamethasone for cardiac surgery: a randomized controlled trial. *Jama*. 2012 Nov 7;308(17):1761-7.
16. Shema-Didi L, Kristal B, Eizenberg S, Marzuq N, Sussan M, Feldman-Idov Y, et al. Prevention of contrast-induced nephropathy with single bolus erythropoietin in patients with diabetic kidney disease: A randomized controlled trial. *Nephrology*. 2016 Apr;21(4):295-300.
17. Dardashti A, Ederoth P, Algotsson L, Bronden B, Grins E, Larsson M, et al. Erythropoietin and protection of renal function in cardiac surgery (the EPRICS Trial). *Anesthesiology*. 2014 Sep;121(3):582-90.
18. van den Berghe G, Wouters P, Weekers F, Verwaest C, Bruyninckx F, Schetz M, et al. Intensive insulin therapy in critically ill patients. *The New England journal of medicine*. 2001 Nov 8;345(19):1359-67.
19. Pons M, Plante I, LeBrun M, Gourde P, Simard M, Grenier L, et al. Protein-rich diet attenuates cyclosporin A-induced renal tubular damage in rats. *Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation*. 2003 Apr;13(2):84-92.
20. Mouser JF, Hak EB, Kuhl DA, Dickerson RN, Gaber LW, Hak LJ. Recovery from ischemic acute renal failure is improved with enteral compared with parenteral nutrition. *Critical care medicine*. 1997 Oct;25(10):1748-54.
21. Angstwurm MW, Engelmann L, Zimmermann T, Lehmann C, Spes CH, Abel P, et al. Selenium in Intensive Care (SIC): results of a prospective randomized, placebo-controlled, multiple-center study in patients with severe systemic inflammatory response syndrome, sepsis, and septic shock. *Critical care medicine*. 2007 Jan;35(1):118-26.

22. Leoncini M, Toso A, Maioli M, Tropeano F, Villani S, Bellandi F. Early high-dose rosuvastatin for contrast-induced nephropathy prevention in acute coronary syndrome: Results from the PRATO-ACS Study (Protective Effect of Rosuvastatin and Antiplatelet Therapy On contrast-induced acute kidney injury and myocardial damage in patients with Acute Coronary Syndrome). *Journal of the American College of Cardiology*. 2014 Jan 7-14;63(1):71-9.
23. Zheng Z, Jayaram R, Jiang L, Emberson J, Zhao Y, Li Q, et al. Perioperative Rosuvastatin in Cardiac Surgery. *The New England journal of medicine*. 2016 May 5;374(18):1744-53.



## 02 May 2021-Sunday

08:30-09:35 | SPECIALIST'S SESSION I

Chairs: Nurdan Bedirli, Raif Kaya

**Anaesthesia Management for Non-Obstetric Surgery During Pregnancy;** Volkan Baytaş

**Bedside Bleeding Coagulation Monitoring;** Ülkü Ceren Köksoy

**Prevention of Acute Kidney Injury and Protection of Renal Function in Intensive Care Unit;** Hakan Yılmaz

**Anesthesia in Non-Operating Procedures in Pediatric Patients;** Nilgün Şahin

**Diaphragmatic Pacing- An Overview;** Gülten Ütebey

**Epidural Analgesia for Labor and Delivery;** Mehmet Yalvaç

**Anesthesia for The Obese Patients;** Zübeyir Cebeci

### ANESTHESIA IN NON-OPERATING PROCEDURES IN PEDIATRIC PATIENTS

**Nilgün Şahin, MD**

*SBÜ Ankara Dr. Sami Ulus Gynecology, Children Health and Diseases Training and Research Hospital*

With the increase in procedural processes in the last 10 years, non-operating room anaesthesia applications have increased significantly, especially in the pediatric patient group. Anaesthesia applications (NORA) given for non-operative processes usually constitute 30% of the daily case number of pediatric hospitals (1). Because the imaging in the pediatric patients and application in minimalinvasive processes becomes more difficulty than the adults in terms of adaptation to the cooperation, general anaesthesia and sedation have become necessary in this patient group (1,2). Sedation in children contains differences compared to the adults. While the elimination of anxiety and pain in the adult patient increases the patient's compliance with the process, the same result cannot be achieved in children. A deeper sedation is required in pediatric patient groups, especially as the age gets smaller (7). Studies performed have shown that the transition to undesired sedation level may be faster and patient safety can be achieved more difficult since the sedation level in children should be deeper (8). Therefore, NORA practitioners in pediatric patients should have more experience and skill (6).

Since these processes are carried out away from operating rooms, it has become necessary to create guidelines for the process and patient safety. (3). According to these guidelines, the areas where sedation is applied to pediatric patients must have the same conditions as in the pediatric operating room. Approximately 1/3 of the complications of NORA cases occur due to the fact that insufficient oxygenation airway safety cannot be provided (4). Another cause of complications arises from active upper respiratory tract infections. (5).

While SARS-CoV2 infection, which has spread from China to the whole world in the last 1 year, progresses together with severe symptoms in adults, children overcome this disease with less symptom or without symptom. While many articles are published on the anaesthesia processes of adult COVID patients, unfortunately the absence of sufficient number of articles

for pediatric patients cause various concerns and uncertainties in pediatric anaesthetists (6). Anaesthetists, who deal with pediatric patients, face with more unknown risks than other anaesthetists because children have no or few symptoms and therefore anaesthetists need extra precautions

Sedation targets of processes, which are diagnostic and therapeutic purpose, in pediatric patient groups:

- Ensuring the patient’s safety
- Minimizing the pain and physical disorder
- Reducing the anxiety, enabling the patient to feel more comfortable psychologically
- Providing the process security
- Ensuring that the patient is discharged safely after the process
- Choosing the minimum drug dose for the patient in the high therapeutic range during these processes (6,9).

The most suitable patients for NORA are ones who take place in ASA I-II risk group. Minimal, medium and deep sedation to be applied to these patients is preferred for NORA (6). Patient groups other than this group:

- ASA III-IV
- Children with anatomically difficult airway control
- Children with moderate / severe tonsil hypertrophy (kissing tonsil) necessitate special evaluation (6,10).

Before the process, family consent must be absolutely complete in the evaluation of the child. The family should be informed about the complications that may develop, and if the person bringing the child to the process will drive a car on the return, it should be explained to the family that an adult should come to take care of the child (6,10).

Before the process, the fasting period should be determined according to the urgency of the process in children. If the process is elective, general anaesthesia fasting times should be followed against the risk of aspiration. Table 1 (6. 11).

Table I. Appropriate Intake of Food and Liquids Before Elective Sedation

Ingested Material	Minimum Fasting Period, h
Clear liquids: water, fruit juices without pulp, carbonated beverages, clear tea, black coffee	2
Human milk	4
Infant formula	6
Nonhuman milk: because nonhuman milk is similar to solids in gastric emptying time, the amount ingested must be considered when determining an appropriate fasting period.	6

The physician, who will apply anaesthesia just before the process, should re-evaluate the patient and decide accordingly about what the appropriate sedatives are. In this evaluation, the child's age, weight, birth age (prematurity may cause complications such as sleep apnea, etc.), allergies, history of drug use, accompanying diseases, presence of pathology that may cause airway obstruction (down send, Marfan send, etc.), seizures history and familial anaesthesia history should be questioned (6,12). Doses of anaesthetic drugs should be calculated carefully according to the child's condition. After the process, the recovery of the child should be evaluated well, and if the saturation in the room air and the child's consciousness level assessment are not made adequately, the child should not be discharged.

### Referances:

1. Shih, G., & Bailey, P. D. (2020). *Nonoperating room anesthesia for children. Current Opinion in Anaesthesiology, 33(4), 584–588.* doi:10.1097/aco.0000000000000880
2. Belani KG. Pediatric non-O. R. anesthesia (NORA): the essentials. *ASA Newslett* 2019; 83:10–13. A review of the challenges of the NORA setting with an example care delivery model of how pediatric NORA may be safely provided.
3. Coté CJ., Wilson S., American Academy of Pediatrics and American Pediatric Dentistry Guidelines for monitoring and management of pediatric patients before, during and after sedation for diagnostic and therapeutic procedures. Revised 2019 *Pediatrics* 2019;143; DOI: 10.1542/peds.2019-1000 originally published online May 28, 2019.
4. Woodward ZG, Urman RD, Domino KB. Safety of non-operating room anesthesia: a closed claims update. *Anesthesiol Clin* 2017; 35:569–581.
5. Mallory MD, Travers C, McCracken CE, et al. Upper respiratory infections and airway adverse events in pediatric procedural sedation. *Pediatrics* 2017; 140:e20170009
6. Soneru CN, Nunez K. Anesthetic concern for pediatric patients in the era of COVID-19. *Pediatr Anaesth.* 2020;30:737-742
7. Coté CJ . Conscious sedation”: time for this oxymoron to go away! *J Pediatr.* 2001;139(1):15–17; discussion: 18–19pmid:11445787
8. Dial S, , Silver P, , Bock K, , Sagy M. Pediatric sedation for procedures titrated to a desired degree of immobility results in unpredictable depth of sedation. *Pediatr Emerg Care.* 2001;17(6):414–420pmid:11753184
9. Coté CJ, Karl HW, Notterman DA, Weinberg JA, McCloskey C. Adverse sedation events in pediatrics: analysis of medications used for sedation. *Pediatrics.* 2000;106(4):633–644pmid:11015502
10. Malviya S, Voepel-Lewis T, Tait AR Adverse events and risk factors associated with the sedation of children by nonanesthesiologists. *Anesth Analg.* 1997;85(6):1207–1213pmid:9390581
11. Mallory MD, Baxter AL, Yanosky DJ, Cravero JP; Pediatric Sedation Research Consortium Emergency physician-administered propofol sedation: a report on 25,433 sedations from the Pediatric Sedation Research Consortium. *Ann Emerg Med.* 2011;57(5):462–468.e1pmid:21513827
12. Hoffman GM, Nowakowski R, Troshynski TJ, Berens RJ, Weisman SJ Risk reduction in pediatric procedural sedation by application of an American Academy of Pediatrics/American Society of Anesthesiologists process model. *Pediatrics.* 2002;109(2):236–243pmid:11826201

## 02 May 2021-Sunday

---

08:30-09:35 | SPECIALIST'S SESSION I

Chairs: Nurdan Bedirli, Raif Kaya

**Anaesthesia Management for Non-Obstetric Surgery During Pregnancy;** Volkan Baytaş

**Bedside Bleeding Coagulation Monitoring;** Ülkü Ceren Köksoy

**Prevention of Acute Kidney Injury and Protection of Renal Function in Intensive Care Unit;** Hakan Yılmaz

**Anesthesia in Non-Operating Procedures in Pediatric Patients;** Nilgün Şahin

**Diaphragmatic Pacing- An Overview;** Gülten Ütebey

**Epidural Analgesia for Labor and Delivery;** Mehmet Yalvaç

**Anesthesia for The Obese Patients;** Zübeyir Cebeci

---

### DIAPHRAGMATIC PACING – AN OVERVIEW

**Gülten Ütebey, MD**

*Universty of Health Sciences Diskapı Yıldırım Beyazıt Teaching and Research Hospital,  
Anesthesiology and Reanimation , Ankara, Turkey , 2021*

Diaphragmatic pacing may be used in patients with respiratory failure due to severe weakness or paralysis of the diaphragm. The phrenic nerve can be stimulated at the neck, thorax or diaphragm level. Patients with high spinal injury and chronic respiratory insufficiency , electrically induced diaphragm pacing is an alternative to long term positive pressure ventilation. For nearly 200 years, electricity has been applied to phrenic nerves to activate the diaphragm. Phrenic nerve stimulation by external electrodes, bulbar poliomyelitis (Sarnoff, 1950), phrenic nerve stimulation (1960), implantable electrode, radio-frequencywaves (Glenn, 1966), systems in which direct diaphragm is stimulated (1990) and diaphragm pacing stimulation system (Onders, 2000) are important studies in historical development.

The diaphragm is the primary muscle of ventilation. It is responsible for approximately 65-80% of vital capacity and has a musculotendinous structure. At the 12th week of embryonal development diaphragm development is completed. It includes Type I and Type Ila-IIb muscle fibers.

The diaphragm is a dome-shaped septum consisting of the muscle surrounding a central tendon (central aponeurosis) that separates the thoracic and abdominal cavities. The central aponeurosis of the diaphragm consists of 1 anterior and 2 lateral parts. The muscular part of the diaphragm consists of lumbar, costal and sternal parts. Pericardiophrenic artery, musculophrenic artery, from the superior and inferior phrenic arteries and the intercostal arteries nutrition is provided. The inferior phrenic arteries arise from the aorta. A smaller branch has collateral anastomoses with branches of the 8th to 12th intercostal arteries. The pericardiophrenic artery arises from the internal mammary artery, and accompanies the phrenic nerve on its course to the diaphragm. The musculophrenic artery

also arises from the internal mammary artery, then gives off branches to the seventh to ninth intercostal spaces, as well as branches to the diaphragm anteriorly.

On the thoracic side of the diaphragm, venous drainage occurs with the azygos and hemiazygos systems, and the inferior phrenic veins and vena cava inferior to the abdominal side. Venous drainage of the peripheral costal parts is provided by intercostal veins, and the drainage of the sternal part is provided by internal thoracic veins. Lymphatic drainage of the diaphragm occurs through anterior parietal, juxtaphrenic and retrocrural lymph nodes. Sensory and motor innervation of the diaphragm is provided by the phrenic nerve. Phrenic nerve originates from C3-5 cervical roots and ipsilaterally provides the innervation of the diaphragm leaf. Right phrenic nerve enters the vena cava inferior, the left phrenic nerve enters the diaphragm just lateral to the pericardium.

Electrical stimulation is applied by stimulating the motor points of the phrenic nerve itself or the diaphragm muscle. While the direct application of the phrenic nerve is performed through the thorax, stimulation of the diaphragm is performed laparoscopically. Direct stimulation of the phrenic nerve by accessing the cervical or thoracic route. Intraperitoneal diaphragm pacing is the stimulation of the muscular part of the diaphragm with the "motor mapping" method laparoscopically. Percutaneous application can be performed using subcutaneous RF receivers in phrenic nerve stimulation systems. In diaphragmatic stimulation systems, there are 5 percutaneous electrodes. Diaphragm pacing is conducted with low frequency electrical stimulation at a slow repetition (respiratory) rate to condition the diaphragm muscle against fatigue and maintain it fatigue-free. Electrodes are placed on the abdominal side of the diaphragm via laparoscopy. An external pacing box provides the pacing stimulus.

Indications are stated as high cervical spinal cord injury, congenital central hypoventilation syndrome, ventilator dependent chronic respiratory failure, amyotrophic lateral sclerosis and phrenic nerve injuries after cardiac surgery.

Contraindications are indicated as diaphragm thickness less than 2 mm, significantly decreased phrenic nerve function, contraction to electrical stimulation during the operation to factors that do not answer, in primary muscle disease, severe adhesion in the abdomen, prominent chest deformity (relative) and under 2 years old (relative).

Complications of diaphragmatic pacing are defined as Infection (skin or pacemaker site), dislodgement of the pacemaker electrode, malfunction of hardware, upper airway obstruction during sleep, transmission of pacemaker impulses to the brachial plexus, phrenic nerve damage, vascular injury, diaphragmatic perforation, capnothorax, stomach, liver and intestinal tract injuries or perforations and venous thromboembolism.

Benefits of diaphragmatic pacing applications are stated as effective breathing process, delaying the time of tracheostomy and connecting to the ventilator, improved sleep quality, reduced need for mechanical ventilation, weaning from mechanical ventilation, reduction in pneumonia secondary to lower lobe atelectasis and reduced intensive care costs.

In the review study by Garara et al. reported safety problems after insertion of intramuscular electrodes include pneumothorax, infection, and interaction with a preexisting pacemaker. The percentage of patients reported as independent of ventilatory support post procedure ranged between 40% and 72.2%. Earlier implantation has not been associated with greater surgical risk and has been suggested to be more effective.

Appropriate indication and adequate perioperative care are fundamental. Preoperative evaluation requires evaluation of phrenic nerve function and diaphragm muscle function through transcutaneous nerve stimulation. Short-acting intravenous and opioid drugs are recommended in the intraoperative period. It is seen that volatile anesthetics are used for anesthesia maintenance. In order to evaluate the response of the diaphragm muscle to stimuli correctly, the use of muscle relaxants is not recommended. In the intraoperative period, hypotension, pneumothorax, capnothorax, atelectasis, autonomic dysreflexia and haemodynamic instability may develop. Postoperative obstructive sleep apnea may occur in those who are diaphragm pacing without tracheostomy. Anesthetic management includes adequate premedication, avoiding over-sedation and neuromuscular blockers and adequate post-operative ICU care.

## References

1. Raymond P Onders , Anthony F Dimarco, Anthony Ignagni Harish Aiyar , J Thomas Mortimer . Mapping the phrenic nerve motor point: The key to a successful laparoscopic diaphragm pacing system in the first human series. *Surgery* Volume 136, Issue 4, October 2004, Pages 819-826.
2. William W L Glenn , Mildred L Phelps. Diaphragm Pacing by Electrical Stimulation of the Phrenic Nerve. *Neurosurgery*, Volume 17, Issue 6, December 1985, Pages 974–984.
3. Robert Downey Anatomy of Normal Diaphragm. *Thoracic Surgery Clinics*, 2011-05-01, Volume 21, Issue 2, Pages 273-279.
4. Laura K. Nason, Christopher M. Walker, Michael F. McNeeley, Wanaporn Burivong, Corinne L. Fligner, J. David Godwin. Imaging of the Diaphragm: Anatomy and Function. *RadioGraphics* 2012; 32:E51–E70.
5. Diaphragmatic Pacing JOHN MOXHAM and JOHN M. SHNEERSON *Am Rev Respir Dis* Vol 148. pp 533-536, 1993.
6. David J. Sugarbaker editors. *Adult Chest Surgery*. The McGraw-Hill Companies; 2009.
7. Strong MJ. The syndromes of frontotemporal dysfunction in amyotrophic lateral sclerosis. *Amyotroph Lateral Scler* 2008; 9: 323-38.
8. Serdar Özkan. Diyafram Evantrasyonu ve Cerrahi Tedavisi. *Journal of Clinical and Analytical Medicine* 2014 ;2: 88-98.
9. A Şanlı - *Bulletin of Thoracic Surgery/Toraks Cerrahisi Bülteni*, 2013 - toraks.org.tr.
10. Onders RP, Elmo MJ, Ignagni AR. Diaphragm pacing stimulation system for tetraplegia in individuals injured during childhood or adolescence. *J Spinal Cord Med* 2007;30:S25-9.
11. Hudson MB, Smuder AJ, Nelson WB, et al. Both high level pressure support ventilation and controlled mechanical ventilation induce diaphragm dysfunction and atrophy. *Crit Care Med* 2012;40:1254-60.
12. Gonzalez-Bermejo J, Morélot-Panzini C, Salachas F, et al. Diaphragm pacing improves sleep in patients with amyotrophic lateral sclerosis. *Amyotroph Lateral Scler* 2012;13:44-54.
13. D Story , E Mariampillai, M Nikfarjam, et al. Anaesthetic Aspects of Implanting of Diaphragmatic Pacing in Patients with Spinal Cord Injury. *Anaesthesia and Intensive Care*. 2010; 38:740-743.
14. Bhavin Garara, Alasdair Wood, Hani J Marcus et al. Intramuscular diaphragmatic stimulation for patients with traumatic high cervical injuries and ventilator dependent respiratory failure: A systematic review of safety and effectiveness. *Injury*, 2016-03-01, Volume 47, Issue 3, Pages 539-544.

15. Miguel L. Tedde, Paulo Vasconcelos Filho, Ludhmila Abrahao Hajjar et al. Diaphragmatic pacing stimulation in spinal cord injury: anesthetic and perioperative management. CLINICS 2012;67(11):1265-1269.
16. Devine, A.; Watt, J. W.H. Anaesthesia and diaphragmatic pacing in patients with tetraplegia. A review of peri-operative management in patients over a 10-year period. European Journal of Anaesthesiology. 13(6):553-561, November 1996.

## 02 May 2021-Sunday

---

“08:30-09:35 | SPECIALIST'S SESSION I

Chairs: Nurdan Bedirli, Raif Kaya

**Anaesthesia Management for Non-Obstetric Surgery During Pregnancy;** Volkan Baytaş

**Bedside Bleeding Coagulation Monitoring;** Ülkü Ceren Köksoy

**Prevention of Acute Kidney Injury and Protection of Renal Function in Intensive Care Unit;** Hakan Yılmaz

**Anesthesia in Non-Operating Procedures in Pediatric Patients;** Nilgün Şahin

**Diaphragmatic Pacing- An Overview;** Gülten Ütebey

**Epidural Analgesia for Labor and Delivery;** Mehmet Yalvaç

**Anesthesia for The Obese Patients;** Zübeyir Cebeci

---

## EPIDURAL ANALGESIA FOR LABOR AND DELIVERY

**Mehmet Yalvaç, MD**

*Hitit University Erol Olçok Training and Research Hospital*

### Abstract

The feeling of motherhood starts in the first months of pregnancy and reaches its highest level at the time of birth. Birth, a process that the expectant mother wants to experience, is an extraordinary feeling defined by those who become mothers. The expectant mother who wants to give birth normally has a fear of birth. "Labor pain" is a very severe pain caused by the contraction of the uterine muscles, which are indispensable for birth. It has been described by many women as the most severe pain in their life. It is certain that normal delivery with epidural analgesia is an advantageous method for patient comfort

### The Clinical Problem

Labor pains; Backache, Cancer pain Phantom pain From various chronic pains such as postherpetic neuralgia, and More severe than acute pain such as a fracture or laceration .1 The uterine contraction pain experienced by primiparas at birth is the most severe pain experience.2 However, pain sensation is related to a person's past experiences, so some people experience more intense pain.3

Labor, a condition that causes the mother to be mechanically tiring, stress and anxiety, and increases the oxygen demand with hyperventilation. The changes that occur cause metabolic acidosis in the mother and a decrease in uteroplacental blood flow, disrupting fetal oxygenation.4

### Fear of Childbirth:

Tocophobia: It is a psychiatric disorder called as a result of birth fear, causing pregnant women to prefer cesarean delivery on demand.5 A study on tocophobia found that at least one in six women gave up pregnancy and had a miscarriage because they were terribly afraid of giving birth.6 In one study, the following causes were identified as causes of fear of childbirth; Usually from pain at the time of birth, dead, Losing your mind, Lack of trust in the team that



will carry out the birth, Damage or death of the baby at birth, Perineum damage, Episiotomy, Complications at birth, Not seeing yourself as capable enough to give birth.<sup>7</sup>

**Labor Analgesia:**

Its purpose is to deliver a safe and painless delivery without affecting the mother's alertness, motor functions, the progress of labor and the health of the baby. Regional blocks; provide mother's contribution to action by relieving labor pain without affecting the patient's consciousness.

Regional analgesia techniques; Epidural, Spinal, Combined spinal epidural, Paraservical block, Pudental block

**Epidural Analgesia:**

Continuous lumbar epidural analgesia can be applied when labor begins actively (cervical dilatation reaches 4 cm and each contraction comes in 3-minute intervals). Sometimes, when these conditions are not met, only a catheter is placed and drug and delivery time can be waited.

It has been determined that there are approximately 11 million births per year in Latin American countries and epidural anesthesia is applied at a rate of 60% in vaginal delivery. When the Scandinavian countries are examined; In Finland and Sweden in all maternity units 95% in Norway, In Denmark, 68% have 24-hour epidural anesthesia clinics. Epidural administration at birth was 1.4% in France in the 1980s, and a study conducted in 1996 found that epidural analgesia was administered in 96% of deliveries. Epidural services available in Turkey, but the frequency of use is relatively low Epidural analgesia application at birth was determined as 35% in private hospitals and 11% in university hospitals.<sup>8</sup>

In this method, only pain transmission is prevented, touch sensation and movement are not restricted. After the application, the expectant mother can get up and walk in the room and see all her needs. The contraction of the uterine muscles and the active participation of the expectant mother in the labor are not affected, the mother reaches her baby painlessly by physiological means at the time of birth.

**Effects on Birth Stages:**

Halpern in a meta-analysis involving 2369 patients, he found significant prolongation in the 1st and 2nd stages of labor.<sup>10</sup> On the other hand, in the study conducted by Leighton et al., While prolongation was detected in the second stage of labor, no difference was observed in the first stage of labor. <sup>11</sup> On the other hand, Curie et al. In his studies, he found that the 1st and 2nd stages of birth were shortened.<sup>12</sup> It is available in publications stating that the action time has not changed.

**RESULT:**

By providing detailed information about epidural analgesia to expectant mothers, unnecessary cesarean requests due to fear of pain can be prevented and a comfortable normal

birth can be achieved. In experienced hands, application complications are within tolerable limits.

1. Zhang J, Klebanoff MA, Dersimonian R. Epidural analgesia in association with duration of labor and mode of delivery: A quantitative review. *Am J Obstet Gynecol* 1999;180:97-98.
2. Eisenach JC. The Pain of childbirth and its effect on the mother and fetus. In: Chestnut DH, ed. *Obstetric anesthesia: principles and practice*. Elsevier/Mosby, Philadelphia, 2004; 288-301.
3. Ertem G, Sevil Ü. Labor Pain And Nursing Approach. *Journal of Anatolia Nursing and Health Sciences*. 2010; 8(2): 117-123.
4. Erdine 1999, TARD 2002.
5. Thampson J, Roberts L, Currie M, Ellwood D. Prevalence and persistence of health problems after childbirth. *Associations With Parity and Method of Birth* 1992;22(2):159-62.
6. Galotti KM et al., Midwife or Doctor: A study of pregnant woman making delivery decisions. *Journal of Midwifery & Women's Health* 2000;45(4):320-29.
7. Galotti KM et al., Midwife or Doctor: A study of pregnant woman making delivery decisions. *Journal of Midwifery & Women's Health* 2000;45(4):320-29.
8. Şahin Ş, Owen M: Türkiye' de ve Dünyada Obstetrik Analjezi ve Anestezi. *Türk Anest*
9. Rean Cem Mecmuası 2002;30:52-29.
10. Halpern SH, Leighton BL, Ohlsson A, et al: Effect of epidural vs. parenteral opioid analgesia on the progress of labor. *JAMA* 1998 ;280:2105-10
11. Leighton BL, Halpern SH: Epidural Analgesia: Effects on Labor Progress and Maternal and Neonatal Outcome. *Seminars in Perinatology* 2002;26(2) 122-35
12. Luria S, Matzkel A, Epidural anesthesia shortens of labor in singleton vertex presentation spontaneous delivery. *Asia Oceania J Obstet gynecol*.1991;17:944-50

## 02 May 2021-Sunday

08:30-09:35 | SPECIALIST'S SESSION I

Chairs: Nurdan Bedirli, Raif Kaya

**Anaesthesia Management for Non-Obstetric Surgery During Pregnancy;** Volkan Baytaş

**Bedside Bleeding Coagulation Monitoring;** Ülkü Ceren Köksoy

**Prevention of Acute Kidney Injury and Protection of Renal Function in Intensive Care Unit;** Hakan Yılmaz

**Anesthesia in Non-Operating Procedures in Pediatric Patients;** Nilgün Şahin

**Diaphragmatic Pacing- An Overview;** Gülten Ütebey

**Epidural Analgesia for Labor and Delivery;** Mehmet Yalvaç

**Anesthesia for The Obese Patients;** Zübeyir Cebeci

## OBESITY AND ANESTHESIA PHYSIOLOGICAL AND PHARMACOLOGICAL CHANGES

**Zubeyir Cebeci**

*Ordu University Faculty of Medicine Anaesthesia and Reanimation Department*

### Definition of obesity

Obesity has been defined as excessive fat accumulation in the body that negatively affects health and quality of life.

Obesity is an important risk factor for diabetes, respiratory failure, hypertension, left ventricular hypertrophy, myocardial ischemia and atherosclerosis. In addition, these issues constitute the most common cause of these population deaths.

### Epidemiology

It is estimated that around 50% of the world's population will be overweight or obese by 2030. While the rate of obese individuals aged 15 and over was 19.6% in 2016, it was 21.1% in 2019 in Türkiye. In 2019, 24.8% of women are obese and 17.3% of men are obese.

### Classification

While classification is made according to body mass index in adults, percentile curves varying according to age and gender are used in children. In children, it is classified as overweight above the 85th percentile and obese above the 90th percentile.

### Physiological changes

Android (central) adiposity in men, gynaecoid (peripheral), the most common type of lubrication in women. Waist to Hip ratio; 0.8 in females and 1 in males indicates android type adiposity.

Increased fat accumulation in the chest wall, diaphragm and abdomen decreases lung compliance. Decreased compliance decreases FRC, ERV, VC, TLC. These parameters are lower in those with central obesity. ERV is the parameter that best shows the effect of obesity on

respiratory function tests. Decreased FRC causes small airways to close, V / P mismatch, Right-to-left shunt and hypoxemia. This situation causes rapid desaturation in obese patients despite adequate preoxygenation during anaesthesia induction. Clinically, it has been shown that oxygen consumption and intrapulmonary shunt increase when transitioning from sitting to supine position in obese patients.

In addition, the accumulation of fat, which reduces the pharyngeal opening collapses the soft tissue between the uvula and epiglottis by causing the upper airway muscles to relax.

The accumulation of fat on the neck increases the external pressure of the pharynx, which is more common in obese patients with OSA.

Obesity, chronic hypoventilation, pulmonary HT and Cor pulmonale coexist in OHS (obesity hypoventilation syndrome).

### **Cardiovascular Change**

Blood volume, Cardiac output and Atherosclerosis are increased. Arrhythmia may develop. Low voltage QRS, T wave flattening, Left axis shift, Prolonged QT are the changes in the ECG that occur.

### **Hematological Change**

Fibrinogen, Factor VII, Factor VIII, Von Willebrand factor and Plasminogen activator inhibitor-1 increase.

### **Gastrointestinal Change**

Gastric volume, stomach acid levels, gastroesophageal reflux and associated symptoms increases. Gastric emptying and liver metabolism decreases. Hepatic steatosis and cholestasis are seen.

### **Endocrine Change**

Impaired Glucose tolerance, Renin angiotensin aldosterone system activation and Subclinical hypothyroidism are seen.

### **Pharmacological change**

#### **Drug Absorption**

Absorption of oral drugs may change due to increased intestinal blood flow in obese patients. Alteration of gastric emptying can alter the time the drug reaches peak plasma concentration. Absorption of transdermal, subcutaneous and intramuscular drugs; It depends on the blood flow of the skin, fat and muscle tissue.

#### **Drug Distribution**

The distribution of the drug depends on the plasma proteins, the affinity of the drug, tissue permeability and size. Depending on obesity, protein binding compounds, adipose

tissue mass, lean tissue mass, organ mass, cardiac output and splanchnic blood flow changes affect the Vd (distribution volume) of drugs. Lipophilic drugs tend to diffuse into adipose tissue, Hydrophilic drugs in lean tissue. The increase in fat tissue mass in obese is more than the increase in lean tissue mass. Obesity alters plasma protein concentration and drug-protein affinity. A1-acid glycoprotein concentration increased in obese patients.

### **Drug Metabolism**

Fatty liver in obese patients and liver damage that occurs with this fat affects the activity and expression of enzymes that are active in drug metabolism. There is a close relationship between increased CYP2E1 activity and body weight and fatty liver. CYP2D6, CYP2C19, CYP1A2, CYP2C9 are other enzyme systems whose activity changes with obesity.

### **Drug excretion**

Drug excretion through the kidneys has also been affected due to the adverse effects of obesity on kidney functions.

### **Pharmacological change**

#### **Thiopental**

It has high lipophilicity, large distribution volume and prolonged half-life in obese patients. Induction dose should be adjusted according to IBW.

#### **Propofol**

It has high lipophilicity and short duration of action. The blood crosses the brain barrier rapidly and is distributed to the central nerve system. The volume of distribution and clearance is increased.

## 02 May 2021-Sunday

---

09:38-10:35 | SPECIALIST'S SESSION II

Chairs: A. Gülsün Pamuk, Haluk Gümüş

**Anaesthetic Management in Bariatric Surgery;** Münire Babayiğit

**Santral Blocks in Pediatric Anesthesia;** Asiye Ceylan

**DOAC Management During Anesthesia;** Merve Bayraktaroğlu

**Extraordinary Reactions During Propofol Anesthesia: Narcolepsy, Chronic Urticaria, Essential Tremor;** İlknur Suidiye Yorulmaz

**Traumatic Brain Injury in Elderly Patients;** İsmail Aytaç

**Innovations in Geriatric Anesthesia;** Fatma Sipahioğlu

---

### ANAESTHETIC MANAGEMENT IN BARIATRIC SURGERY

**Dr. Münire Babayiğit**

*Department of Anesthesiology and Reanimation, Kecioren Training and Research Hospital*

#### INTRODUCTION:

Obesity is a chronic metabolic disease that negatively affects the quality and duration of life and is one of the most important health problems of today. Morbid obesity is associated with hypertension, ischemic heart disease, diabetes mellitus, obstructive sleep apnea, and obesity hypoventilation syndrome. (1)

Bariatric surgery is becoming widespread in the treatment of obesity and related systemic problems. Laparoscopic sleeve gastrectomy (LSG) comes to the fore as a new and effective treatment among surgical methods, and its frequency of application is increasing day by day. (2) With the increase of bariatric surgery, anesthesiologists are more frequently encountered with the obese patient group. Anesthesia management is characteristic among these patients. Preoperative evaluation should be done meticulously and a personal anesthesia plan should be made. Perioperative and postoperative risks should be determined and prepared for them.

#### Preoperative evaluation

Decreased chest wall compliance, lung volumes, and diaphragmatic motion increase the work of breathing. Airway narrowing and excessive peripharyngeal adipose tissue can lead to an abnormal decrease in upper airway muscle tone, leading to the development of obstructive sleep apnea (OSA) during REM sleep. (3) The rate of severe obstructive sleep apnea is 10-20% in those with a body mass index > 35 kg / m<sup>2</sup> (Obese class 2) and is generally undiagnosed. This situation doubles the frequency of postoperative desaturation, respiratory failure, cardiac events and admission to intensive care.

With preoperative diagnosis and initiation of continuous airway pressure (CPAP) therapy, these complication rates can be significantly reduced (4). This group of patients is more sensitive to the effects of anesthetic agents and opioids.

**Airway Evaluation:**

Preoperative evaluation should be evaluated in detail in terms of the risk of difficult ventilation and difficult intubation. The probability of difficult ventilation and difficult intubation is high in male patients with a beard, neck circumference  $\geq 43$  cm, and mallampati score  $\geq 3$ . Fat accumulation around the face increases soft tissues in the upper airways, including the pharynx and palate; secondary forward displacement of the larynx and large and big tongue causes airway obstruction frequently results with hypoxia and hypercapnia. In addition, atlantooccipital joint limitation due to cervical and thoracic fat accumulation and presternal fat deposits prevent the movement of the laryngoscope and the difficulty of direct laryngoscopy increases. (5) The estimated difficult laryngoscopy rate is around 1% for this population. The difficult mask ventilation rate is around 10%.

Preoperative gastric fluid volume and acidity increase in obese patients. H2 antagonists (cimetidine, ranitidine 150 mg orally), particulate free antacid and metoclopramide 10 mg should be given 12 and 2 hours before surgery. (6)

**Intraoperative evaluation;**

Agents that can cause respiratory depression should be avoided in premedication. In monitoring, non-invasive arterial pressure, electrocardiogram, peripheral SpO<sub>2</sub>, EndTidal CO<sub>2</sub> (EtCO<sub>2</sub>) and urine output can be monitored, as well as BIS, peripheral nerve stimulation tests, invasive arterial pressure and body temperature. The ramp position is a helpful position to facilitate the intubation phase. (7)

Physiological changes that develop in obesity affect the pharmacodynamics and pharmacokinetics of drugs. Applying the drugs according to the actual weight of the patients may cause side effects. For a safe anesthesia management, the selection of the ideal anesthetic agent, appropriate ventilation strategies and postoperative care are important.

Induction and maintenance doses of anesthetic agents are administered according to the corrected body weight. When TIVA is administered with remifentanil and propofol, the depth of anesthesia should be followed by BIS monitoring. Dose adjustment of water-soluble drugs should be based on ideal body weight to prevent overdose. Similarly, the dose requirement of muscle relaxants (pancuronium, vecuronium and rocuronium) whose elimination depends on the liver blood flow should be made directly on the basis of ideal body weight. (8.9)

Sugammadex is faster and safer than neostigmine in reversing the muscle relaxant effect in obese patients. Opioids should be avoided for postoperative pain management. Tramadol, non-steroidal anti-inflammatory drugs or local anesthetic infiltrates are more useful.

General anesthesia causes compression and absorption atelectasis due to the use of muscle relaxants and high inspired oxygen fraction. There is a direct relationship between developing atelectasis and postoperative pulmonary complications. Postoperative respiratory failure and pneumonia may develop due to atelectasis.

Recruitment maneuver in the perioperative period is a method used to open the alveoli collapsed with high airway pressure and to improve gas exchange and arterial oxygenation. This maneuver can be performed by methods such as PEEP, continuous positive airway pressure (CPAP), pressure controlled mechanical ventilation, spontaneous breathing, placing the patient in the prone position or high frequency ventilation.

Obese patients have a high risk of postoperative nausea and vomiting. Perioperatively used inhalation anesthetics and opioids further increase this risk. Studies have shown that this risk can be reduced by 20% with TIVA.

Wound infections, atelectasis, lung infections, pulmonary thromboembolism, hypertension, arrhythmias, pulmonary edema and heart failure are problems that can be seen in the postoperative period. In order to minimize the incidence of complications, hypoxia, hypercarbia and fluid overload should be avoided and effective analgesia should be applied. In order to prevent complications, agents that cause respiratory depression should be avoided, adequate oxygenation should be provided, deep vein thrombosis prophylaxis should be applied, respiratory physiotherapy should be performed and patients should be mobilized early.

#### References:

1. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults-- The Evidence Report. National Institutes of Health. *Obes Res* 1998;6 Suppl 2:51S-209S.
2. NCD Risk Factor Collaboration (NCD-RisC). Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis 1698 population-based measurement studies with 19.2 million participants. *Lancet* 2016;387:1377–96.
3. Roizen FR, Fleisher LA. Eşlik eden hastalıklarda anestezi uygulamaları (cilt 1), (Çev:Kaan N). Miller RD Miller anestezi(eds). İzmir Güven Kitabevi. Altıncı Baskı. İzmir: 2010:S1017-49.
4. Members of the Working Party:, Nightingale CE, Margaron MP, Shearer E, Redman JW, Lucas DN, Cousins JM, et. al.Peri-operative management of the obese surgical patient 2015: Association of Anaesthetists of Great Britain and Ireland Society for Obesity and Bariatric Anaesthesia. *Anaesthesia*. 2015 May 7. doi: 10.1111/anae.13101.
5. Rocke DA, Murray WB, Rout CC, Gouws E. Relative risk analysis of factors associated with difficult intubation in obstetric anesthesia. *Anesthesiology* 1992;77(1):67-73.
6. Sabharwal A, Christelis N. Anaesthesia for bariatric surgery, *Anaesthesia for bariatric surgery* 2010;2010;99-103.
7. Sinha, C.A. Some anesthetic aspect of morbid obesity. *Curr. Opin. Anaesthesiol* 2009; 22;442-46.
8. Claire E Moore, Mark Forrest. Anaesthesia in the obese patient. *Anaesthesia And Intensive Care Medicine*2011;12:(7):277-79.
9. Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med* 1993;29;328(17):1230-5.



## 02 May 2021-Sunday

09:38-10:35 | SPECIALIST'S SESSION II

Chairs: A. Gülsün Pamuk, Haluk Gümüş

**Anaesthetic Management in Bariatric Surgery;** Münire Babayiğit

**Santral Blocks in Pediatric Anesthesia;** Asiye Ceylan

**DOAC Management During Anesthesia;** Merve Bayraktaroğlu

**Extraordinary Reactions During Propofol Anesthesia: Narcolepsy, Chronic Urticaria, Essential Tremor;** İlnur Suidiye Yorulmaz

**Traumatic Brain Injury in Elderly Patients;** İsmail Aytaç

**Innovations in Geriatric Anesthesia;** Fatma Sipahioğlu

### CENTRAL BLOCKS IN PEDIATRIC SURGERY

**Asiye Yüce Ceylan**

*Aksaray Training and Research Hospital , Department of Anesthesiology, Aksaray, Turkey*

#### Abstract

Pediatric neuraxial central blocks have been increasingly used for the last 20 years to reduce the need for general anesthetics and opioids in the perioperative setting and to provide more effective analgesia in the postoperative period(1). Especially in the pediatric age group, caudal epidural anesthesia is used mainly for surgeries of the lower extremities, pelvis, perineum and lower abdomen reliable regional anesthesia technique(2). It is often used to supplement general anesthesia. The supplemental use of caudal epidural anesthesia provides fast painless recovery. It reduces unwanted autonomic reactions and stress response to surgical interventions(3,4). Neuroaxial central block alone is preferred in subumbilical interventions in premature newborns and cases with neuromuscular diseases, severe chronic airway disease such as cystic fibrosis, asthma or pulmonary diseases, if there is a high risk of malignant hyperthermia or if general anesthesia is not preferred(5).

There are significant anatomical differences in terms of neuraxial blocks in adult and pediatric patient groups. In the newborn, the spinal cord ends at L4, dural sac S3-4, spinal cord L1 at the age of 2, and dural sac S2 (5). The epidural space is more gelatinous. Thus, the local anesthetics spread better. The line passing through the iliac crest area chest spinous process of L4 or L3-L4 in the adult, while it reaches other spinal process of L5 in the newborn (6). In the newborn, the distance between the skin-subarachnoid space is 1.4 cm which increases with age. Ligamentum flavum is thinner and looser than adults. The volume of ligamentum flavum is 4-6ml / kg in newborns and 2ml / kg in adults. Myelination of spinal cord and vertebral column ossification is incomplete (5). There are also differences in pharmacokinetics of local anesthetics between newborns and adults. P450 enzyme system activity, pseudocholinesterase enzyme level, methemoglobin reductase enzyme level, alpha 1 acid glycoprotein (AAG) level are lower (7). Blood brain barrier maturation is incomplete.

Because of increased heart rate and cardiac output, peak blood level is reached quickly (5). Elimination rate is slower than adults. Particular attention should be paid to toxicity in continuous infusions through the epidural catheter. Although complications are not frequent, Akin et al. reported 7/1000 dural punctures, 4.98/100 vascular punctures in 5536 cases (8). Total complication rate was reported as 1.5 / 1000, where severe complication rate was 1/40000. Beyaz et al. reported 2088 cases with the rate of vascular puncture 0.88/100, Eti et al. reported 2/1000 dural punctures in 988 cases. Dalens et al. published 1.3 /1000 dural punctures in 750 cases. Begeç et al. reported 2262 cases, with 2.2 / 1000 of dural punctures 2.2 / 1000. Beyaz et al. reported dural punctures in 1,9 / 1000 of 2088 cases and 1100 cases by Veyckemans et al. were reported as 0.9 / 1000 of dural punctures (9,10, 11,12,13).

Air embolism is one of the most important complications. McGrown et al. 500 caudal application, vascular intervention was 7%, and Dallan and Hausman was 10.6% in the series of 750 blocks (12). The air resistance loss method should not be used in determining the lumbar and caudal epidural areas. While there is an air embolism with a small amount of air, permanent neurological damage may occur with more air.

In pediatric central blocks, guidance of ultrasonography is recommended in the application of caudal epidural block especially in more challenging applications of infants and young children (14). Reducing the duration of intervention decreases the complication rates (15). Pediatric central blocks provide excellent analgesia for the postoperative period. Pediatric central blocks performed by experienced specialists are also safe and efficient like other anesthesia practices (2).

## References

1. Silvani P, Camporesi A, Agostino MR, Salvo I. Caudal anesthesia in pediatrics: an update. *Minerva Anesthesiologica*. 2006; 72 (6): 453-459.
2. *Clinical anesthesiology* lange 6th edition Güneş Bookstores p 987
3. Desborough JP. The stress response to trauma and surgery. *Br J Anaesth* 2000; 85: 109-17.
4. Somri M, Gaitini LA, Vaida SJ, et al. Effect of ilioinguinal nerve block on the catecholamine plasma levels in orchidopexy: comparison with caudal epidural block. *Paediatr Anaesth* 2002; 12: 791-97.
5. Kaya G. Central Blocks in Children Özcengiz Dilek, Barış p. , Pediatric anesthesia, academicians bookstore, 1st edition 2014, pp 899-912
6. *Regional anesthesia atlas* david I. brown chapter 49, 393-417
7. Erdine p. neurophysiology of pain 1st edition istanbul nobel printing 2000. pp 427-438
8. Mine AKIN, Sibel SAYDAM, Gülsen KESKİN, Sengül ÖZMERT, Yeşim ŞENAYLI1, Devrim Tanıl KURT, Feyza SEVER 1., Atilla ŞENAYLI. *Bozok Medical Journal* 2015; 5 (2): 41-5 *Bozok Med J* 2015; 5 (2 ): 41-5
9. Markakis DA. Regional anesthesia in pediatrics. *Anesthesiology Clinic North America*. 2000; 18 (2): 355-381
10. Beyaz SG, Tokgöz O, Tüfek A. Caudal Epidural Block in Children and Infants: Retrospective analysis of 2088 cases. *Ann Saudi Med*. 2011; 31 (5): 494-497.
11. Eti Z, Batirel H, Göğüş FY. Retrospective evaluation of caudal analgesia in 981 pediatric patients. *Journal of Turkish Anesthesia Reanimation Association*. 2000; 28: 313-316.
12. Dalens B, Hasnaoui A. Caudal anesthesia in pediatric surgery: Success rate and adverse effects in 750 consecutive patients. *Anesth Analg*. 1989; 68 (2): 83-89.
13. Veyckemans F, Van Obbergh LJ, Gouverneur JM. Lessons from 1100 pediatric caudal blocks in a teaching hospital. *Reg Anesth*. 1992; 17 (3): 119-125.

14. Clinical anesthesiology lange 6th edition sun bookstores p 989
15. Wang LZ, Hu XX, Zhang YF, Chang XY. A randomized comparison of caudal block by sacral hiatus injection under ultrasound guidance with traditional sacral canal injection in children. Paediatr Anaesth. 2013 May; 23 (5): 395-400

**02 May 2021-Sunday**

---

**09:38-10:35 | SPECIALIST'S SESSION II**

**Chairs:** A. Gülsün Pamuk, Haluk Gümüş

**Anaesthetic Management in Bariatric Surgery;** Münire Babayiğit

**Santral Blocks in Pediatric Anesthesia;** Asiye Ceylan

**DOAC Management During Anesthesia;** Merve Bayraktaroğlu

**Extraordinary Reactions During Propofol Anesthesia: Narcolepsy, Chronic Urticaria, Essential Tremor;** İlnur Suidiye Yorulmaz

**Traumatic Brain Injury in Elderly Patients;** İsmail Aytaç

**Innovations in Geriatric Anesthesia;** Fatma Sipahioğlu

---

## **EXTRAORDINARY REACTIONS DURING PROPOFOL ANESTHESIA: NARCOLEPSY, CHRONIC URTICARIA, ESSENTIAL TREMOR**

***Dr. İlnur Suidiye Yorulmaz***

*Anesthesiology and Reanimation Depth., Duzce, Turkey*

### **INTRODUCTION**

Narcolepsy, Chronic Urticaria, Essential Tremor cases had neurodegeneration of these diseases. Neurodegeneration that occurs in different parts of the brain can lead to changes in responses to anesthetic drugs. We discussed below low propofol needs and probable relationship of increased GABA receptor activity and neurodegeneration.

### **CASE 1: NARCOLEPSY**

38 years old, 75kg, male patient, BMI 21.9 kg/m<sup>2</sup>, ASA II status, narcolepsy without cataplexy, dysthymia, Type I unregulated DM, Cataract surgery planned under general anesthesia was performed. Medications used by the patient were: Modafinil 600 mg/ day, Thioctic acid, venlafaxine 150 mg/day, bupropion 300mg/day, insulin glargine 30 IU/ day, regular insulin (3X10IU)/day. Modafinil was stopped 1 day before surgery, Anesthesia was induced with propofol, rocuronium and fentanyl in the form of bolus injection. Anesthesia was maintained with propofol and remifentanyl ( 25-50 mcg/kg/h; 1 mcg/kg/min) both titrated to keep entropy levels between 40 -60 and burst suppression rate between 0-2%. ASA standard monitoring was used, plus invasive arterial pressure, 4 channel EEG and entropy were both monitored to guide the anesthesia level and possibly increase the information on the hypnosis in case there was difficulty in awakening from anesthesia. It was observed that the dose of propofol administered during the operation, which lasted for 1 hour, was between 25-50 mcg / kg / hour. The patient was evaluated as difficult intubation because of dysmorphic teeth and mandibular structure, Cormack- Lahen score was 4, and intubation at the second attempt with a intubating introducer. Hypertension was occurred only 5 minute (190/98 mmHg) during the difficult intubation. At the end of the surgery the patient was transferred to the post-anesthesia care unit (PACU), where he remained, alert and oriented for 30 minutes. No

narcolepsy events occurred at the ward, the patient slept normally that night, and was discharged home following day. Postoperative interviews were performed and no signs of awareness or recall were detected.

### **CASE 2: ESSENTIAL TREMOR**

75 years old, 70 kg, BMI 24.2 kg/m<sup>2</sup>, male patient, ASA II status, essential tremor patient for 20 years, history of multiple drug use due to essential tremor. Deep brain stimulation operation planned under sedoanalgesia. One week before the operation, magnetic resonance imaging was performed under sedation. After administration of propofol 20 mg bolus, 0.5-1 mg / kg / hour infusion was done. Propofol infusion was stopped and 10 mg ephedrine was administered because noninvasive blood pressure values decreased to 50/35 mmHg at 20th minute of administration. The patient's blood pressures returned to baseline within 2 minutes. The process has been aborted. After 1 week, the MRI procedure was completed without any problem by using half the previous dose of propofol infusion. During the deep brain stimulation operation, 10 mg in fractionated doses was applied to keep the Ramsey sedation scale 3-4. A total of 50 mg of propofol was given and transferred to the service without any problem. But we observed that the patient was resistant to the sedative effect of dexmedetomidine (1).

### **CASE 3: PRURİGO NODULARİS (Chronic Urticaria)**

49 years old female patient, ASA II status, with prurigo nodularis. It was evaluated as prurigo nodularis by the dermatology department as symmetrical itchy nodular lesions on the forearm and legs, especially on the extensor surfaces for 3 months, and topical lidocaine and antibiotic pomade were started 2 weeks before surgery. The patient hadn't any systemic medication use. There wasn't any malignancy, chronic kidney disease or rheumatologic disease was detected in the patient. Prurigo thought to be linked to anxiety and stress. Anesthesia was induced with propofol, rocuronium and fentanyl boluses. Anesthesia was maintained with propofol and remifentanyl ( 25-50 mcg/kg/h; 1 mcg/kg/min) both titrated to keep Bispectral index levels between 40 -60 and burst suppression rate between 0-2%. During the 2-hour operation, a total of 450 mg of propofol, 100 mg of rocuronium, 50 micrograms of fentanyl and 700 micrograms of remifentanyl were used. It was found that the propofol dose was reduced by 50% compared to the TIVA dose administered to normal individuals, intraoperative vital signs remained stable, and there was no awareness in the postoperative period (2).

### **DISCUSSION:**

The common anesthetic properties in these 3 different diseases are as follows:

- Propofol was used as an anesthetic agent in all 3 patients.
- It was noteworthy that sensitivity to propofol increased in all 3 patients, and propofol doses were decreased by more than 50% compared to patients in that age group.
- EEG-based neuromonitoring methods were applied in all 3 patients.

- All 3 patients probably had neurodegeneration in various parts of the brain.
- All 3 patients probably had increased sensitivity to GABA receptors.
- All 3 patient's postoperative interviews were performed and no signs of awareness or recall were detected.

### **PROPOFOL**

Propofol is a fast-acting intravenous sedative hypnotic medication extensively used for induction and maintenance of anesthesia and sedation procedures. Propofol's principal mechanism of action is to enhance chloride current at the gamma-aminobutyric acid type A (GABAA) receptor on the post-synaptic membrane of neurons. Glycine receptors and ligand-gated chloride channels, which mediate neuronal inhibition at the spinal level, have also shown sensitivity to propofol (3).

Propofol decreases the connectivity especially thalamus, but it also increases the connectivity within the pons of the brainstem during propofol-induced mild sedation (4-5).

### **GABA RECEPTORS**

GABA receptors are major inhibitory receptors in the mammalian brain. Each GABA A receptor exhibits a pentameric complex structure with ion channels in the middle that are permeable to chlorine ions and less permeable to bicarbonate ions. GABA binding to the receptor causes a conformational change in the receptor. This conformational change causes opening in the ion channel and hyperpolarization of the membrane. Barbiturates, etomidate, propofol, benzodiazepines, inhaled anesthetics, and neurosteroids exert their effects through the GABAA receptor. These drugs bind to the receptor at different sites and facilitate the opening of the channel allosterically.

Various subunits on GABA receptors are encoded by 20 mammalian genes ( $\alpha 1-6$ ,  $\beta 1-4$ ,  $\gamma 1-3$ ,  $\rho 1-3$ ,  $\delta$ ,  $\epsilon$ ,  $\pi$  and  $\theta$  subunits). These subunit compositions in the receptor determine the cellular expression, biological and pharmacological behavior of GABAA receptors (6-8).

The inhibitory actions of GABA are mediated by three receptor classes (GABAA, GABAB and GABAC/GABAA- $\rho$ )

The inhibitory activity of GABA is divided into 2 main types.

- Phasic inhibition
- Tonic inhibition

During the action potential in phasic inhibition, the membrane depolarizes and the concentration of GABA increases rapidly in the synaptic gap from presynaptic vesicles. GABA activates GABA receptors in the postsynaptic membrane and reduces postsynaptic neuron excitability. Phasic inhibition occurs by transient or phasic activation of GABA receptors by

GABA released from presynaptic vesicles. It has been shown that subunits of postsynaptic GABA<sub>A</sub> receptors are major regulators of phasic inhibition.

Extra synaptic GABA<sub>A</sub> receptors contain  $\pi$  ( $\pi$ ) subunits that regulate tonic inhibition in many brain areas. Tonic GABAergic inhibition has been demonstrated in the mammalian brain, particularly the hippocampus, the thalamocortical neurons of the ventral basal complex, and the neocortex.

A variety of anatomical studies have demonstrated that the  $\alpha$ 1,  $\alpha$ 2,  $\alpha$ 5,  $\beta$ 2,  $\beta$ 3, and  $\gamma$ 2 subunits are widely expressed in the rodent and human hippocampus (9-11).

Also, in the hippocampus, major GABA<sub>A</sub> receptor-mediated inhibition is mediated by GABA receptors, including alpha ( $\alpha$ ) -5 and delta ( $\delta$ ) subunits. It has been shown that 75% of all inhibitory stimuli in hippocampal neurons are in the form of tonic inhibition. The effect of propofol, midazolam, etomidate and gaboxadol on tonic inhibition is observed to be several times greater compared to synaptic phasic inhibition.

Extrasynaptic receptors are exposed to low concentrations of GABA that are typically present in the extrasynaptic space. Because the extrasynaptic concentration of GABA does not fully saturate the extrasynaptic population of GABA<sub>A</sub> receptors, an increase in agonist affinity by anesthetics can greatly increase GABAergic current. Researchers suggest that anxiolytic, myorelaxant and sedative effect of benzodiazepines are mediated primarily through receptors containing the  $\alpha$  and  $\gamma$  family of subunits (12).

We argue that sensitivity to the effect of propofol as a result of the increase in GABA receptor activity that we tried to present in our cases occurs as a result of this tonic extrasynaptic receptor sensitization or changes the GABA receptors subunit conformation.

Studies have shown that receptor subtypes ( $\alpha$  -5 GABA<sub>A</sub>) in pyramidal neurons in the hippocampus are particularly sensitive to low concentrations of many intravenous anesthetics.

### **Essential tremor and neurodegeneration**

Song et al. showed that during the dexmedetomidine induced altered arousal and recovery functional connectivity of the LC to the PCC, thalamus and basal ganglia covaried with the level of arousal (13).

Studies have shown that patients with essential tremor have neurodegeneration in the locus cereleus region. We think that the unresponsiveness / decreased response to dexmedetomidine in our case is due to its effect through alpha-2 receptors on the locus cereleus region.

In positron emission tomographic examinations performed using Flumazenil (C11) in patients with essential tremor, abnormalities in the lateral premotor cortex, in the venterolateral thalamus region, were detected in the GABA<sub>A</sub> binding region. This study also demonstrated

an increase in GABAA receptor binding abnormalities in cerebellar thalamic input pathways (14).

### **Narcolepsy and neurodegeneration**

Severe sleeping disorders may lead several neuronal damage in locus coeruleus region.

Hypersomnias of central origin include:

1. Type 1 narcolepsy with cataplexy and hypocretin deficiency: loss of hypocretin neurons in the lateral hypothalamus which is reflected by low hypocretin-1 (Orexin-A) levels in CSF.
2. Type 2 narcolepsy without cataplexy: shows etiological heterogeneity and hypocretin - 1 deficiency in a minority of patients.
3. Idiopathic hypersomnia with normal cerebrospinal fluid (CSF) hypocretin level.

Hypocretin axons are found throughout the CNS. The hypothalamus, locus coeruleus, raphe, medial thalamus, all levels of spinal cord, sympathetic and parasympathetic centers, and many other brain regions are innervated by hypocretin neurons.

Hypocretin rises synaptic activity in neurons of the hypothalamus and locus coeruleus. Hypocretin acts on postsynaptic receptors to increase cytosolic calcium and can act at presynaptic receptors on axon terminals to enhance release of glutamate and GABA.

There are studies in the literature showing that the amygdal body volume is decreased and neuronal loss is present in patients with narcolepsy. At the same time, drugs such as modafinil and amphetamine used in the treatment of narcolepsy can affect the amount of GABA neurotransmitters in various parts of the brain. In published case reports, it was reported that propofol resistance developed in patients who received modafinil on the day of the operation in patients using propofol anesthesia. Modafinil was discontinued 1 day before in our patient.

### **Chronic Urticaria and neurodegeneration**

They observed by Zhang et al. that neurotransmitter changes showed in different brain regions, particularly in the cortex, hippocampus and thalamus, following propofol-induced anesthesia (15).

Zhang et al. observed the effect of propofol on normal human brain function with fMRI and showed that the decrease in signals in the hypothalamus, frontal lobe and temporal lobe was significantly correlated with propofol anesthesia. Therefore, they suggested that it can be concluded that these brain regions are sensitive to propofol anesthesia (16).

In a study by Papoiu et al. In itchy end-stage kidney patients, it was observed that this patient group had more activation and increased gray matter density in the amygdala and hippocampus compared to healthy controls (17).



In patients with prurigo nodularis or lichen simplex chronicus, hippocampus activation is significantly increased during stress-induced itching (18). Chronic stress and sleep disorders can lead the neuronal loss in the brain.

Chronic itching in the brain (over 6 weeks) can alter functional brain connections in the anterior (ACC) cingulate cortex, posterior cingulate cortex (PCC), and prefrontal cortex (PF) brain areas (19). It can reduce gray matter in cortical areas associated with itching, including PF and precuneus (20).

## CONCLUSION

Neurodegeneration occurs as a part or result of various diseases. This fact may act on the anesthetic drugs effectiveness in clinical managements. Anesthesiologists should alert this unexpected conditions and use neuromonitoring techniques in this drugs administration for patient security.

## REFERENCES

1. Yorulmaz, I. , Esbah, A. , Dikici, S. , Ozlu, O. and Er, U. (2017) Unanswered Response to Dexmedetomidine and Exaggerated Response to Propofol during Deep Brain Stimulation in Essential Tremor Case. *Open Access Library Journal*, 4, 1-6. doi: 10.4236/oalib.1103605.
2. Yorulmaz I.S, Karka O.E. Istanbul Derm-Rheum update summit 2020. 27-29 November 2020. S-19. Abstract book. page:33-34.
3. Hales T.G, Lambert J.J. The actions of propofol on inhibitory amino acid receptors of bovine adrenomedullary chromaffin cells and rodent central neurones. *Br. J. Pharmacol.* 1991;104: 619-628.
4. Zhang H , Wang W, Zhao Z, Ge Y, Zhang J, Yu D, Chai W, Wu S, Xu L. The action sites of propofol in the normal human brain revealed by functional magnetic resonance imaging. *Anat Rec (Hoboken)*. 2010 Dec;293(12):1985-90. doi: 10.1002/ar.21069.
5. Song X. X, Yu B.W, Anesthetic effects of propofol in the healthy human brain: Functional imaging evidence. *Journal of Anesthesia*. 2010;29:279-288.
6. Olsen RW, McCabe RT, Wamsley JKGABAA receptor subtypes: autoradiographic comparison of GABA, benzodiazepine, and convulsant binding sites in the rat central nervous system. *J Chem Neuroanat.* 1990 Jan-Feb; 3(1):59-76.
7. Macdonald RL, Olsen RW. GABAA receptor channels. *Annu Rev Neurosci.* 1994; 17():569-602.
8. Whiting PJ, Bonnert TP, McKernan RM, et al. Molecular and functional diversity of the expanding GABA-A receptor gene family. *Ann N Y Acad Sci.* 1999 Apr 30; 868():645-53.
9. de Blas AL, Vitorica J, Friedrich P. Localization of the GABAA receptor in the rat brain with a monoclonal antibody to the 57,000 Mr peptide of the GABAA receptor/benzodiazepine receptor/Cl<sup>-</sup> channel complex. *J Neurosci.* 1988 Feb; 8(2):602-14
10. Olsen RW, McCabe RT, Wamsley JK. GABAA receptor subtypes: autoradiographic comparison of GABA, benzodiazepine, and convulsant binding sites in the rat central nervous system. *J Chem Neuroanat.* 1990 Jan-Feb; 3(1):59-76.
11. Fritschy JM, Mohler H. GABAA-receptor heterogeneity in the adult rat brain: differential regional and cellular distribution of seven major subunits. *J Comp Neurol.* 1995 Aug 14; 359(1):154-94.
12. Rissman R.A, Mobley W.C. Implication for treatment: GABAA receptors in aging, Down syndrome and Alzheimer's disease. *J Neurochem.* 2011 May; 117(4): 613–622.
13. Song A.H, Kucyi A, Napadow V, et al. Pharmacological modulation of noradrenergic arousal circuitry disrupts functional connectivity of the locus ceruleus in humans. *The journal of neuroscience.* 2017;37(29):6938-6945.

14. Gironell, A., Figueiras, F.P., Pagonabarraga, J., Herance, J.R., Pascual-Sedano, B., Trampal, C. and Gispert, J.D. (2012) Gaba and Serotonin Molecular Neuroimaging in Essential Tremor: A Clinical Correlation Study. *Parkinsonism & Related Disorders*, 18, 876-880.
15. Zhang H, Wang W, Gao W, Ge Y, Zhang J, Wu S, Xu L. 2009. Effect of propofol on the levels of neurotransmitters in normal human brain: a magnetic resonance spectroscopy study. *Neurosci Lett* 467:247–251.
16. Zhang H, Wang W, Zhao Z, Ge Y, Zhang J, Yu D, Chai W, Wu S, Xu L. The action sites of propofol in the normal human brain revealed by functional magnetic resonance imaging. *Anat Rec (Hoboken)*. 2010 Dec; 293(12):1985-90. doi: 10.1002/ar.21069.
17. Papoiu AD, Emerson NM, Patel TS, Kraft RA, Valdes-Rodriguez R, Nattkemper LA, Coghill RC, Yosipovitch G. Voxel-based morphometry and arterial spin labeling fMRI reveal neuropathic and neuroplastic features of brain processing of itch in end-stage renal disease. *J Neurophysiol*. 2014; 112:1729–1738.
18. Kim HJ, Park JB, Lee JH, Kim IH. How stress triggers itch: a preliminary study of the mechanism of stress-induced pruritus using fMRI. *Int J Dermatol*. 2016; 55:434–442.
19. Ishiura Y, Coghill RC, Patel TS, Oshiro Y, Kraft RA, Yosipovitch G. Distinct patterns of brain activity evoked by histamine-induced itch reveal an association with itch intensity and disease severity in atopic dermatitis. *Br J Dermatol* 2009; 161:1072-1080.
20. Desbordes G, Li A, Loggia ML, Kim J, Schalock PC, Lerner E, et al. Evoked itch perception is associated with changes in functional brain connectivity. *Neuroimage Clin* 2015; 7:213-221.

## 02 May 2021-Sunday

### 09:38-10:35 | SPECIALIST'S SESSION II

Chairs: A. Gülsün Pamuk, Haluk Gümüş

**Anaesthetic Management in Bariatric Surgery;** Münire Babayiğit

**Santral Blocks in Pediatric Anesthesia;** Asiye Ceylan

**DOAC Management During Anesthesia;** Merve Bayraktaroğlu

**Extraordinary Reactions During Propofol Anesthesia: Narcolepsy, Chronic Urticaria, Essential Tremor;** İlknur Suidiye Yorulmaz

**Traumatic Brain Injury in Elderly Patients;** İsmail Aytaç

**Innovations in Geriatric Anesthesia;** Fatma Sipahioğlu

## INNOVATIONS IN GERIATRIC ANESTHESIA

**Dr. Fatma Ozkan Sipahioğlu**

*University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Anesthesiology and Reanimation, Ankara, Turkey*

The elderly adult ( $\geq 65$  years old) patient group constitutes a large part of the surgical procedures performed in our country as well as all over the world. Considering physiological changes, co-morbid diseases and increased complication and mortality risks, geriatric anesthesia management is challenging. Facing with simultaneous problems in different areas with elder patients requires a multilateral approach, effective perioperative care and a team who can handle these separate domains simultaneously.

### PREOPERATIVE MANAGEMENT

Preoperative period comprises a comprehensive geriatric assessment (CGA) that including functional status, mobility, presence and stability of comorbidities, frailty, nutrition, polypharmacy, anticoagulant therapy, depression and cognitive ability (neurocognitive function). It is known that CGA has a positive impact on postoperative outcomes (1).

Basal functional capacity is evaluated in detail with commonly used basic and instrumental daily life activity (ADL) screening tests. Mobility, fall risk and functional limitation can be determined with the time up to go TUG test. It has been shown that the 1-year mortality of patients with unfavorable TUG test and dependent on activities of daily living is significantly higher than other patients (2). However, more independent functional status is a strong predictor of better postoperative function and shorter recovery period (3).

Another way to assess functional capacity in the elderly patient is to evaluate the metabolic equivalents (METs) of daily activities. Further evaluation at a low METs level is recommended.

Functional capacity is not limited to the evaluation of the patient's physical performance, but also includes the assessment of cognitive state, mood and nutritional status.

Dementia, with a frequency of 5–8% among older adults, is associated with high mortality and poor prognosis (4). However, the current cognitive impairment is the predictor of postoperative delirium (POD) (5). Careful assessment of cognitive status is critical for common postoperative complications such as POD or postoperative cognitive dysfunction (POCD).

Routine pre-operative cognitive assessment is recommended, especially in the elderly ones with risk factors for cognitive impairment (6). However, elderly patients should be informed about neurocognitive disorders (e.g. confusion, memory problems) that they may encounter in the postoperative period. In addition, whether the patient understands the planned surgery or not, and the patient's expectations from the treatment should be evaluated. Otherwise, their family should be informed.

Senility alone is a risk factor for depression, and more than 10% of elderly people have significant depressive symptoms (7). A recent study showed that baseline depression has been associated with increased mortality (8). Elderly patients should be screened for depression and substance abuse.

Malnutrition is common in the elderly. Providing preoperative nutritional support to elderly patients with malnutrition reduces complications such as postoperative respiratory tract, wound, urinary tract infections and deep vein thrombosis, however no clear effect on mortality has been demonstrated (9). Preoperative fasting period should not be too long in the elderly, oral nutrition should start again as soon as possible after surgery.

The inclusion of elderly patients with reduced functional reserves in the prehabilitative program for an optimum period of 4 weeks consisting of exercise practices, nutrition support and psychological support before surgery is one of the current issues. Prehabilitation programs aim to strengthen the functional capacity and physiological reserves of the patient against surgical stress and to improve postoperative outcomes.

One of the important issues in CGA is frailty . Frailty is a state of decreased physiological reserve and reduced tolerance to medical and surgical procedures. The prevalence of fragility in the elderly is 30% (10), its incidence increases as the age progresses. Furthermore, it is more common in women than in men (11). Various measurement tools (eg, Fried frailty tool, frailty index, FRAIL scale, clinical frailty scale) have been developed to assess frailty, but a standard measurement tool could not be determined. It is certain that frailty has negative effects on mortality and postoperative complications (12).

It would be appropriate to make use of guidelines for systematic evaluation. Accordingly, the necessary tests should be applied and risk classification should be made.

Due to physiological changes in the elderly, exaggerated drops in blood pressure during anesthesia induction, reduced responsiveness to hypovolemia and limited ability to increase cardiac output make the elderly vulnerable to cardiac events. It has been shown that the large

majority of cardiac arrests were caused by factors that are not related with anesthesia. High ASA score and the need for emergency surgery were the major predictors (13).

Advanced age alone is not an indication for electrocardiogram (ECG). Most elderly people also experience abnormalities in ECG, but these abnormalities are often not associated with increased cardiac risk. Chronic heart failure (PPE) history and high ASA score (>3) were noted as significant predictors of postoperative cardiac complications (14).

Pulmonary complications are independent predictors of mortality in elderly patients. Age-related physiological changes predispose to pulmonary complications in the elderly. Poor overall health status, current infections, chronic obstructive pulmonary disease (COPD), PPE, atelectasis, pneumonia, pulmonary thromboembolism, hypoalbuminemia and renal dysfunction are the most common risk factors for postoperative pulmonary complications (PPC). Interventions such as lung expansion therapy (incentive spirometry, deep breathing exercises and continuous positive airway pressure) and thromboprophylaxis are effective in reducing the risk of pulmonary complications (15).

There is no consensus regarding laboratory tests. Routine hemoglobin and hematocrit is not recommended except in surgeries which significant blood loss is expected (16). Preoperative creatine and albumin may be obtained before moderate or high risk surgery in frail elderly patients or those with a known history of liver or chronic disease .

One of the problem we encounter in geriatric patients is excessive drug use, polypharmacy. It is difficult to obtain an accurate drug history from elderly patients. As the number of taken medications increases, the risk of adverse drug reactions increase either. Guidelines recommend perioperative discontinuation of unnecessary drugs and keeping the addition of new drugs to a minimum, if possible (15).

### **INTRAOPERATIVE MANAGEMENT**

Age cannot be the only criterion for a surgical indication decision . In fact, it is seen that ASA scoring focuses more on severe systemic disease and age is not a risk factor. Although it is known that postoperative mortality and morbidity increase with age, the age-related perioperative risk is mostly due to overt fragility, the presence of high-risk comorbidities, and the invasiveness of the surgical procedure (16). The main comorbidities contributing to postoperative mortality are acute myocardial infarction, chronic renal failure, and intracranial hemorrhage (17).

Laparoscopic surgery has better postoperative outcomes, shorter hospital stay and lower mortality in geriatric patients than open surgery (18).

Evidence on the best anesthesia technique for the elderly patient group is still insufficient. While deciding on the anesthetic technique, its suitability for the surgical procedure, the

patient's existing diseases, risk factors and the patient's preference should be taken into consideration, and an evaluation should be made on a case-by-case basis.

If both general or neuraxial anesthesia are suitable, the preference would be more to neuraxial anesthesia. It can reduce lung complications, especially in patients with COPD (19). A retrospective study of 2019, superior perioperative results were obtained with epidural anesthesia compared to general anesthesia (GA) in patients over the age of 70 who underwent major lumbar surgery. Similarly, a meta-analysis concluded that there are significant advantages in favor of regional anesthesia (RA) in terms of early mortality and risk of deep vein thrombosis for hip fracture patients (15).

In elderly patients who need a diagnostic or therapeutic procedure, monitored anesthesia care and sedation are generally preferred. Since elderly patients are particularly susceptible to airway obstruction, hypoxemia, hypercapnia or aspiration, the dose of all administered drugs should be reduced and short-acting agents should be preferred. Routine use of continuous oxygen support and end-tidal carbon dioxide level monitoring is recommended.

Reducing the doses of anesthetic agents, increasing the interval between repeat doses, slow administration of bolus injections and preferring shorter-acting agents are effective in protecting the elderly from excessive anesthetic depth, hypotension attacks and side effects of anesthetic agents. Brain function monitoring is recommended.

It should be noted that opioids are about two times stronger in elderly patients. And the MAC value decreases by about 6% with each decade after the age of 40. In other words, the MAC value decreased by 25% in an 80-year-old patient (20).

Doses are considerably reduced to avoid residual effects and complications of neuromuscular agents in the elderly. The induction dose is reduced by 50% and the maintenance dose by 25%. The use of a peripheral nerve stimulator (such as TOF) for dose adjustment is highly recommended .

The only drug that is not recommended to reduce the dose in the elderly is sugammadex . The standard dose should be used (21).

In geriatric patient management, anesthesiologists should be familiar with inappropriate drugs for elderly patients according to the Beers criteria. In particular, benzodiazepines should be avoided as they increase the risk of POD. Some of the other important drugs to avoid are meperidine, anticholinergics (especially scopolamine), diphenhydramine and metoclopramine (22).

It is also necessary to be more careful in elderly patients with Alzheimer's disease or other forms of dementia. These patients may be taking cholinesterase inhibitors (eg donepezil, rivastigmine, galantamine). Chronic administration of these drugs may lead to a decrease in

plasma cholinesterase and thus prolong the duration of neuromuscular blockers, and decrease the effect of anticholinesterase drugs .

The choice of monitoring depends on the patient and surgery, but monitoring tools recommended for routine especially used in major and emergency surgery are: intra-arterial blood pressure monitoring, central venous monitoring, cardiac output monitoring, cerebral oxygen saturation, anesthesia depth monitoring (BIS, entropy) and neuromuscular monitoring (15) .

Nowadays, there are less invasive devices that can continuously monitor the pulse volume. However, the accuracy of these data depends on the waveform signal received from the arterial system. Cardiac output monitoring may not provide accurate information, as aortic compliance is poor and rhythm disturbances such as atrial fibrillation are common in the elderly.

A decrease of more than 15% of the baseline value in regional cerebral oxygen saturation (rSO<sub>2</sub>) is indicative of cerebral ischemia. Monitoring the decrease in cerebral oxygen saturation has an important place in preventing cerebral hypoxia in elderly patients, it has been shown that early intervention can reduce POD or POCD (23).

In general, perioperative fluid optimization should be done in the elderly patient. The goal should be to avoid dehydration, to provide an effective circulation volume and adequate tissue perfusion. There are studies showing that targeted haemodynamic therapy is superior to traditional fluid therapy in terms of mortality and postoperative complications in the high-risk geriatric patient population, but the evidence is insufficient (24).

Similarly, there is no consensus on red blood cell (RBC) transfusion. Whether RBC transfusion increases the risk of infection is controversial. Even the hemoglobin thresholds of liberal and restrictive RBC transfusion strategies are not clear. Usually 7-8 gr/dl hemoglobin level is accepted as the threshold value. However, in order to provide tissue perfusion in high-risk patients, the hemoglobin value can be withdrawn up to 10 gr/dl. The studies did not significantly differ between the two strategies in terms of mortality and morbidity. The general view is to avoid unnecessary transfusion as much as possible and to opt for a restrictive strategy.

Maintain of perioperative thermoregulation is very important in the elderly. The elderly are at serious risk due to their cachectic nature and low metabolic rate. In this regard, using passive and active additional warming methods is useful in protecting from hypothermia. In general, if the body temperature is <36 ° C, preoperative active warming is recommended.

### **POSTOPERATIVE MANAGEMENT**

Pain assessment and treatment in the elderly is difficult due to medical comorbidities and cognitive impairment. Even if elderly patients have difficulty in perceiving pain, inadequate analgesia can be result in delirium and morbidity.

Multimodal drug therapy and perioperative regional analgesia are dramatically efficient in pain management. Paracetamol is safe whereas nonsteroidal anti-inflammatory drugs and morphine should be used with caution. Opioid dose should be kept minimal against risk of delirium. Regional analgesia (especially epidural analgesia) and USG guided nerve blocks (facial, iliohypogastric, femoral nerve, psoas compartment sciatic nerve block ) have remarkable results , furthermore they reduce the need for systemic opioids. Patient controlled analgesia (PCA) is also one of the commonly used methods. In this regard, epidural PCAs provide better analgesia, better mental state and bowel activity.

Postoperative cognitive dysfunction is one of the most common complication in postoperation period. Their incidence reaches up to 50% (25). They are associated with increased mortality and morbidity, especially in the elderly. Preventive strategies, early recognition and management of perioperative risk factors are emphasized in treatment.

Pre-existing cognitive impairment and dementia are the strongest predisposition factors for POD. In addition, a recent study reported that those with severe obstructive sleep apnea had a 3-fold higher risk for POD (26). The chosen anesthesia technique has no effect on POKB, however, anesthetic depth is related to POKB. Comprehensive multidisciplinary care and multimodal interventions, antipsychotics, depth of anesthesia monitoring and dexmedetomidine treatment have been shown to reduce the incidence of POD and POCD (27, 28).

The most common issue in recent years is increased inflammatory response associated with POCD (29). Proinflammatory cytokines such as IL-6, TNF- $\alpha$ , high expression of FKBP51 (FK506 binding protein 51) in leukocytes and glucocorticoid resistance have been found to be associated with POCD (30-32).

## CONCLUSION

Perioperative care in the elderly always requires a multidisciplinary approach. The goal is getting them their pre-morbid conditions and providing a quality life. However, it is often difficult to apply these approaches in clinical routine due to limited human resources and deficiency in the health system. More randomized controlled studies are needed to clarify a few unclear issues.

## References

1. Partridge JS, Harari D, Martin FC, Dhesei JK. The impact of pre-operative comprehensive geriatric assessment on postoperative outcomes in older patients undergoing scheduled surgery: a systematic review. *Anaesthesia*. 2014;69 Suppl 1:8-16.
2. Schmidt M, Eckardt R, Altmeyden S, Wernecke K-D, Spies C. Functional impairment prior to major non-cardiac surgery is associated with mortality within one year in elderly patients with gastrointestinal, gynaecological and urogenital cancer: A prospective observational cohort study. *Journal of Geriatric Oncology*. 2018;9(1):53-9.
3. Lawrence VA, Hazuda HP, Cornell JE, Pederson T, Bradshaw PT, Mulrow CD, et al. Functional independence after major abdominal surgery in the elderly. *Journal of the American College of Surgeons*. 2004;199(5):762-72.



4. Bai J, Zhang P, Liang X, Wu Z, Wang J, Liang Y. Association between dementia and mortality in the elderly patients undergoing hip fracture surgery: a meta-analysis. *Journal of Orthopaedic Surgery and Research*. 2018;13(1):298.
5. Ansaloni L, Catena F, Chattat R, Fortuna D, Franceschi C, Mascitti P, et al. Risk factors and incidence of postoperative delirium in elderly patients after elective and emergency surgery. *British Journal of Surgery*. 2010;97(2):273-80.
6. Mohanty S, Rosenthal RA, Russell MM, Neuman MD, Ko CY, Esnaola NF. Optimal Perioperative Management of the Geriatric Patient: A Best Practices Guideline from the American College of Surgeons NSQIP and the American Geriatrics Society. *Journal of the American College of Surgeons*. 2016;222(5):930-47.
7. Steffens D, Fisher, G., Langa, K., Potter, G., & Plassman, B. . Prevalence of depression among older Americans: The Aging, Demographics and Memory Study. . *International Psychogeriatrics*. 2009;21: 879-88. .
8. Drudi LM, Ades M, Turkdogan S, Huynh C, Lauck S, Webb JG, et al. Association of Depression With Mortality in Older Adults Undergoing Transcatheter or Surgical Aortic Valve Replacement. *JAMA Cardiology*. 2018;3(3):191-7.
9. Avenell A, Smith TO, Curtain JP, Mak JC, Myint PK. Nutritional supplementation for hip fracture aftercare in older people. *Cochrane Database Syst Rev*. 2016;11(11):Cd001880.
10. Handforth C, Clegg A, Young C, Simpkins S, Seymour MT, Selby PJ, et al. The prevalence and outcomes of frailty in older cancer patients: a systematic review. *Ann Oncol*. 2015;26(6):1091-101.
11. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in Older Adults: Evidence for a Phenotype. *The Journals of Gerontology: Series A*. 2001;56(3):M146-M57.
12. Khan M, Jehan F, Zeeshan M, Kulvatunyou N, Fain MJ, Saljuqi AT, et al. Failure to Rescue After Emergency General Surgery in Geriatric Patients: Does Frailty Matter? *Journal of Surgical Research*. 2019;233:397-402.
13. Nunes JC, Braz JRC, Oliveira TS, de Carvalho LR, Castiglia YMM, Braz LG. Intraoperative and Anesthesia-Related Cardiac Arrest and Its Mortality in Older Patients: A 15-Year Survey in a Tertiary Teaching Hospital. *PLOS ONE*. 2014;9(8):e104041.
14. Liu LL, Dzankic S, Leung JM. Preoperative electrocardiogram abnormalities do not predict postoperative cardiac complications in geriatric surgical patients. *J Am Geriatr Soc*. 2002;50(7):1186-91.
15. Lim B-G, Lee I-O. Anesthetic management of geriatric patients. *Korean J Anesthesiol*. 2020;73(1):8-29.
16. Apfelbaum JL, Connis RT, Nickinovich DG, Pasternak LR, Arens JF, Caplan RA, et al. Practice advisory for preanesthesia evaluation: an updated report by the American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. *Anesthesiology*. 2012;116(3):522-38.
17. Chu C-L, Chiou H-Y, Chou W-H, Chang P-Y, Huang Y-Y, Yeh H-M. Leading Comorbidity associated with 30-day post-anesthetic mortality in geriatric surgical patients in Taiwan: a retrospective study from the health insurance data. *BMC Geriatrics*. 2017;17(1):245.
18. Chen K, Pan Y, Maher H, Zhang B, Zheng X-y. Laparoscopic hepatectomy for elderly patients: Major findings based on a systematic review and meta-analysis. *Medicine*. 2018;97(30):e11703.
19. Hausman MS, Jr., Jewell ES, Engoren M. Regional versus general anesthesia in surgical patients with chronic obstructive pulmonary disease: does avoiding general anesthesia reduce the risk of postoperative complications? *Anesth Analg*. 2015;120(6):1405-12.
20. Eger EI, 2nd. Age, minimum alveolar anesthetic concentration, and minimum alveolar anesthetic concentration-awake. *Anesth Analg*. 2001;93(4):947-53.
21. Lee LA, Athanassoglou V, Pandit JJ. Neuromuscular blockade in the elderly patient. *J Pain Res*. 2016;9:437-44.
22. Irwin MG, Ip KY, Hui YM. Anaesthetic considerations in nonagenarians and centenarians. *Curr Opin Anaesthesiol*. 2019;32(6):776-82.
23. Ružman T, Mraovic B, Šimurina T, Gulam D, Ružman N, Miškulin M. Transcranial Cerebral Oxymetric Monitoring Reduces Brain Hypoxia in Obese and Elderly Patients Undergoing General Anesthesia for Laparoscopic Cholecystectomy. *Surgical Laparoscopy Endoscopy & Percutaneous Techniques*. 2017;27(4):248-52.
24. Gurgel ST, do Nascimento P, Jr. Maintaining tissue perfusion in high-risk surgical patients: a systematic review of randomized clinical trials. *Anesth Analg*. 2011;112(6):1384-91.
25. Inouye SK, Westendorp RGJ, Saczynski JS. Delirium in elderly people. *The Lancet*. 2014;383(9920):911-22.
26. Bilotta F, Giordano G, Pugliese F. Preoperative stratification for postoperative delirium: obstructive sleep apnea is a predictor, the STOP-BANG is not? *Journal of Thoracic Disease*. 2019:S202-S6.
27. Zeng H, Li Z, He J, Fu W. Dexmedetomidine for the prevention of postoperative delirium in elderly patients undergoing noncardiac surgery: A meta-analysis of randomized controlled trials. *PLOS ONE*. 2019;14(8):e0218088.

28. Janssen TL AA, Hooft L, Mattace-Raso FUS, Mosk CA, van der Laan L. Prevention of postoperative delirium in elderly patients planned for elective surgery: systematic review and meta-analysis. *Clin Interv Aging*. 2019;14:1095-117.
29. Luo A, Yan J, Tang X, Zhao Y, Zhou B, Li S. Postoperative cognitive dysfunction in the aged: the collision of neuroinflammation with perioperative neuroinflammation. *Inflammopharmacology*. 2019;27(1):27-37.
30. Micha G, Tzimas P, Zalonis I, Kotsis K, Papdopoulos G, Arnaoutoglou E. Propofol vs Sevoflurane anaesthesia on postoperative cognitive dysfunction in the elderly. A randomized controlled trial. *Acta Anaesthesiol Belg*. 2016;67(3):129-37.
31. Zhang H, Wu Z, Zhao X, Qiao Y. Role of dexmedetomidine in reducing the incidence of postoperative cognitive dysfunction caused by sevoflurane inhalation anesthesia in elderly patients with esophageal carcinoma. *Journal of Cancer Research and Therapeutics*. 2018;14(7):1497-502.
32. Wang L-W, Zhu M-J, Li Y, Wang S-T, Zhou M-Y, Yu Y-J, et al. FKBP51 is associated with early postoperative cognitive dysfunction in elderly patients undergoing hip fracture surgery. *Medicine*. 2019;98(5):e14037.

## 02 May 2021-Sunday

10:45-12:15 | Panel 12: ANESTHESIA VII

Chairs: Slavenka Straus, Ayşegül Özgök

**Anesthesia Management for Ventricular Assist Device Implementation;** Hija Yazıcıoğlu

**Intraaortic Balloon Pump Counter Pulsation;** Ervin Bejko

**Single Lung Ventilation;** Mehtap Tunç

**Vasoplegia in Cardiac Surgery: How We Can Prevent It in Postoperative Period?;** Slavenka Straus

**Medical Education During Covid-19: Our Experience;** Fatos Sada

## ANESTHESIA MANAGEMENT for VENTRICULAR ASSIST DEVICE IMPLANTATION

**Hija Yazıcıoğlu, M.D.**

*TC University of Health Sciences Ankara City Hospital*

*Department of Anesthesiology and Reanimation*

### ***Why should we concern about heart failure (HF) and ventricular assist devices (VAD)?***

Approximate cost for cardio-vascular diseases in USA is 31 billion \$ (It is 10 % of all medical expences). The expenses is predicted to be increased 127 % by 2030. [Card Fail Rev. 2017 Apr; 3(1): 7–11]. There are 5 million CHF patients in USA and 600.000 cases are class IV, HF. HTx is gold standard for HF resistant to maximal medical treatment. However, there are 2200 donors and 50.000 deaths per year.

Because of donor shortage and long waiting list for HTx, VAD's are developed for acute or chronic cardiac decompensated patients to preserve organ functions, stabilization of haemodynamics and for cardiac support. Patients in ICU for HTx waiting list cost \$5000/ day and who are on LVAD support in ICU cost 3000 \$ per day while a patient with a LVAD at home costs \$27 per day. Selection of right patient, defining low risk subgroups and ideal timing for implamentation like before worsening of cardiac failure increases the cost efficiency of LVADs.

The ethiology of cardiac failure can be defined as ischemic cardiomyopathy developed from hypertention, coronary artery disease, MI or non-ischemic cardiomyopathy presented after valvular disease, viral/ bacterial cardiomyopathy (CMP), peripartum CMP, idiopathic/familial CMP, myocarditis, connective tissue disease, drugs, toxins, alcohol.

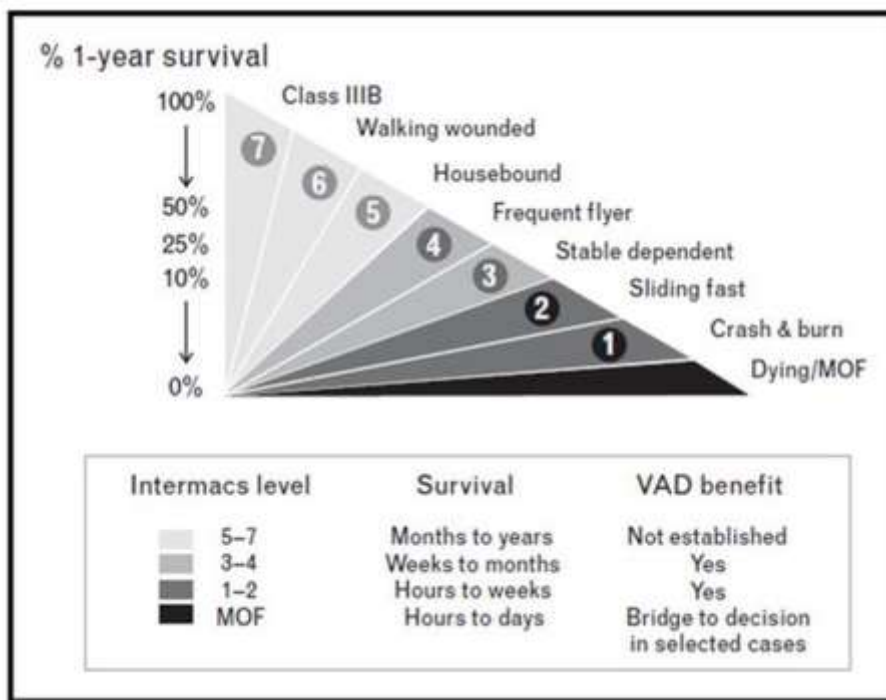
The aim of HF treatment is to improve quality of life, slow the improvement of disease, reverse the cardiac dysfunction and decrease mortality. When we identify the HF treatment era we see pre- $\beta$  adrenergic receptor blockage (BARB) era which includes digitalis, diuretics and vasodilators. Then BARB era comes with goal directed medical treatment (GDMT). Finally mechanical circulatory support devices (MCSD) era.

First idea of MCSD was suggested by Prof. De Bakey in 1963. Then in 1968 IABP was introduced into practice. In 1971 first adult ECMO device was implanted successfully followed by first pediatric case in 1972 and first newborn (Baby Esperanza) in 1974 performed by Prof.

Barlett. After FDA approval manufacturing of ventricular assist devices (VAD) have progressed rapidly since 1990.

**HOW to IDENTIFY PATIENTS for MCS/ D IMPLANTATION:**

MCS/ D implantation is considered according to INTERMACS (Interagency Registry for Mechanically Assisted Circulatory Support) classification. It is constituted with the analysis of data of more than 15,000 patients from hospitals, MCS/ D industry, American National Heart, Lung and Blood Institutes. It is a method to distinguish various grades of NYHA Class III, IV patients and to identify outcomes of patients requiring MCS/ D.



INTERMACS CLASS	DEFINITION
1	Critical cardiogenic shock
2	Progressive decline
3	Stable but inotrope dependent
4	Frequent HF symptoms
5	Exertion intolerant; housebond
6	Exertion limited
7	Advanced NYHA III

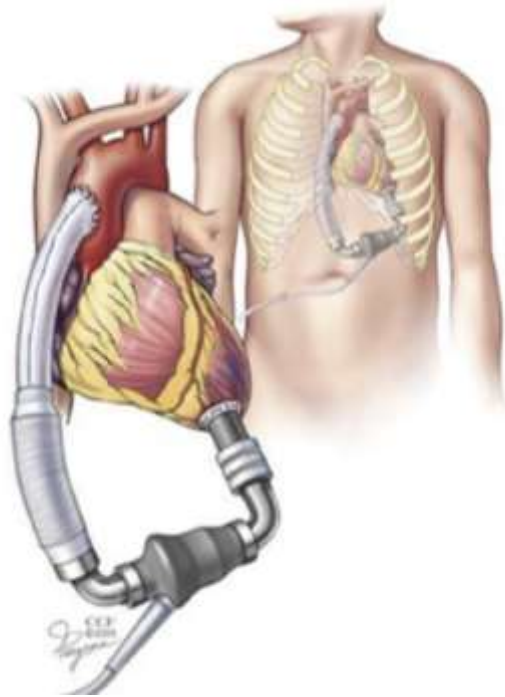
**Intermacs Risk Score**

<b>PROFIL &amp; NYHA</b>	<b>DESCRIPTION</b>	<b>DEFINITION</b>	<b>TIME to MCSD</b>
<b>1 (NYHA IV)</b>	<b>Cardiogenic shock</b>	<b>Critical cardiogenic shock</b>	<b>Within hours</b>
<b>2 (NYHA IV)</b>	<b>Progressive decline</b>	<b>Inotrope dependence with continuing deterioration</b>	<b>Within a few days</b>
<b>3 (NYHA IV)</b>	<b>Stable but inotrope dependent</b>	<b>Stable on mild to moderate doses of inotropes or stable on temporary circulatory support without inotropes</b>	<b>Within a few weeks</b>
<b>4 (NYHA IV)</b>	<b>Recurrent advanced heart failure</b>	<b>Recurrent rather than refractory decompensation</b>	<b>Within weeks to months</b>
<b>5 (NYHA IV)</b>	<b>Exertion intolerant</b>	<b>Comfortable at rest</b>	<b>Variable</b>
<b>6 (NYHA III)</b>	<b>Exertion limited</b>	<b>Able to do mild activity; fatigued within a few minutes of any physical exertion</b>	<b>Varibale</b>
<b>7 (NYHA III)</b>	<b>Advanced NYHA III</b>	<b>Clinically stable with a reasonable level of comfortable activity, despite nonrecent history of previous decompensation</b>	<b>Not a candidate for MCSD</b>

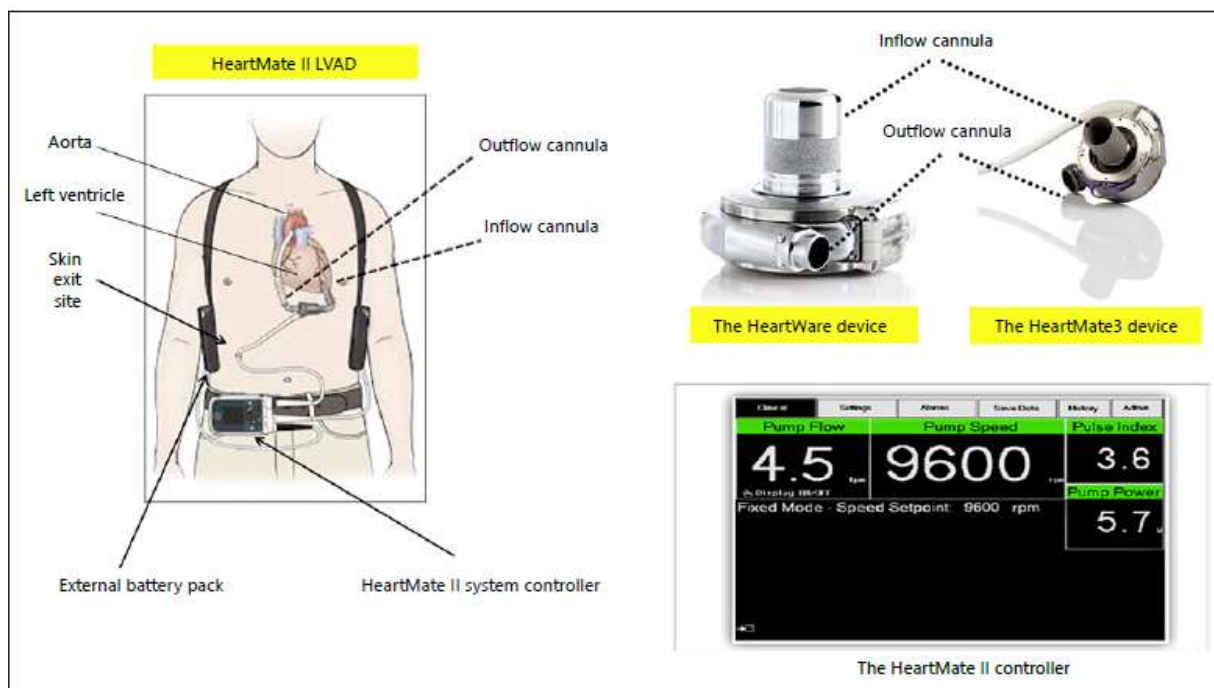
**Examples of MCSD' s & How do They Work?**

Left ventricular assist device (LVAD), Right ventricular assist device (RVAD), biventricular assist device (BIVAD) and total artificial heart (TAH) are the examples of MCSD. There are approximately 2000 LVAD implantation per year in England & one year of survival for LVAD is noted to be 80 %. An example of LVAD;

**HeartMate II LVAD**



Inflow cannulation LV apex, outflow cannula anastomosed to the ascending aorta. Axial flow LVAD withdraws blood from LV apex and pumps it to ascending aorta. Percutaneous lead connected to rechargeable batteries worn by the patient.



**MCS D CLASSIFICATION:**

<b>PERIOD of SUPPORT</b> Short period (6 h-7 days) Medium period (7 days - 1 year ) Long period (destination)	<b>DEVICE LOCATION</b> Paracorporal Ekstracorporal Intracorporal
<b>VENTRICULAR SUPPORT</b> RVAD LVAD BiVAD	<b>POWER SOURCE</b> Pneumatic Electrical
<b>REASON for SUPPORT</b> BTT BTR BTD BTB DT	<b>PUMP MECHANISM</b> Axial Centrifugal
<b>GENERATION of DEVICE</b> First Second Third generation	<b>FLOW</b> Continious flow Pulsatil flow

**MCS D Indications:**

Bridge to HTx (BTT): Cardiac support till HTx

Bridge to Recovery (BTR): Give chance to the heart for recovery; postpartum HF, viral CHF

Bridge to Decision (BTD): Support to those who aren't currently qualified for HTx but may be in future

Bridge to Bridge (BTB): Exp; Transition to LVAD from BiVAD

Destination Therapy (DT): Cardiac support during the rest of life

**MCS D BRIDGE TO HTx:**

HTx candidate CI < 2 L/ min / m<sup>2</sup> SBP < 80 mmHg , PCWP > 20 mmHg

**SHORT-TERM TREATMENT with MCS D:**

Shock after cardiomy

Acute graft dysfunction following HTx

During non-cardiac operations/ cardiogenic shock during catheterisation

Cardiogenic shock following MI

Acute myocardit & CMP

Hemodynamic support following high-risk operations and interventions

**DESTINATION THERAPY with MCSD (DT):**

NYHA IV, end-stage HF, not a candidate for HTx, No response to OMT for 2 mo, IABP dependent for 7 days; iv inotrop dependent for 14 days, LVEF < % 25

**BRIDGE to RECOVERY (BTR):**

Reverse Remodelling, calcium saturated contractile force, sarcoplasmic reticulum Ca-ATPase and RyR receptor, Na<sup>+</sup>/ Ca<sup>2+</sup> exchanger ve dystrophin gene expression increase and these are ended up with LV function improvement. Myocardial healing with LVAD was reported to be seen if Age < 50, non-ischemic HF, and HF < 2 years. Patients with ICD, have Creatinin < 1.2 gr/dl and LVED diameter < 6.5cm were candidates for recovery with LVAD. [Farris SD. Et al. J Am Coll Cardiol 2017;70(3):344-54]

**ANESTHESIA MANAGEMENT for MCSD:**

Anesthesia management for LVAD implantation is like dealing with HF, HTx patient. Patients have severly compromised LV function.

**Preoperative considerations**

Patient optimization targets platelet count >150.000 , serum albumin > 33 g litre<sup>-1</sup> , normal liver enzyme levels, estimated glomerular filtration rate > 50 ml kg<sup>-1</sup> min<sup>-1</sup> , haematocrit > 34%, mean pulmonary artery pressures < 25 mm Hg, and low inotropic support. Failure to achieve these increases the perioperative risk. Neurological assessment is documented, via transient cessation of sedation if the patient is intubated. Premedication is avoided to prevent cardiac or respiratory depression.

**Monitoring and access**

Standard cardiac monitoring, including five-channel electrocardiography, invasive arterial blood pressure monitoring is used. Central venous access is mandatory, both for pulmonary artery catheterization and fluid resuscitation. Mixed venous oxygen saturation assesses the adequacy of cardiac output, aiming for >65%. Transoesophageal echocardiography (TEE) is used throughout the perioperative and immediate postoperative period. A surgically placed left atrial catheter is more accurate than pulmonary capillary wedge pressure for monitoring left heart filling pressures.

**Induction and maintenance**

Induction must prevent haemodynamic decompensation from reduced preload and contractility and is best performed inside the operating theatre with titrated increments of induction agents and inotropic support. Rapid sequence induction is modified to continue

ventilation with cricoid pressure thus avoiding hypoxic and hypercarbic pulmonary hypertension. Inhalation or i.v. anaesthesia is suitable. External defibrillationpads are attached. Antibiotic prophylaxis is done. Body warming devices are used to maintain normothermia. Surgical access is commonly via median sternotomy, but left thoracotomy with



lung isolation via a double-lumen endotracheal tube is an option. Bleeding is common so transamine, anti-fibrinolysis and cell salvage are routinely used. Full heparinization is required, irrespective of preoperative coagulation.

### **Perioperative period**

TEE is used to exclude valve lesions, shunts and intracardiac thrombus. CPB is generally but not universally used for placement of inflow cannulae within the ventricle, but duration can be minimized by tunnelling the percutaneous lead and completing the outflow cannula anastomosis before instituting bypass. Inflow cannulae are directed posteriorly towards the mitral valve to prevent obstruction. Before VAD activation, all air should

be removed and the heart backflow filled with blood. Deairing is via back-flow of blood from the aorta to a Luer lock connection on the outflow cap and by elevating the LV apex. The VAD is initiated at low speed with a cross-clamp on the outflow cannula and a needle

vent. CPB flow is then reduced followed by removal of the graft cross-clamp. The LV should be full and off CPB before the pump speeds are increased to avoid entraining air into the system, which is further minimized by flooding the surgical field with saline or carbon dioxide.

### **Weaning from CPB:**

Atelectatic lung is expanded before weaning bypass to prevent Valsalva-induced hypotension. CPB weaning concerns are from RV failure, pulmonary hypertension, systemic vasodilatation, and bleeding. TEE is vital for deairing, RV assessment, and to check cannulae positions and flow. RV dysfunction can be difficult to predict, thus monitoring and prophylaxis against right heart failure must be instituted in all cases before separation from bypass, using inhaled nitric oxide, i.v. nitrates and phosphodiesterase inhibitors. RV dysfunction results in chamber dilatation and leftward ventricular septal deviation on TEE, predicting imminent failure. Atrial or AV sequential pacing is useful to maintain adequate cardiac output. Protamine must be used to reverse heparinization but can worsen RV function and cause pulmonary hypertension.

### **Postoperative complications**

The immediate postoperative management of VADs presents a real challenge for both surgeon and intensivist.

The most common problems encountered are the following:

(1) Bleeding: This is the most frequent complication after VAD implantation and coagulopathy is common. Minimizing CPB times, meticulous surgical technique, autologous blood transfusion, and normothermia are standard. Early re-exploration reduces the excessive use of blood and associated products, which risk transfusion-related lung injury. Platelet consumption via the device and the risk of spontaneous intracerebral haemorrhage translate into early platelet transfusion. TEG and laboratory results guide blood products' administration.

(2) Tamponade: The impending of tamponade are decreasing flows on the VAD, increasing central venous pressure, signs reduced mean arterial pressure with escalation of inotropic support and metabolic acidosis with oliguria. It is corrected by immediate surgical decompression

(3) RV failure

(4) Fluid overload: Fluid overload can be due to massive transfusion of blood and blood products or mobilization of oedema fluid with higher cardiac outputs. Early haemofiltration is recommended with removal of fluid if cardiovascularly unstable.

(5) Vasoplegia: This may be secondary to the use of phosphodiesterase inhibitors or systemic inflammatory response syndrome. Despite the risks to the RV and renal axis, high-dose norepinephrine and vasopressin may be required to optimize organ perfusion.

(6) Haemodynamic instability: Post-LVAD insertion, the interventricular septum is entrained leftwards towards the inflow cannula when the ventricles are underfilled. This differs from septal deviation seen with RV failure or high pump speeds. TEE is crucial to determine the need for further fluid challenges and adjustment of pump speeds.

(7) Gastrointestinal and hepatic dysfunction: First-generation VADS, in the intraperitoneal position produced frequent upper GI pressure symptoms on the stomach and intestines, but this is rarely seen with second- and third-generation devices. Ileus is common and managed with prokinetics. Enteral feeding is advocated as soon as gut function is resumed. Liver dysfunction is common in patients with chronic heart failure. Close monitoring of liver enzymes and withdrawal of hepatotoxic drugs limits further damage. Warfarin therapy should be monitored closely with impaired liver synthetic function.

(8) Infection: Antibiotic prophylaxis is continued according to hospital infection control policy. Preoperative malnutrition and invasive support and also the VAD itself contribute to postoperative infections.

### **Contraindications for a Left Ventricular Assist Device**

Some may be relative, especially as technology improves

- a. Acute cardiogenic shock or arrest with uncertain neurologic status.
- b. Irreversible contraindication to heart transplant if destination or recovery is not the aim.
- c. Non-systolic HF.
- d. Co-existing illness with life expectancy < 2 years.

- e. Terminal severe comorbidity, e.g. metastatic or advanced cancer, severe liver disease or severe lung disease.
- f. Active uncontrolled systemic infection or significant risk of infection.
- g. Active severe bleeding.
- h. Right HF not secondary to left HF.
- i. Moderate or severe aortic insufficiency that will not be corrected.
- j. Anatomical considerations such as hypertrophic cardiomyopathy, large ventricular septal defect.
- k. Psychosocial limitations, e.g. inability to comply with medical regimen or device and driveline maintenance or inability of patient or companion to maintain LVAD operation and interpret alarms

## 02 May 2021-Sunday

---

10:45-12:15 | Panel 12: ANESTHESIA VII

Chairs: Slavenka Straus, Ayşegül Özgök

Anesthesia Management for Ventricular Assist Device Implementation; Hija Yazıcıoğlu

Intraaortic Balloon Pump Counter Pulsation; Ervin Bejko

Single Lung Ventilation; Mehtap Tunç

Vasoplegia in Cardiac Surgery: How We Can Prevent It in Postoperative Period?; Slavenka Straus

Medical Education During Covid-19: Our Experience; Fatos Sada

---

### PREDICTORS OF INTRA-AORTIC BALLOON PUMP INSERTION IN CARDIAC SURGERY

*Dr.Ervin Bejko,Dr.Esmerilda Bulku,Dr Stavri Llazo,  
Dr.Jonela Burimi,Dr.Alfred Ibrahim,Dr.Saimir Kuci*

#### ABSTRACT

##### Background

The intra-aortic balloon pump (IABP) is a device for temporary circulatory support that aims to reduce left ventricular afterload as it increases coronary perfusion pressure. The IABP is designed to offer mechanical support in cases of reduced ventricular function resulting from cardiac insufficiency, myocardial infarction and also postoperative damage.

##### Aim

The aim of this study is to present a complete panorama of all the patients who underwent insertion of an IABP in the Division of Cardiac Surgery at the Mother Teresa University Hospital Center focusing mainly on the outcome.

##### Materials and Methods:

From 2006-2020, a total of 95 cardiac surgical patients with IABP implantation in the OR or in the ICU were retrospectively analyzed.

##### Results:

The majority of the patients 77% were male. The mean age of the group resulted 64.22±9.72.. 18% presented as emergencies. The most common presenting symptom was chest pain in 84.6%. 53.85% of the patients had more than two risk factors for cardiovascular disease, the most common of which was HTN 76.9%.

Regarding comorbidities, 53.85% had CHF graded NYHA II(23%), II-III (23%) . 30.76% had AF and 54% of patients had a history of MI. 23% of patients needed continuous venovenous hemofiltration (CVVHF). The most frequently performed surgery was CABG in 86.5% of patients.

In 60.8 % of patients, the main indication for the insertion of IABP was the inability to wean from cardiopulmonary bypass. However, 75.7% regained hemodynamic stability after upon insertion and could therefore be weaned from the bypass machine. In 39.2% of the cases, the device was placed postoperatively in the ICU. 41.6% of patients were only under contrapulsation for less than 24 hours.

Mean hospital stay was  $19.5 \pm 8.5$  days.

76.9% of the patients were discharged. Hospital mortality was 23.1% (n=17).

**Conclusion:**

Early survival and outcome of the IABP device depends firmly on the cardiac function pre-insertion.

Key words: intra-aortic balloon pump, contrapulsation

## 02 May 2021-Sunday

---

10:45-12:15 | Panel 12: ANESTHESIA VII

Chairs: Slavenka Straus, Ayşegül Özgök

Anesthesia Management for Ventricular Assist Device Implementation; Hija Yazıcıoğlu

Intraaortic Balloon Pump Counter Pulsation; Ervin Bejko

Single Lung Ventilation; Mehtap Tunç

Vasoplegia in Cardiac Surgery: How We Can Prevent It in Postoperative Period?; Slavenka Straus

Medical Education During Covid-19: Our Experience; Fatos Sada

---

### CURRENT ANESTHETIC APPROACHES DURING SINGLE LUNG VENTILATION

**Assoc. Prof. Dr. Mehtap Tunç, MD**

*Atatürk Chest Diseases and Thoracic Surgery Training  
and Research Hospital, University of Health Sciences, Ankara, Turkey*

One-lung ventilation (OLV) is the oxygenation of the blood and the removal of CO<sub>2</sub> from the blood via ventilating a single lung. It is an indispensable part of thoracic surgery. It aims to ventilate the selected lung with mechanical ventilation and collapse the other one with voluntary airway blockage. OLV causes some significant physiological problems for the anesthesiologist. These include physiological derangements caused by placing the patient in the lateral decubitus position (LDP), open pneumothorax, and lung isolation. The LDP has the potential to alter the ventilation/perfusion rate significantly. Ventilation/perfusion mismatching becomes prominent when anesthesia induction, mechanical ventilation, muscle relaxation, the thorax's opening, and surgical manipulation are adjoined. Factors that adversely affect hypoxic pulmonary vasoconstriction (HPV) also contribute to the development of hypoxemia.

Hypoxemia defined as an arterial oxygen tension (PaO<sub>2</sub>) is less than 60 mmHg and/or oxygen saturation (SpO<sub>2</sub>) is less than 90% when inspired oxygen fraction (FiO<sub>2</sub>) is 1.0. The incidence of hypoxemia during OLV has currently reduced to 5-10% because of the frequent usage of flexible fiberoptic bronchoscopy in lung isolation. It is also attributable to introducing newer, volatile anesthetics that cause less inhibition of HPV in a dose-dependent manner and less venous admixture during OLV.

Patients requiring OLV are at an increased risk of developing acute lung injury during the postoperative period. Anesthetic management, particularly mechanical ventilation, can influence the extent of perioperative acute lung injury. Specific lung-protective strategies are recommended to avoid lung damage.

In the past, anesthesiologists have tried to prevent hypoxia and ensure adequate gas exchange by using high tidal volumes (TV), zero positive end-expiratory pressure (PEEP), and high FiO<sub>2</sub>. Unluckily, these applications have been reported to contribute to barotrauma, volutrauma, atelectotrauma, and biotrauma. It has been found that independent risk factors such as high

peak and plateau airway pressure, high intraoperative TV, pneumonectomy, and excessive fluid infusion also lead to acute lung injury. Besides, oxidative stress and ischemia-reperfusion injury can be seen after OLV.

We can summarize the ventilation approaches recommended today to prevent both hypoxemia and lung damage as follows:

FiO<sub>2</sub> should be kept below 1.0 and as low as possible. It is recommended to adjust the FiO<sub>2</sub>, which ensures that the SpO<sub>2</sub> is  $\geq$  92-94 %.

In lung-protective ventilation for OLV, the TV should be calculated according to the ideal body weight. In studies where the TV was applied to 4-6 ml/kg, it was shown that PaO<sub>2</sub> decreased (in 3 trials, 60 minutes after the start of OLV), airway pressures decreased, and PaCO<sub>2</sub> increased (in 5 trials, 15 minutes after the start of OLV) as common results compared with high TV. The postoperative mild ARDS rate decreased (in 5 trials). However, there was no difference in postoperative complications and length of hospital stay.

PEEP is one of the essential parameters of lung-protective ventilation during OLV. However, its optimal level has not been determined yet. When 10 cm H<sub>2</sub>O of PEEP is applied with low TV, it has been shown that shunt fraction and driving pressure decreased, and PaO<sub>2</sub> / FIO<sub>2</sub> ratio increased. Recruitment Maneuvers (RMs) have been shown to increase oxygenation and compliance and to reduce dead space. It is recommended to use low TV, RMs, and PEEP together at the open lung approach during OLV.

Other components of the protective OLV are increasing the inspiratory/expiration rate, applying permissive hypercapnia, and keeping the driving pressure low.

It has been demonstrated that individualized PEEP providing minimum driving pressure reduces the number of patients developing pneumonia, complications, and ARDS frequency in the postoperative period. Moreover, it was found that individualized PEEP decreases PEEP and plateau pressure.

It has been shown that the application of CPAP or apneic oxygenation to the operated lung increases oxygenation and decreases inflammation.

It has not been clearly revealed which ventilation mode we should prefer during OLV. Pressure-controlled ventilation has been shown to be beneficial in some situations. If end-tidal CO<sub>2</sub> does not reach the target level or hypoxemia does not improve or airway pressures increase despite the increase in TV, it is recommended to switch from volume-controlled mode to pressure-controlled mode.

Approaches other than ventilation that directly affect the success of OLV are anesthetics, fluid therapy, and glycocalyx. Inhalation agents are preferred because of their effects that reduce inflammation and glycocalyx damage. Liberal fluid therapy should be avoided in thoracic anesthesia. Restrictive fluid therapy is recommended for moderate-risk patients. In high-risk

patients (ASA 3 - 4), goal-directed fluid therapy should be applied using dynamic monitoring facilities (pulse pressure variation/stroke volume variation). Balanced crystalloids are recommended to be administered at a rate of 3 ml/kg/h or less.

As a result, ensuring oxygenation and protecting the lungs should be our primary goal during OLV.

**References:**

1. El Tahan MR, et al. Impact of low tidal volumes during one-lung ventilation. A meta-analysis of randomized controlled trials. *Journal of Cardiothoracic and Vascular Anesthesia* 31.5 (2017): 1767-1773
2. Jankovic RJ, et al. Intraoperative hypoxemia during one-lung ventilation: Is it still an anesthesiologists' nightmare? (hypoxemia during one-lung ventilation) *Serbian Journal of Anesthesia and Intensive Therapy* 41.1-2 (2019): 37-43.
3. Meleiro H, et al. New evidence in one-lung ventilation. *Revista Espanola de Anestesiologia y Reanimacion (English Edition)* 65.3 (2018): 149-153.
4. Park MH, et al. Driving pressure during thoracic surgery: a randomized clinical trial. *Anesthesiology* 130.3 (2019): 385-393.
5. Şentürk M, et al. Intraoperative mechanical ventilation strategies for one-lung ventilation. *Best practice & research Clinical Anaesthesiology* 29.3 (2015): 357-369.
6. Şentürk Mert, et al. Fluid management in thoracic anesthesia. *Minerva Anestesiologica* 83.6 (2017): 652-659.



---

## 02 May 2021-Sunday

---

10:45-12:15 | Panel 12: ANESTHESIA VII

Chairs: Slavenka Straus, Ayşegül Özgök

Anesthesia Management for Ventricular Assist Device Implementation; Hija Yazıcıoğlu

Intraaortic Balloon Pump Counter Pulsation; Ervin Bejko

Single Lung Ventilation; Mehtap Tunç

Vasoplegia in Cardiac Surgery: How We Can Prevent It in Postoperative Period?; Slavenka Straus

Medical Education During Covid-19: Our Experience; Fatos Sada

---

### VASOPLEGIA IN CARDIAC SURGERY: HOW WE CAN PREVENT IT IN POSTOPERATIVE PERIOD?

**Prof. Slavenka Straus, MD, PhD**

*Clinical Center University of Sarajevo*

*Clinic for Cardiovascular Surgery*

*Bosnia and Herzegovina*

#### INTRODUCTION

Vasoplegia is an abnormally low systemic vascular resistance (SVR) that is manifest as profound hypotension or the requirement for therapies to avoid this, in the presence of a normal or increased cardiac output. Clinically, vasoplegia is often recognised in the absence of such comprehensive haemodynamic data. The causes of vasoplegia are diverse, and several definitions have been described for specific causes; similarly, related terminologies are variably used. The absence of consensus clinically based definitions of vasoplegia impede progress in understanding the pathophysiology of vasoplegia. Vasoplegia can occur in cardiac surgery with cardio-pulmonary bypass (CPB) (the second commonest cause), but we can see it also in sepsis (the first commonest cause), non – cardiac major surgery, burns, trauma and patients with pancreatitis.

In the cardiac surgery, vasoplegic syndrome, a form of vasodilatory shock following CPB, accounts for less than 5% of all circulatory shock. Despite this, between 5 and 50% of patients undergoing cardiac surgery may experience vasoplegic syndrome with high morbidity and mortality rates in those patients. Incidence is higher in patients with preoperative risk factors including preoperative use of antihypertensive medications (preoperative use of beta-blockers, ACE inhibitors), higher Euroscore, a large number of comorbidities (such as Diabetes mellitus, Myocardial dysfunction, Heart transplant etc.), warmer core temperatures while on CPB, and a longer duration on CPB bypass or patients with ventricle assist device insertion.

A large number of patients require vasopressors post-operatively to maintain adequate tissue perfusion. The need for escalating vasopressors is associated with a higher incidence of morbidity and mortality.

In pathogenesis of vasoplegic syndrome, in cardiac surgery, with CPB, main role in occurrence have cytokine and inflammatory mediators, endothelial injury, nitric oxide (NO) - mediated smooth muscle relaxation, catecholamine receptor down regulation and cell hyperpolarisation.

There are two types of vasoplegic syndrome – catecholamine sensitive and catecholamine resistant one.

### **MANAGEMENT OF VASOPLEGIA IN CARDIAC SURGERY**

About what from the beginning of planning the treatment of vasoplegia/vasoplegic syndrome we should think?

From the early onset of treatment we need to think about vasoplegic syndrome although at first we may not have a complete picture of the onset. In these circumstances early suspicion is „time is a life“.

We need to apply early intervention, diagnostic procedures as well as adequate therapy.

Management of vasoplegic syndrome should be aggressive, as this condition can lead to a high mortality rate and morbidities. Think of perfusion direct therapy - pharmacological therapy.

During the treatment of vasoplegic syndrome we need to have meticulous monitoring – hemodynamic profile, pulmonary function, renal function, neuropsychiatric status, hematological status, possible co-infection or septic condition.

And of course, above all, we need to be aware of possible additional complications that may occur within the onset and development of vasoplegic syndrome (usually MOF management). Make timely diagnostics and conduct adequate therapy.

We have to apply fluid resuscitation for optimising filling pressure.

After volume resuscitation, the use of catecholamines is considered to be the cornerstone for hemodynamic treatment - Epinephrine, Norepinephrine, and Phenylephrine.

Vasopressin is as effective as norepinephrine in increasing mean arterial pressure and, when used in combination with norepinephrine, low vasopressin doses have a norepinephrine-sparing effect.

Moderators of NO and/or inflammation are included in therapy of vasoplegic syndrome: methylene blue, hydroxocobalamin, vitamin C, thiamine and corticosteroids.

Methylene blue (MB) has several actions that may counteract the effect of increased NOS stimulation which take a part in vasoplegia. First, it may antagonize endothelial NOS activity. Furthermore, it may scavenge NO directly and inhibit guanylate cyclase activity in the treatment of refractory vasoplegia in cardiac surgery with CPB. The usual dose is 1.5 to 2.5 mg/kg intravenously with or without an infusion at 0.25 to 0.5 mg/kg/h for 4 to 6 hours.

Corticosteroids significantly reduce the inflammatory response associated with CPB. We should consider administration of glucocorticoids as they can restore vascular responsiveness to vasopressors, inhibit the synthesis of iNOS and COX2, and finally, low doses of glucocorticoids appear to restore vascular responsiveness to norepinephrine. Low IV doses of hydrocortisone (200mg per day) can be administered if fluids and catecholamines alone are not able to restore stability. Prophylaxis may be most useful in patients with risk factors for cardiac vasoplegia.

Intravenous high-dose hydroxocobalamin can be used as a part of therapy for vasoplegia as it can raise blood pressure. The reason for hypertension is probably via an inhibitory effect on nitric oxide synthase. The usual dose for vasoplegia is 5 or 10 g IV over 15 minutes.

Vitamin C, given IV, recently has gained attention for the treatment of vasoplegia. Vitamin C is important in catecholamine synthesis, and this may explain the impressive reduction in vasopressor requirements seen in a case series of cardiac surgical patients receiving a dose of 1.5 g every 6 hours for 96 hours.

Angiotensin II is an endogenous peptide produced by the liver as angiotensinogen, and subsequently changed by renin in the kidney to angiotensin I and by lung endothelial-bound ACE to angiotensin II. The numerous effects of angiotensin II include direct arterial vasoconstriction by engagement of the AT-1 receptor on vascular smooth muscle, stimulation of aldosterone release, increased ADH secretion, and increase in sympathetic activity.

Angiotensin II in the setting of post-CPB vasoplegia is particularly attractive, as extra-corporeal circulation would be expected to bypass pulmonary circulation and thereby limit exposure of angiotensin I to ACE.

Mechanical procedures can be used as well, such as blood purification – CytoSorb as a part of CPB circuit.

## **CONCLUSION**

Vasoplegia presents a serious and life-threatening entity that continues to challenge anesthesiologist – intensivists. Cardiac vasoplegia can occur after any type of cardiac surgery, predominantly when CPB is used. Knowing pathophysiology and risk factors for vasoplegia, we can identify patients at risk to develop vasoplegic syndrome after cardiac surgery. We have to treat it as soon as possible with aggressive treatment, as the condition is with high incidence of morbidity and mortality. Use the catecholamines as the first line treatment, early use of a vasopressor can give a benefit, reserve mephylen blue for rescue treatment, corticosteroids as adjuvant therapy which improve response to catecholamines, think about administration of other alternative therapy such as vitamin C, tiramine and hydroxocobalamin.

## **References:**

1. Lambden S., Creagh-Brown BC., Hunt J., Summers C., et al. Definitions and pathophysiology of vasoplegic shock. *Critical Care* 2018;22:174.

2. Busse LW., ,Barker N., Petersen C., Vasoplegic syndrome following cardiothoracic surgery — review of pathophysiology and update of treatment options. *Critical Care* 2020;24:36
3. Barnes TJ., Hockstein MA., Jabaley CS. Vasoplegia after cardiopulmonary bypass: A narrative review of pathophysiology and emerging targeted therapies. *SAGE Open Medicine* 2020, Volume 8: 1– 8.
4. Shah R., Wenger RK., Patel PA., Oscar D., et al. Severe Vasoplegic Shock During Coronary Artery Bypass Surgery: Therapeutic challenges and Dilemmas in Hemodynamic Rescue. *J Cardiothorac Vasc Anesth* 2020;34(5):1341-1347.
5. Orozco Vinasco DM., Schoonewolff CAT., Orozco Vinasco AC. Vasoplegic syndrome in cardiac surgery: Definitions, pathophysiology, diagnostic approach and management. *Rev Esp Anesthesiol Reanim* 2019 May;66(5):277-287.
6. Habib AM., Elsherbeny AG., Almhizia RA. Methylene Blue for Vasoplegic Syndrome Postcardiac Surgery. *Indian Journal of Critical Care Medicine* 2018;22(3):44-49.
7. Heim C., Ctellanos I., Rosch R., Wayland M., et al. Catecholamine – refractory vasoplegia after cardiac surgery: The safe use of methylene blue to reduce morbidity and mortality. *Thorac cardiovasc Surg* 2013;61 – OP97.
8. Editorial. A Systematic Approach to the Treatment of Vasoplegia. Based on Recent Advances in Pharmacotherapy. *J Cardiothorac Vasc Anesth* 2019;33:1310-1314.

## 02 May 2021-Sunday

10:45-12:15 | Panel 12: ANESTHESIA VII

Chairs: Slavenka Straus, Ayşegül Özgök

**Anesthesia Management for Ventricular Assist Device Implementation;** Hija Yazıcıoğlu

**Intraaortic Balloon Pump Counter Pulsation;** Ervin Bejko

**Single Lung Ventilation;** Mehtap Tunç

**Vasoplegia in Cardiac Surgery: How We Can Prevent It in Postoperative Period?;** Slavenka Straus

**Medical Education During Covid-19: Our Experience;** Fatos Sada

### MEDICAL EDUCATION DURING COVID-19: OUR EXPERIENCE

**F. Sada, A.Hasani, R. Nallbani, N. Baftiu**

*Faculty of Medicine\*, "University of Pristina", Pristina, Kosovo*

#### Summary

Abstract: COVID-19 pandemic resulted as emergence in health care systems around the world. As such was also a challenging issue organizing study's in superior-academic level in every faculty, but especially in Medical Faculty in Pristina, Kosovo. In this paper we present the challenges that Faculty of Medicine of "University of Pristina" (FM-UP), had in organizing studies during the COVID-19 pandemics. "Task force" was created inside the FM-UP, to propose solutions for obstacles, challenges that occurred during the academic year of studies.

#### Methodology

Collecting the data from every class 1 - 6 from studies in FM-UP, for the academic years 2019/20 and 2020/21. Collected data are gathered independently for lectures and practical training organized by the faculty staff. Also final exams in various classes were studied in the way they were held.

#### Results

All of the lectures studies since COVID-19 pandemic started were organized online, for every class 1 – 5. Practical training was kept combined for classes 3-6, online and physically inside the University Clinical Center, as pandemic waves came and left, while classes' 1-2 majority of practical training was kept online. Inside the same class, they were groups that had to undergo 2 week lockdown, because one of the students became COVID-19 positive. Final exams were held in form of testing, overcoming the practical exam and one to one; professor student exam interaction.

#### Discussion

As for medical staff that had to battle the COVID-19 pandemic, treating patients and organizing Hospitals to offer medical care for surge of COVID-19 patients, same thing applied for Medical Faculties to organize and keep studies in the level that will be acceptable for patients, student and faculty staff. For majority of obstacles, were find temporary solutions.

But the “cost” for medical students of these kind of studies, will be displayed in years to come as those student will become medical doctors and start practicing medicine for treating various patients.

---

**02 May 2021-Sunday**

---

**13:35-14:50 | Panel 13: ICU IV**

Chairs: Mehmet Uyar, Sumru Şekerçi

**New Challenges-Old Problems in The Treatment of Infections in Intensive Care Units;** Jasmina Smajić**The Prevention of Organ Dysfunction in Sepsis;** İsmail Cinel**Vasopressin in Sepsis;** Andrijan Kartalov**Multiple Organ Dysfunction Syndrome in Patients with COVID-19 Disease;** Meldijana Omerbegovic

## **MULTIPLE ORGAN DYSFUNCTION SYNDROME IN PATIENTS WITH COVID-19 DISEASE**

**Meldijana Omerbegović, MD, PhD, Assist Prof***University Clinical Centre Sarajevo**Clinic of Anesthesia and Resuscitation**Bolnička 25**Sarajevo, Bosnia and Herzegovina*

### **Abstract**

Since its emergence, it has been obvious that the disease COVID-19 caused by SARS-CoV-2 virus might have a spectrum of different clinical presentations what has been confirmed later during 2020 and 2021, with special burden of the possibilities of numerous virus mutations which have led to even more complicated process of diagnosing and treating of this severe condition. It is postulated that inhaled virus SARS-CoV-2 might bind to epithelial cells in the nasal cavity through human angiotensin-converting enzyme-2 (ACE2) which is the main receptor for both SARS-CoV2 and SARS-CoV viruses(1).The spectrum of the clinical pictures of the disease comprises different forms from mild and moderate to severe illness. Host receptors are found mostly in the human respiratory tract epithelium (2). Although COVID-19 is characterized by mainly affecting respiratory system in some patients with severe forms of COVID 19 the developed multi-organ dysfunction may include acute respiratory failure, acute liver failure, acute kidney injury, cardiovascular dysfunction along with numerous haematological alterations and neurological disorders (3). There are hypotheses that mechanisms associated with the direct and indirect pathogenic features of SARS-CoV-2 virus are involved. Postulated indirect mechanisms are related to dysregulated inflammatory response characterized by cytokine release syndrome with elevated inflammatory mediators, dysfunction of endothelium, alterations of coagulation pathways and accumulation of inflammatory and immune cells into the tissues and organs with consecutive injuries. Further research on the pathogenesis and mechanisms of preventing and treating of multiple organ dysfunction in patients with COVID-19 disease are required.

**Key words:** COVID-19 disease, multiple organ dysfunction, SARS-CoV-2 virus, angiotensin-converting enzyme-2 receptor, immune dysregulation

## References :

1. Li W , Moore MJ , Vasilieva N , et al. Angiotensin-converting enzyme 2 is a functional receptor for the SARS coronavirus. *Nature* 2003;426:450–4
2. Mason RJ. Pathogenesis of COVID-19 from a cell biology perspective. *Eur Respir J* 2020;55:2000607.
3. Diao B, Feng Z, Wang C et al. Human kidney is a target for novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Preprint from MedRxiv. doi: 10.1101/2020.03.04.20031120 (2020).

## Introduction

The novel severe acute respiratory syndrome (SARS) coronavirus-2 that belongs to family Coronaviridae has been responsible for the outbreak of pandemic that has spread to the whole world while the disease termed coronavirus disease 19 or COVID-19, has been in focus of different scientific circles, health care professional communities as well as all other scientific and professional circles and the whole public communities all over the world for the last sixteen months.

COVID-19 has been spreading at alarming pace all over the globe, as no other disease in the history of mankind, with increasing morbidity and high rate of mortality among all populations.

The spectrum of the clinical pictures of the disease comprises different forms from mild and moderate to severe illness. The most of the patients have been asymptomatic or with signs of a mild infective illness with affection of the upper respiratory tract. Patients who develop moderate and severe conditions require intensive monitoring and intensive therapy with different supportive medications and different levels of respiratory support. Patients with most severe conditions require immunomodulatory drugs and other supportive measures.

Despite all accumulated knowledge of this novel and severe disease the immunization process against the SARS-CoV-2 which has been started in many countries may give hope and relief in terms of slowing down the pace of pandemic and limiting the number of patients with critical conditions.

## Pathophysiology and clinical course

In the absence of the knowledge of the cellular responses to the SARS-CoV-2 virus, a plausible course of events might be postulated based on the previous studies with SARS-CoV. In most papers on pathophysiology of COVID-19 three stages of the disease are described such as: 1) asymptomatic phase, 2) invasion and infection of the upper respiratory tract and 3) involvement of the lower respiratory tract with progression to acute respiratory distress syndrome .

After transmission of the virus via airborne respiratory droplets and aerosols from person to person, once bound to the host receptors on the cells of mucous membranes of upper respiratory tract, the viruses enter the host cells through endocytosis or membrane fusion.



It is postulated that inhaled virus SARS-CoV-2 might bind to epithelial cells in the nasal cavity through angiotensin-converting enzyme-2 (ACE2) which is the main receptor for both SARS-CoV2 and SARS-CoV viruses (1). The characteristics of this stage are local propagation of the virus and quite limited innate immune response.

In the next stage the disease is clinically manifested after the propagation of the virus down the respiratory tract and the more intense innate immune response might be initiated.

Clinical signs during involvement of the upper airways include fever, malaise and dry cough. The immune response is more intense involving the release of C-X-C chemokine ligand 10 (CXCL-10) and interferons (IFN- $\beta$  and IFN- $\lambda$ ) from the cells that have been infected with the virus. The disease is limited to this stage in the majority of the patients so they develop a mild clinical picture with possibility of administering symptomatic therapy and monitoring at home.

But the less number of patients might have progression of the disease to the third stage with characteristic pulmonary infiltrates, while the small number of patients might have a very severe condition with multiple organ dysfunction. In the stage of involvement of lower respiratory tract the viruses enter the type 2 alveolar epithelial cells at the host receptor angiotensin-converting enzyme-2 (ACE-2) with consequent replication and production of more viral particles. The pneumocytes invaded by the virus may release many different cytokines and pro-inflammatory substances like tumour necrosis factor- $\alpha$  (TNF- $\alpha$ ), interleukins (IL-1,IL-6,IL-8, IL-10 ,IL-12), interferons (IFN- $\lambda$  and IFN- $\beta$ ), macrophage inflammatory protein-1 $\alpha$  (MIP-1 $\alpha$ ) and monocyte chemoattractant protein-1 (MCP-1). This release of numerous cytokines produce accumulation of neutrophils, CD4 helper T cells and CD8 cytotoxic T cells and releasing of different enzymes and factors, with subsequent even severe inflammation and lung injury. The alveolar cells undergo apoptosis with releasing new viral particles and spreading of the process to adjacent cells and disappearance of pneumocytes of type 2 and 1, while the damages caused by accumulated inflammatory cells lead to widespread alterations of respiratory membrane resulting in acute respiratory distress syndrome and hypoxic respiratory failure. The characteristic of the ARDS is related to the obstructive thromboinflammatory syndrome in the microcirculation of the lungs. The formation of microthrombi within the pulmonary vasculature may lead to pulmonary hypertension, pulmonary haemorrhage, pulmonary infarction, and secondary ventricular failure. Mechanisms that lead to acute respiratory failure include direct infection of the lung tissues by virus, cytokine release syndrome, and formation of microthrombi in the pulmonary microcirculation (2,3).

Clinical picture of those patients may vary from the acute respiratory distress syndrome to severe cardiocirculatory insufficiency and multiple organ dysfunction syndrome.

In other words COVID-19 limited to the conducting airways may produce mild clinical picture with possibility of treatment at home, while COVID-19 that has propagated to the level of

upper respiratory tract and the lower respiratory tract may have moderate and severe clinical picture which necessitates intensive monitoring and support in intensive care unit(4).

There are numerous significant knowledge gaps about the pathogenesis of COVID-19. The present postulations are made on basis of the assumptions that viral entry by SARS-CoV-2 could be the same as SARS-CoV. Along with accumulation of the knowledge on different clinical manifestations and clinical course of COVID-19 it has been obvious from the first cases of the disease that classification into different categories based on respiratory symptoms should be reconsidered and revised to incorporate the symptoms of involvement of many other organs.

#### **Effects of SARS-CoV-2 virus on different organs and tissues**

The wide distribution of the angiotensin-converting enzyme-2 receptors in the human organism contribute to extensive disease distribution in many organs besides lungs with consecutive alterations and dysfunctions.

These extrapulmonary manifestations include myocardial dysfunction, neurologic conditions, hepatic dysfunction, renal dysfunction and renal failure, gastrointestinal symptoms, endocrine dysfunction, endothelial dysfunction and coagulation alterations, along with dermatologic manifestations.

Patients with hypertension, diabetes and coronary artery disease may develop more severe clinical picture after infection with SARS-CoV-2 virus. Myocardial injury produced by direct and indirect effects of the infection with virus SARS-CoV-2 may include myocarditis, arrhythmias, systolic and diastolic abnormalities, myocardial ischemia and sudden cardiac death. Measuring of the biomarkers of myocardial injury and echocardiography besides electrocardiography and chest imaging may help in monitoring the cardiovascular condition of these patients(5).

The events of apoptosis or necrosis of cardiomyocytes may result from the infiltration of inflammatory cells and overproduction of inflammatory mediators what may lead to the myocardial infarction. Besides that viral infection may result in the swelling of myocardial fibers and accumulation of CD4+ T cells. There were also findings of alterations of endothelial cells in the microvasculature of the heart (6,7).

One of the major contributing factors for the mortality related to COVID-19 is acute kidney injury, what has been explained by findings that podocytes and proximal tubular epithelial cells have high expression of ACE 2 receptors, which are distinctive targets for SARS-CoV-2 virus(8). In some studies it was shown that the patients with functional deficits in innate and adaptive immunities had increased risk for chronic kidney disease during the SARS-CoV2 pandemic.

According to the findings of some authors attaching of SARS-CoV-2 virus to the renal tubules cells and internalizations of viruses lead to complement-mediated response and infiltration of

CD68+ macrophages to the interstitial tissue with subsequent damage and fibrosis. Along with other factors such as dehydration, nephrotoxic medications, hypoxia, rhabdomyolysis, hypotension and underlying diseases these changes may lead to acute kidney injury during hospitalization(9).

There are significant alterations of the haematopoietic system in the patients infected with SARS-CoV-2 virus. Lymphocytopenia and leukopenia may lead to susceptibility to bacterial infections. Thrombocytopenia may be strongly correlated with the severity of illness (10).

Invading the hematopoietic cells may lead to altered hematopoiesis secondary to immune system response. There is also assumption that alveolar damage induced by virus may affect the resident megakaryocytes in the lungs, while endothelial damage may lead to thrombus formation and thrombocytopenia (10,11).

Alterations of coagulation in the patients with severe COVID-19 have been described as thrombosis in different parts of circulatory beds, hyperfibrinolysis, thrombocytopenia, sepsis-induced coagulopathy, and elevated plasmin activity, while blood hypercoagulability, prolonged prothrombin time, and enhanced fibrin degradation products increase the risk of disseminated intravascular coagulation(12).

Risk of thrombosis in patients with severe COVID-19 has been increased due to prolonged inflammation, immobility, hypoxia and potential damage of endothelial cells with high expression of ACE 2 receptors, by virus(12),

Signs of involvement of the liver are recognized in all patients with COVID 19, but patients with severe forms have significant elevation of liver enzymes. Acute liver failure may result from the direct infections of hepatocytes by the virus. Many factors might be involved in liver injury such as severe hypoxia, altered perfusion, direct invasion of the virus and drugs that might interfere with hepatocyte metabolism. In the situation of concomitant kidney and liver injury in patients with severe COVID-19 there appears higher danger of decreased metabolism of medications and increased risk of the toxic effects of the drugs (13,14).

Some observational studies have shown that COVID-19 might be associated with an increased risk of dysregulation of glucose metabolism what has been explained in the light that the dysregulation of ACE 2 pathways may have impact on alterations in glucose metabolism. The expression of ACE 2 receptors in both endocrine and exocrine pancreatic cells is quite considerable and in patients with severe forms of the disease inflammation of pancreas may result in accumulation of immune system cells, particularly macrophages and neutrophils with subsequent cytokine production and deteriorating of lung injury leading to more severe forms of ARDS (15).

The most common gastrointestinal symptoms that accompany COVID-19 disease comprise diarrhea, abdominal pain and vomiting, while diarrhea might be one of the initial

presentations of the disease. Postulated mechanism of gastrointestinal involvement is described as direct viral invasion of the cells of gastrointestinal tract (15,16).

From the reports of different neurological manifestations the most common central nervous system symptoms were dizziness, headache, impaired consciousness, cerebrovascular disease, ataxia and epilepsy, while the affection of peripheral nervous system was presented by numerous and different symptoms. Great number of the patients with severe COVID 19 displayed neurologic symptoms like acute cerebrovascular diseases and encephalopathy (17).

Conjunctivitis related to SARS-CoV-2 via inoculation of droplets to the eyes, infection of lacrimal glands and migration of the virus from the nasolacrimal duct have been described.

Cutaneous manifestations in patients with COVID 19 include erythematous rash, widespread urticaria and skin rash (18).

### **Multiple organ dysfunction in patients with COVID-19 disease**

In the situation of adequate innate and adaptive immune response after infection with the SARS-CoV-2 patients develop relatively mild clinical picture with convalescence expected in different periods after the initial symptoms.

In the situation when immune response of innate and adaptive immunity to infections with SARS-CoV-2 are dysregulated then the clinical course lead to more severe clinical picture with further tissue damage and multiple organ dysfunction.

Elucidating the pathogenesis of multiple organ dysfunction in patients with severe forms of COVID-19 infection is a complex task as many questions regarding the pathophysiology of this disease have not been answered yet.

There is a hypothesis that a delayed release of interferons in the early stages of COVID-19 infection lead to generation of high levels of pro-inflammatory cytokines [interleukin (IL)-1 $\beta$ , IL-6, TNF-  $\alpha$ ) and chemokines related to the elevated number of neutrophils and monocytes in the patients lung and peripheral blood. Dysregulated immune responses may lead to immune damage to various tissues. In the situation of disabled immune system the macrophages and neutrophils accumulate in the injured tissues developing the cytokine storm when the healthy cells are being destroyed by excessive inflammatory response (19,20).

### **Conclusions**

Although COVID-19 is characterized by mainly affecting respiratory system in some patients with severe forms of COVID 19 the developed multi-organ dysfunction may include acute respiratory failure, acute liver failure, acute kidney injury, cardiovascular dysfunction along with numerous haematological alterations and neurological disorders. There are hypotheses that most important mechanisms are associated with the direct and indirect pathogenic features of SARS-CoV-2 virus. Postulated indirect mechanisms are related to dysregulated

increased and prolonged inflammatory response described as cytokine release syndrome characterized by elevated inflammatory mediators, dysfunction of endothelium, alterations of coagulation pathways and accumulation of inflammatory and immune cells into the tissues and organs.

Further research on the topic of pathogenesis, risk factors, clinical course, possible different therapeutic, modulatory and preventive measure in treating multiple organ dysfunction syndrome in COVID-19 disease are required. Hopefully, increasing the knowledge on the pathogenesis of dysregulated immune response in severe COVID-19 and its effects on multiple organs may improve clinical knowledge on this issue and enable preventive measures besides the therapeutic and supportive measures that are administered in everyday healthcare process for the patients with most severe COVID-19 disease forms, with final aim of reducing associated morbidity and increasing the chances for survival of these patients.

### References :

1. Li W , Moore MJ , Vasilieva N , et al. Angiotensin-converting enzyme 2 is a functional receptor for the SARS coronavirus. *Nature* 2003;426:450–4
2. Mason RJ. Pathogenesis of COVID-19 from a cell biology perspective. *Eur Respir J* 2020;55:2000607.
3. Ackermann M et al (2020) Pulmonary vascular endothelialitis, thrombosis, and angiogenesis in Covid-19. *N Engl J Med* 383:120–128. *gl J Med* 383:120–128.
4. Xu Z, Shi L, Wang Y, et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *Lancet Respir Med* 2020;8:420-2.
5. Oudit GY, Kassiri Z, Jiang C, Liu PP, Poutanen SM, Penninger JM, Butany J. SARS-coronavirus modulation of myocardial ACE2 expression and infammation in patients with SARS. *Eur J Clin Invest* 39:618–625
6. Xu H et al . Clinical characteristics and risk factors of cardiac involvement in COVID-19. *J Am Heart Assoc* 9:e016807
7. Bonow RO, et al. Association of coronavirus disease 2019 (COVID-19) with myocardial injury and mortality. *JAMA Cardiol.* 2020;5(7):751–753
8. Diao B, Feng Z, Wang C et al. Human kidney is a target for novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Preprint from MedRxiv 2020. doi: 10.1101/2020.03.04.20031120 .
9. Benedetti C, Waldman M, Zaza G, Riella LV, Cravedi P (2020) COVID-19 and the kidneys: an update. *Front Med.* <https://doi.org/10.3389/fmed.2020.00423>
10. Diao B, Wang C, Tan Y et al. Reduction and functional exhaustion of T cells in patients with coronavirus disease 2019 (COVID-19). *Front. Immunol.*2020; 11, 827 .
11. Tang N, Li D, Wang X, Sun Z. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. *J. Thromb. Haemost.* 2020;18(4), 844–847
12. Ranucci M, Ballotta A, Di Dedda U et al. The procoagulant pattern of patients with Covid-19 acute respiratory distress syndrome. *J. Thromb. Haemost.*2020; 18(7), 1747–1751
13. Li Y, Xiao SY . Hepatic involvement in COVID-19 patients: pathology, pathogenesis and clinical implications. *J Med Virol.*2020; <https://doi.org/10.1002/jmv.25973>
14. Youssef, M. et al. COVID-19 and liver dysfunction: a systematic review and meta-analysis of retrospective studies. *J. Med. Virol.* 2020; 92, 1825–1833
15. K.P. Patel, K.P.A. Patel, R.R. Vunnam, et al. Gastrointestinal, hepatobiliary, and pancreatic manifestations of COVID-19. *J Clin Virol*,2020; 128
16. Lin L ,Jiang X ,Zhang Z , et al. Gastrointestinal symptoms of 95 cases with SARS-CoV-2 infection. *Gut* 2020;[gutjnl-2020-321013](http://www.ncbi.nlm.nih.gov/pubmed/32241899). pmid:<http://www.ncbi.nlm.nih.gov/pubmed/32241899>

17. Zhang T, Rodricks MB, Hirsh E. COVID-19-associated acute disseminated encephalomyelitis: a case report. Preprint from MedRxiv 2020, doi:10.1101/2020.04.16.20068148 .
18. Marzano AV, Cassano N, Genovese G, Moltrasio C, Vena GA. Cutaneous manifestations in patients with COVID-19: a preliminary review of an emerging issue. *Br J Dermatol.* 2020 Sep;183(3):431–42.
19. Mangalmurti N, Hunter CA. Cytokine Storms: understanding COVID-19. *Immunity* 2020;53:19-25.
20. Blanco-Melo D, Nilsson-Payant BE, Liu W-C, et al. Imbalanced host response to SARS-CoV-2 drives development of covid-19. *Cell* 2020;181:1036-1045.e9

---

## 02 May 2021-Sunday

---

15:00-16:30 | Panel 14: ANESTHESIA VIII

Chairs: Zerrin Özköse Şatırlar, Murat Sayın

**Acute Abdominal Pain Related to Covid-19 in Kids; Nightmare for Surgeons and Pediatricians, Challenge for Anesthesiologists;** Marijana Karisik

**Perioperative Respiratory Complications in Children;** Berrin Işık

**Abdominal Migraine in Pediatric Patients;** Dusica Simic

**Effects of Anesthesia on The Brain in Children;** Nurten Bakan

**Post-Craniotomy Pain Management in Pediatric Patients;** Dilek Yörükoğlu

---

### **ACUTE ABDOMINAL PAIN RELATED TO COVID-19 IN KIDS; NIGHTMARE FOR SURGEONS AND PEDIATRICIANS, CHALLENGE FOR ANESTHESIOLOGISTS**

***Marijana Karišik, MD-PhD***

*Department of Anesthesia  
Institute for children diseases  
Clinical Center of Montenegro*

#### **Summary**

Multisystem inflammatory syndrome (MIS-C) is a new pediatric disease that can manifest in children and adolescents a few weeks after they have been infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Many of those children, infected with COVID-19, may not have had symptoms or presented with a mild, self-limiting upper respiratory illness. This could explain why children had positive antibodies to SARS-CoV-2, but negative RT-PCR at the time of MIS-C evaluation. In this potentially life-threatening inflammatory disorder, two symptoms most often seen are persisting fever and an upset stomach (pain, vomiting or diarrhoea), as well as rash, cardiac damage and shock with considerably abnormal levels of serum inflammatory, coagulative, and cardiac markers. MIS-C has the ability to mask the routine diagnosis, with rapid deterioration of patients making recognition, admission and early treatment in pediatric intensive care units essential. The appearance of antibodies to COVID-19 in patients with MIS-C shows us that this is an immune response, triggered by initial infection, not an active one.

**02 May 2021-Sunday****15:00-16:30 | Panel 14: ANESTHESIA VIII**

Chairs: Zerrin Özköse Şatırlar, Murat Sayın

**Acute Abdominal Pain Related to Covid-19 in Kids; Nightmare for Surgeons and Pediatritions, Challenge for Anesthesiologists;** Marijana Karisik**Perioperative Respiratory Complications in Children;** Berrin Işık**Abdominal Migraine in Pediatric Patients;** Dusica Simic**Effects of Anesthesia on The Brain in Children;** Nurten Bakan**Post-Craniotomy Pain Management in Pediatric Patients;** Dilek Yörükoğlu**PERIOPERATIVE RESPIRATORY COMPLICATIONS IN CHILDREN****Prof. Dr. Berrin Işık***Gazi University, School of Medicine,**Department of Anesthesiology and Reanmation, Ankara*

Children are at increased risk of perioperative respiratory and/or cardiovascular complications because of their unique respiratory and cardiovascular physiology compared to adults. Adverse pulmonary outcomes that follow surgery and anesthesia are often attributed to anesthesia care. Perioperative respiratory adverse events in children are one of the major causes of morbidity and mortality during pediatric anesthesia. "Perioperative Pulmonary Complications (PPCs)" are a significant concern for anesthesia caregivers because we use drugs and techniques that effect cardiac and pulmonary functions, temporarily decrease lung volume, impair airway reflexes, limit immune function, and depress secretion mobilization.

This brief article aims to present current literature review.

There aren't any consensus on PPCs terms. But researches accepts a lot of unwanted or side effects related respiratory and cardiovascular function deficiency as PPCs. Events accepted as "respiratory complications" in the studies are presented collectively in Table I.

**Table I:** Respiratory complication

- |                         |  |
|-------------------------|--|
| • Hypoventilation       | • Pneumonia                            |
| • Desaturation          | • Pulmonary edema                      |
| • Hypoxemia             | • Excess secretions                    |
| • Hypercapnia           | • Breath holding                       |
| • Airway obstruction    | • Irregular breathing                  |
| • Laryngospasm          | • Respiratory failure after extubation |
| • Stridor               | • Re-intubation                        |
| • Bronchospasm          | • Recurrent cough                      |
| • Difficult ventilation | • Hiccup                               |
| • Bronchial aspiration  | • Obstruction by tongue                |
| • Atelectasis           | • Postoperative oxygen requirement     |
| • Bronchitis            |  |



Differences are also seen in the definition of complications as a term. A few of the generally accepted definitions as PPCs are given below.

**Adverse respiratory events** were defined as any episode of perioperative airway obstruction, oxygen desaturation less than 90% (for  $\geq 10$  s), breath holding ( $\geq 15$  s), severe coughing, and any requirement for unanticipated endotracheal intubation.

**Laryngospasm:** Requirement of PPV  $> 20$ cm H<sub>2</sub>O or administration of succinylcholine, complete airway obstruction associated with muscle rigidity of abdominal wall or chest wall, unrelieved by maneuvers to relieve soft tissue obstruction.

**Airway obstruction:** Partial airway obstruction with snoring noise and respiratory efforts without deep desaturation; relieved easily by "Jaw Thrust", positive airway pressure and/or a guedel airway.

**Bronchospasm:** Increase in respiratory effort, especially expiration, associated with hypercapnia and oxygen desaturation, wheeze on auscultation, capnography changes in ventilated patients with increase in the slope of the plateau, and increase in airway peak pressure.

**Apnea/Hypopnea:** Need of bag mask ventilation

**Postoperative oxygen requirement:** Oxygen need 2h post-operative to keep saturation  $> 92\%$ .

PRCs are some of the most common critical events that can occur in pediatric surgical patients underwent anesthesia. It has been estimated that of all the perioperative damaging events, 297 damaging events per 10,000 anesthetics, over 75% involve the respiratory system, of which 36% are related to laryngospasm. In 2013, the Wake-Up Safe (WUS) initiative concurred: Respiratory etiology for "Serious Adverse Events" (SAE) represented 34% of the overall 1.4 per 1000 pediatric anesthetics.

In pediatric age group especially at newborn period anatomic and physiologic differences, surgical causes, syndromes, anomalies have need to special management in anesthesia practice. Moreover, pediatric anesthesia is inherently more difficult than adults. Anesthesia can exaggerate respiratory deterioration in young children because of their inability to control respiration and inherent susceptibility to rapid desaturation, airway obstruction, early respiratory fatigue and lung atelectasis. As majority cases of anesthesia related mortality in children occur because of inadvertent respiratory (airway-related) and circulatory events, knowledge of the main developmental changes of these two vital organ systems that occur over time since birth makes anesthesia safer for young children. Especially premature infants can be exposed to the danger of prolonged apnea and consequent worsening of respiratory function. The transitional phase of circulation is vulnerable to revert to persistent fetal circulation in neonates.

Neonates and infants, especially premature neonates, have immature respiratory control, inefficient inspiratory muscles, different airway and lung mechanics and higher basal metabolic requirement of oxygen. Undetected apnea or airway obstruction, respiratory fatigue or lung atelectasis under anesthesia may produce rapid respiratory deterioration in these children perioperatively. Hypoxia, hypercapnia, acidosis or electrolyte disturbances increase pulmonary vascular resistance and may cause transitional circulation to revert to persistent fetal circulation in newborns. Pediatric population and especially infants have less cardiac reserves and rate dependent cardiac output. They poorly tolerate depression of myocardial contractility and changes in systemic vascular resistance or circulatory volume during anesthesia. Predominant parasympathetic control of the heart frequently produces bradycardia and its deleterious effects in newborns and young infants in response to several noxious and autonomic stimuli. Newborns are tend to hypoxia because of higher HbF level in their blood, which causes less oxygen delivery at tissue level despite having a higher hemoglobin level.

Major characteristics of cardiovascular physiology in neonates and infants, and their anesthetic implications are presented in Table II.

<b>Physiologic characteristics</b>	<b>Anesthetic implications</b>
Persistent fetal circulation	Decreased peripheral tissue oxygen delivery. Prolonged inhalational induction/rapid iv induction with consequent cardio circulatory depression.
Vulnerable transitional circulation	Susceptible to revert to persistent fetal circulation, perioperatively.
Stiff myocardium/Less myocardial tension during contraction	Near static stroke volume/rate-dependent cardiac output
Less functional cardiac reserve	Cannot tolerate increased pre- or after load, myocardial depression, hypovolemia and arrhythmia.
Predominant parasympathetic control of heart	Prone to bradycardia in response to noxious and autonomic stimuli.
High basal endogenous catecholamine's	Exogenous catecholamines are less effective.
Higher Fetal Hemoglobin in newborn	Prone to perioperative hypoxia

There are some predicting factor related to respiratory events in young pediatric population. Children younger than 3 years and those with a medical history including prematurity, metabolic or genetic disorder, or neurological impairment, snoring, airway hypersensitivity, and a medical condition with fever or under medication are at increased risk of severe critical events and should be anaesthetised by an adequately experienced an anaesthesiologist with sufficient pediatric training and ongoing pediatric experience or, if possible, postponed.

Appreciation of these distinctive respiratory characteristics in young children is necessary to formulate suitable anesthetic plans for safe conduct of anesthesia as respiratory-related morbidity and mortality occurs even in healthy children.

## References

1. Egbuta C, Mason KP. Recognizing Risks and Optimizing Perioperative Care to Reduce Respiratory Complications in the Pediatric Patient. *J Clin Med*. 2020 22;9(6):1942. doi: 10.3390/jcm9061942. PMID: 32580323; PMCID: PMC7355459.
2. Habre W, Disma N, Virag K, Becke K, Hansen TG, Jöhr M, Leva B, Morton NS, Vermeulen PM, Zielinska M, Boda K, Veyckemans F; APRICOT Group of the European Society of Anaesthesiology Clinical Trial Network. Incidence of severe critical events in paediatric anaesthesia (APRICOT): a prospective multicentre observational study in 261 hospitals in Europe. *Lancet Respir Med*. 2017 May;5(5):412-425. doi: 10.1016/S2213-2600(17)30116-9. Epub 2017 Mar 28. Erratum in: *Lancet Respir Med*. 2017;5(5):e19. Erratum in: *Lancet Respir Med*. 2017 Jun;5(6):e22. PMID: 28363725.
3. Lei H, Chao L, Miao T, Shen Ling L, Yan Ying P, Xiao Han P, Yun Bo X. Serious airway-related adverse events with sevoflurane anesthesia via facemask for magnetic resonance imaging in 7129 pediatric patients: A retrospective study. *Paediatr Anaesth*. 2019;29(6):635-639. doi: 10.1111/pan.13601. Epub 2019 Jun 19. PMID: 30729614.
4. Odor PM, Bampoe S, Gilhooly D, Creagh-Brown B, Moonesinghe SR. Perioperative interventions for prevention of postoperative pulmonary complications: systematic review and meta-analysis. *BMJ*. 2020 Mar 11;368:m540. doi: 10.1136/bmj.m540. PMID: 32161042; PMCID: PMC7190038.
5. Saikia D, Mahanta B. Cardiovascular and respiratory physiology in children. *Indian J Anaesth*. 2019 Sep;63(9):690-697. doi: 10.4103/ija.IJA\_490\_19. PMID: 31571681; PMCID: PMC6761775.

## 02 May 2021-Sunday

---

15:00-16:30 | Panel 14: ANESTHESIA VIII

Chairs: Zerrin Özköse Şatırlar, Murat Sayın

**Acute Abdominal Pain Related to Covid-19 in Kids; Nightmare for Surgeons and Pediatritions, Challenge for Anesthesiologists;** Marijana Karisik

**Perioperative Respiratory Complications in Children;** Berrin Işık

**Abdominal Migraine in Pediatric Patients;** Dusica Simic

**Effects of Anesthesia on The Brain in Children;** Nurten Bakan

**Post-Craniotomy Pain Management in Pediatric Patients;** Dilek Yörükoğlu

---

### POST-CRANIOTOMY PAIN MANAGEMENT IN CHILDREN

***Dilek Yörükoğlu, MD***

*Ankara University, Ibni Sina Hospital*

Over the recent years studies have shown that adults who undergo major craniotomy, experience moderate to severe pain in the postoperative period. Due to limited data on epidemiology in the pediatric population, post-craniotomy pain in children have been underestimated and overlooked.

Now it is evident that post-craniotomy pain should be treated aggressively in the first 24 to 72 hours.

The assessment of pain in pediatric population presents a challenge as they are often unable to express or accurately describe their pain. Several pain scales are used to evaluate the intensity of postoperative pain in children. Numeric Rating Scale and Visual Analog Scale are used for children older than 7 years of age. Behavioral and observational scales (FLACC, EVENDOL, CHEOPS, WBFS) are used for younger children and infants.

Inadequate pain control in children may cause anxiety, hypertension, shivering, emesis which can lead to increase in intracranial pressure. Therefore pain treatment is very important during their stay in the hospital.

Local anesthetic infiltration of the incision site and scalp block just before surgery are preemptive methods. It has been shown that preemptive analgesia enables calm awakening and stable hemodynamics in the early postoperative period.

Systemic pharmacological treatment consists of opioids, NSAID drugs and paracetamol. Opioids are administered either by patient controlled (PCA) or nurse controlled (NCA) manner, according to the age of the patient. NSAID and paracetamol are useful adjuncts to pain therapy and should be on scheduled regimen. In some centers codein (oral, rectal or im) administration is a routine practice.

Clinical evidence uptill now shows that , multimodal approach is the safest and the most effective way to treat post-craniotomy pain.

Reviews of the literature show that further research is needed to be done in post-craniotomy pain in children .

**02 May 2021-Sunday****16:40-17:55 | Panel 15: ICU V****Chairs:** Aslı Dönmez, Nermin Göğüş**The History of Pandemics;** Sanem Çakar Turhan**New Concept of Sedation in The ICU With a Review in Covid-19 Patients;** Visnja Ivancan**ECMO Treatment in The Severe Pulmonary Infection with Covid-19;** Vedat Eljezi

---

## HISTORY OF PANDEMICS AND COVID-19

***K. Sanem Çakar Turhan***

*Ankara University, Ibni Sina Hospital*

Pandemic comes from the Ancient Greek word “Pandemos” (Pan=all and demos=people). Pandemic is general definition of an epidemic occurring worldwide and usually affecting a large number of people. According to the definition of WHO (World Health Organization), to define a disease as pandemic, a new disease that the population has never met before should appear, the infectious agent should spread and lead to a lethal disease and the causative agent should easily and continuously spread among the population (1). In addition to causing sudden, widespread morbidity and mortality, pandemics lead to social, political and economical deteriorations (2).

The most fatal pandemic throughout human history is Plague. The causative agent *Yersinia Pestis* is a gram-negative bacteria which is transmitted with the infected flea bite but it is also reported that it could be transmitted with body secretions or respiratory droplets similar to Covid-19. However while the contamination in plague is through the rodents carrying the infected flea, contamination in Covid-19 is by infected human beings. The incubation period is 1-7 days after emergence of flu-like disease (3).

Influenza virus is an enveloped RNA virus from Orthomyxo viridea family and it has 3 subtypes as A, B and C. The most common type causing flu in human beings is Influenza A and it causes moderate-severe infections in all age groups. Influenza B mostly affects children and causes mild epidemics. Influenza C is rarely seen in humans. While Influenza B and C virus infect only humans, Influenza A virus infects birds, swine and some mammals. Influenza virus has 2 important surface antigens; hemagglutinin and neuroaminidase. Genetic mutations develop frequently in influenza A virus and these mutations cause structural alterations in these antigens. While small and slowly developing alterations in hemagglutinin chain (antigenic drift) cause epidemics, sudden and great laterations in hemagglutinin (antigenic shift) cause pandemics (4).

The historical data related to influenza virus comes from Greek writings in 412 BC. It has been reported that an epidemic disease similar to influenza symptoms has been defined by Hipoccrat and Livy (5). However the first exactly documented Influenza pandemics has developed in Europe in 1580 and then it has spread to Asia and Africa (6). Since then a total

31 influenza pandemics has been reported. During 17th century localized epidemics have been observed and during 18th century, at least 3 pandemics have developed between 1729-1782. During 19th century 3 pandemics has been seen (1830-1831, 1833-1834 and 1889-1890). The most severe among them was the pandemics which is known as “The Russian Flu” which has started in Russia, rapidly spread to Europe, North America, Latin America and Asia. It has caused death of approximately 1 million people. During 20th century, several influenza pandemics have been observed. Among these, 1918 Spanish Flu, 1957 Asian Flu, 1968 Hong Kong Flu, 1976 Swine Flu and 1997 Bird Flu were the most important pandemics (7). Influenza virus was first isolated in laboratory in 1932 (8).

The most fatal pandemics in human history, 1918 Spanish Flu, has led to progressions in the field of public health, development of public health programmes and creation of international cooperation plans (6).

Coronavirus is an enveloped and single stranded RNA virus from Coronaviridae. Human coronavirus was first defined in 1960 (9).

The first Coronavirus epidemic was seen in 2002 in Guangdong in China and it has spread to 29 countries. The causative agent is SARS-CoV (Severe Acute Respiratory Syndrome Corona Virus) (12). Worldwide 8422 people was infected and 916 people died and the mortality rate was reported as 10% (10,11).

The other epidemic of Coronavirus is MERS-CoV (Middleeast respiratory syndrome-CoV) which developed in June 2012 in Saudi Arabia. The main intermediate host was reported as camels. It has spread to 26 countries including Europe, Asia and USA within 4 years after emergence of the disease. WHO reported 1791 confirmed MERS-CoV cases and 640 disease-related deaths and the mortality rate was reported as 36% (12).

The last pandemics of Covid-19 has started in March 2020 in Wuhan in China and has spread all over the world. According to WHO data, since April 2021 there is approximately 136 million diagnosis of Covid-19, 2.9 million deaths and a total of 733 million doses of vaccine administered.

Looking to the pandemic history, we see that pandemics recur and it is difficult to clear off completely. Considering the current globalization, it is unavoidable that worldwide pandemics will recur in the future. So it is important to develop strategies for overcoming pandemic with the least social and economical harms and to provide global applicability of these rules.

## REFERENCES

1. Khan U, Mehta R, Arif MA, Lakhani OJ. Pandemics of the past: A narrative review. J Pak Med Assoc 2020; 70(5) (suppl 3): S34-S37.
2. Madhav N, Oppenheim B, Gallivan M, Mulembakani P, Rubin E, Wolfe N. Chapter 17 Pandemics: Risks, impacts and mitigation. Jamison DT, Hellen G, Horton S, Jha p, Laxminarayan R, Mock CN, Nugent R (eds): In Disease Control Priorities: Improving Health and reducing poverty, 3rd edition, Volume 9, Washington, DC: World Bank 2018: 315-345.

3. Snowden FM. Chapter 3 Overview of three plague pandemics. Snowden FM (ed): In *Epidemics and Society: From the Black Death to the present*, New Haven: Yale University Press 2019: 28-39.
4. Daly P. Introduction to pandemic influenza. *BCMJ* 2007; 49 (5): 240-244.
5. Kuszewski K, Brydak L. The epidemiology and history of influenza. *Biomed and Pharmacother* 2000; 54: 188-95.
6. Saunders-Hastings PR, Krewski D. Reviewing the history of pandemic influenza: Understanding patterns of emergence and transmission. *Pathogens* 2016; 5 (66): 1-19.
7. Brasseur JW. Pandemic influenza: A brief history and primer. *JAAPA* 2007; 20(1): 24-28.
8. Potter CW. A history of influenza. *J of Appl Microbiol* 2001; 91: 572-579.
9. Özlü A, Öztaş D. Yeni Coronavirüs pandemisinde geçmişten ders çıkartmak. *Ankara Med J* 2020; (2): 468-481.
10. Cherry JD, Krogstad P. SARS: The first pandemic of the 21st century. *Pediatr Res* 2004; 56 (1): 1-5.
11. LeDuc JW, Barry MA. SARS, the first pandemic of the 21st century. *Emerg Infect Dis* 2004; 10(11): e26
12. İnal S. Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) Enfeksiyonu: Ortadoğu Solunum Yetmezliği Sendromu-Koronavirüs Enfeksiyonu. *Okmeydanı Tıp Dergisi* 2016; 32(Ek sayısı): 37-45.



02 May 2021-Sunday

16:40-17:55 | Panel 15: ICU V

Chairs: Aslı Dönmez, Nermin Göğüş

The History of Pandemics; Sanem Çakar Turhan

New Concept of Sedation in The ICU With a Review in Covid-19 Patients; Visnja Ivancan

ECMO Treatment in The Severe Pulmonary Infection with Covid-19; Vedat Eljezi

ECMO TREATMENT IN THE SEVERE PULMONARY INFECTION WITH COVID-19

Vedat Eljezi, MD PhD

Resuscitation Anesthesia Department

CHU Gabriel Montpied, Cardiovascular surgery

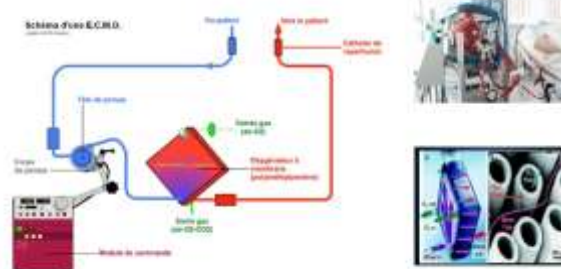
Clermont Ferrand, France



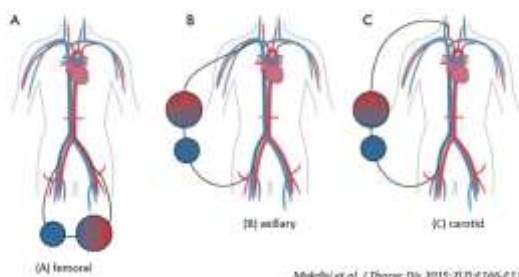
**ECMO treatment in COVID-19 pandemic**

Vedat ELJEZI MD PhD  
 Pôle Anesthésie Réanimation  
 CHU Gabriel Montpied, Chirurgie cardio-vasculaire  
 Clermont Ferrand  
 France  
 02 May 2021

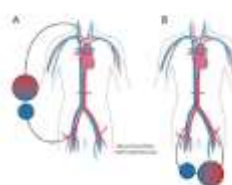
ECMO function



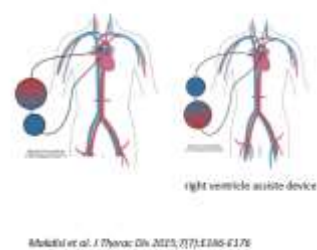
VA-ECMO peripheric cannulation

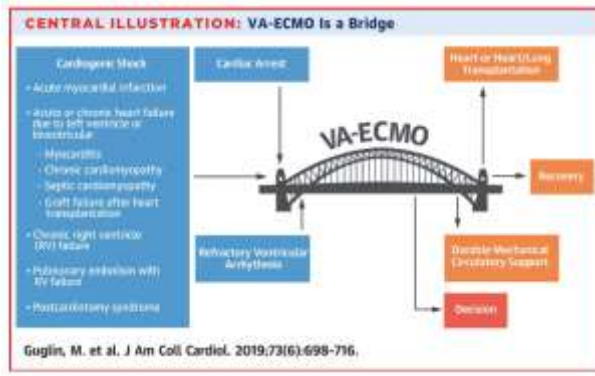


Veno-venous ECMO: two cannulation approach



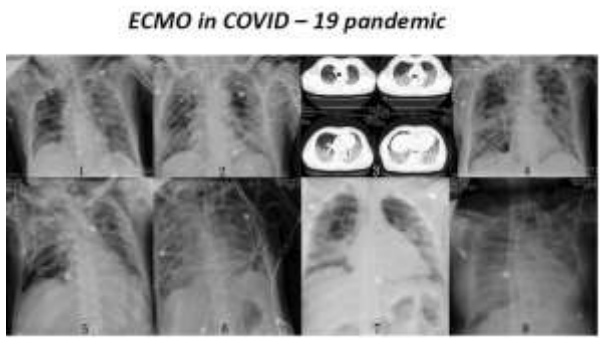
VA-ECMO central cannulation





### ECMO in COVID – 19 pandemic challenges

- The first studies from China reported high mortality rates in patients supported with ECMO
  - Many clinicians were concerned about using high-cost, resource-intensive therapies for a small, select proportion of critically ill patients if national healthcare systems were in danger of being overwhelmed
  - Dilemma if the high mortality rates related to the pathophysiology of the virus itself or the use of ECMO by overwhelmed clinicians in suboptimal circumstances
  - Initial withholding ECMO support in patients with COVID-19
- Wang D, Fan L, Peng C, et al. ECMO for COVID-19 pneumonia patients: a retrospective study. Crit Care. 2020;24:1-10.
- Chen H, Huang C, Guo C, et al. Clinical characteristics and outcomes of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

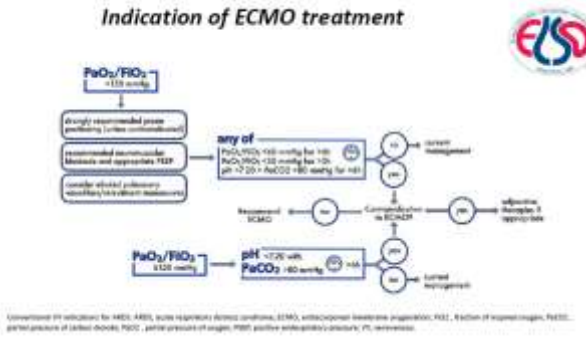
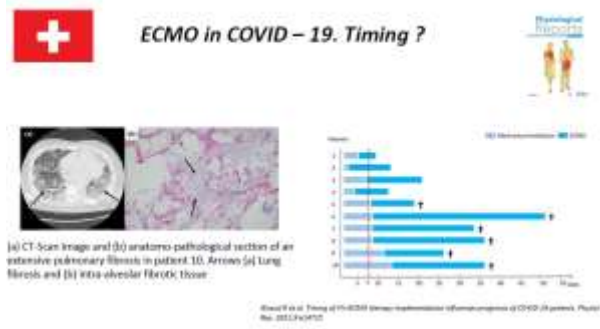


### ECMO during the COVID-19 pandemic: When is it justified?

Conditions for ECMO during COVID-19

1. Only use ECMO in critical care units
2. Use intelligent patient selection
3. Support of the solution: CONTRIBUTE TO RESEARCH
4. Be negative: starting cohort ECMO

- ECMO should only be considered when proven effective and relatively inexpensive measures such as prone, neuromuscular blockade and lung protective ventilation have been tried without success.
- Select the most deserving candidates
- Resource allocation is the paramount in critical care during pandemic conditions
- Well-conducted randomized controlled trials (RCTs) represent the best method of determining the efficacy of medical interventions



### Contraindications for ECMO

Absolute contraindications	Relative contraindications
<ul style="list-style-type: none"> <li>Uncontrolled arrhythmias</li> <li>Chronic Pulm. Block Category 2-3</li> <li>Mechanical ventilation &gt; 10 days</li> <li>High-grade aortic/aortic-bi-iliac stenosis</li> <li>COVID-19</li> <li>Coronary stenosis</li> <li>Diabetes</li> <li>Severe neurologic disease which would preclude cannulation patients</li> <li>Disseminated intravascular coagulation</li> <li>Wound-healing disorder</li> <li>Uncontrolled diabetes with chronic hypoglycemia fluctuations</li> <li>Severe osteoporosis</li> <li>Recent major malnutrition</li> <li>Severe peripheral vascular disease</li> <li>Other pre-existing life-threatening medical condition</li> <li>Non-ventilatory or unable to perform activities</li> <li>Recent (within 30 days) major surgery</li> <li>Recent major trauma (e.g. aortic aneurysm)</li> <li>Uncontrolled bleeding</li> <li>Contraindications to anticoagulation</li> <li>Inability to accept blood products</li> <li>Preexisting DVT</li> </ul>	<ul style="list-style-type: none"> <li>Age &gt; 80 years</li> <li>Severe renal failure</li> <li>Severe liver failure</li> <li>Severe thrombocytopenia</li> <li>High-grade aortic/aortic-bi-iliac stenosis</li> <li>High-grade peripheral vascular disease</li> <li>High-grade peripheral vascular disease</li> <li>High-grade peripheral vascular disease</li> <li>High-grade peripheral vascular disease</li> </ul> <p>These recommendations are based on data available from conventionally managed critically ill COVID-19 infected patients admitted to ICU and existing ECMO risk prediction models derived from non-COVID-19 patients</p>

- ### ECMO treatment initiation
- ECMO cannulation within a designated COVID-19 environment
  - Performed by trained cannulators
  - Maximum of 5 team members in the room/ backspace during cannulation
  - Aseptic cannulation is strongly discouraged
  - Centers should develop a checklist
  - COVID-19 spigot bag that contains all the material
  - We recommend the use of plain x-ray, vascular ultrasound and echocardiography (transthoracic OR transoesophageal) or fluoroscopy over a blind cannulation
  - Large multi-stage, drainage cannula be used (e.g. 23 Fr or greater)
  - Single stage, return cannula (19-23 Fr for adults)
  - Dual lumen cannulae should be avoided
  - Artero-arterial or Artero-internal jugular configuration be used







## Low Flow Anaesthesia and Its Benefits



Dr. Ali Fuat ERDEM  
Sakarya University, Faculty of Medicine  
Department of Anaesthesiology and Reanimation

### Low Flow Anaesthesia (LFA) and Its Benefits

- Definition and classification
- Some formulas
- Pool model for LFA
- Requirements for LFA
- Potential risks
- Benefits of LFA

### Low flow anaesthesia (LFA)

Low flow anaesthesia is defined to be an inhalation anaesthetic technique via a rebreathing system in which the rebreathing fraction at least amounts to 50% of the exhaled gas volume is led back to the patient after carbon dioxide absorption in the next inspiration.



### Classification of gas flow rates Baker and Simionescu (1984)

Classification	Fresh gas flow rates (L/min)
Metabolic flow	~ 0.25
Minimal flow	0.25-0.5
Low flow	0.5-1
Medium flow	1-2
High flow	2-4
Very high flow	>4

### Classification of gas flow rates Baker and Simionescu (1984)

Minimal flow	0.25-0.5 (L/min)
Low flow	0.5-1 (L/min)

### Low Flow Anaesthesia (1 L/dk)



1952

### Minimal Flow Anaesthesia (0,5 L/dk)



1974

- Oxygen consumption
- Anaesthesia gas uptake
- Nitrous oxide uptake
- Control via the MAC value
- Effects of reduced fresh gas flow
- Monitoring

should be know for low-flow and minimal-flow anaesthesia

Also, should be know for GENERAL ANAESTHESIA

### Oxygen consumption (VO<sub>2</sub>)

**(Brody formula) = 10 x KG [kg]<sup>3/4</sup> [mL/min]**

**3,5 x KG [kg] [mL/min]**

Patient's oxygen consumption during anaesthesia corresponds to their metabolic consumption and can be assumed to be roughly constant.

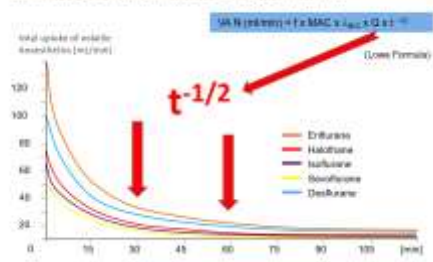
However, it is well known that oxygen consumption is overestimated by 50 to 20% in anaesthetized patients, particularly in those in the higher weight classes. Nevertheless, we can continue to refer to the Brody formula by including in our calculations a general overestimate of oxygen consumption as a safety margin.

### Anaesthesia gas uptake (Low formula)

$$V_{AN} = f \times MAC \times \lambda_{B/G} \times Q \times t^{-1/2} \text{ [mL/min]}$$

- $V_{AN}$  = uptake of inhalational anaesthetics in mL/min
- $f \times MAC$  = desired expiratory anaesthetic concentration as a function of the minimal alveolar concentration of the anaesthetic chosen (e.g., 0.8 x MAC)
- $\lambda_{B/G}$  = coefficient of blood-gas solubility
- $Q$  = cardiac output (dL/min)
- $t$  = time

### How much gas does the patient take up during anaesthesia?



### Nitrous oxide uptake (Severinghaus formula)

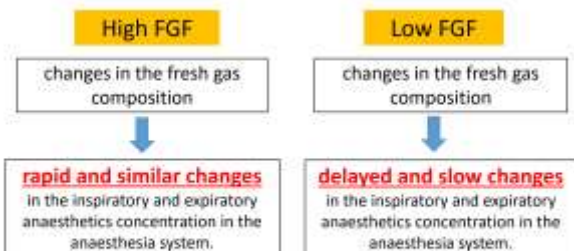
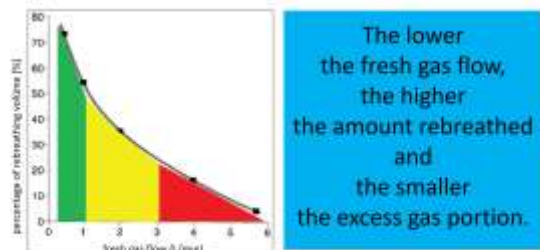
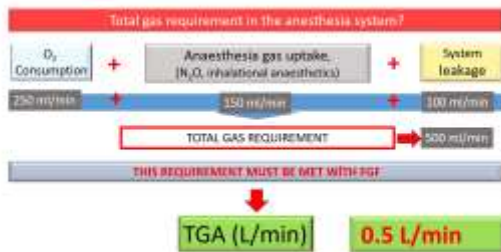
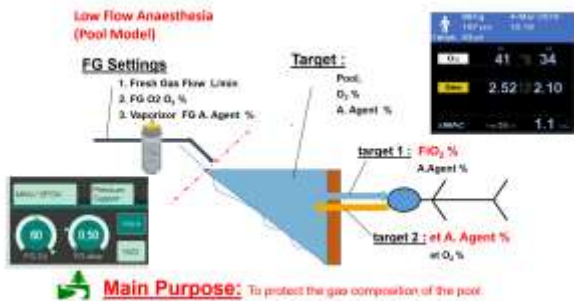
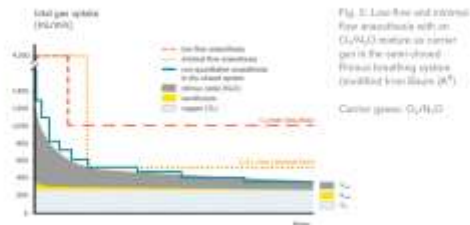
$$V_{N_2O} = 1000 \times t^{-1/2}$$

$$V_{N_2O} = \frac{1000}{\sqrt{t(dk)}}$$

nitrous oxide uptake for a standard weight adult patient,

Duration (min)	N <sub>2</sub> O uptake (ml/min)
1	1000
25	200
60	130
100	100
225	67

Its uptake is high at the beginning of anaesthesia but it becomes less in the course of time with the increased saturation of the tissue with gas.



### Monitoring

- Ins. O<sub>2</sub> / Exp. O<sub>2</sub>
- Ins. N<sub>2</sub>O / Exp. N<sub>2</sub>O
- Ins. / Exp. Anaes. Agent
- Ins. CO<sub>2</sub>, End-tidal CO<sub>2</sub>
- Ins. / Exp tidal volüm
- Minute Volume
- Airway pressures

should be monitored

**ALARMS should be set**



Requirements for LFA

- Circle rebreathing system with effective CO<sub>2</sub> absorber
- Accurate flow meters for adjustments of FGF below 1L/min
- Continuous gas monitoring (FiO<sub>2</sub>, EtCO<sub>2</sub>, FICO<sub>2</sub>, FIAA, ETAA, FIN<sub>2</sub>O, EtN<sub>2</sub>O/MAC value)
- Gas tight breathing system. Recommended test leakage should be below 150 mL/min at 30 cm H<sub>2</sub>O test pressure. Should be tested before anaesthesia induction.
- The breathing system should have minimal internal volume



Potential Risks ?

- ✓ Hypoxia
- ✓ Hypoventilation
- ✓ Increase of the expiratory carbon dioxide
- ✓ Insufficient depth of anaesthesia
- ✓ Accidentally applying an excessively volatile agent
- ✓ Toxic gas accumulation
- ✓ Bacterial contamination

- ✓ with equipment for monitoring inhaled and exhaled gas concentrations
- ✓ setting alarms
- ✓ absorbents containing neither potassium- nor sodium hydroxide



- Gases may accumulate during low flow anaesthesia**
- Poorly controlled diabetes (accumulation of acetone, ketoacidosis),
  - Severely malnourished patients
  - Drunken patients (ethanol),
  - Heavy smokers (carbon monoxide),
  - Septicemia

the fresh gas flow rate should not be lower than 1.0 L/min

**Brief review: Theory and practice of minimal fresh gas flow anaesthesia**  
 Melita Brannell, MD, PhD - Margareta Wario-Strömberg, PhD - Cla. J. Nauert, Co-Author (2021) 2019-2021  
 Fredrik Thorsell, MD, PhD - Jan Johansson, MD, PhD - DOI: 10.1007/978-93-325-4176-2

Contributions to low flow anaesthesia

There are no absolute contraindications to utilizing low flow anaesthesia during elective general anaesthesia. Keeping in mind the long term outcomes of minimal flow techniques, it may not be optimal to use minimal flow techniques in emergency cases or in medically complex patients where a rapid adjustment of the inhaled anaesthetic concentration may be required. The use of minimal flow is a more challenging technique during mask anaesthesia or whenever the airway is not sealed completely for other reasons.



Low flow anaesthetic techniques are not suitable



- Short term anaesthesia with a face mask
- Procedures with imperfectly gas-tight airways (i.e. bronchoscopies with a rigid bronchoscope)
- Use of technically unsatisfactory equipment with a high gas leakage
- **Inadequate monitoring**
- **No CO<sub>2</sub> absorber**

J. A. Baum, Low Flow Anaesthesia

The various options of low- and minimal-flow anaesthesia present sufficient clinical techniques for use with rebreathing systems. Only when low-flow anaesthesia is performed can the advantages of rebreathing systems be realised. Therefore, in everyday clinical practice where inhalational anaesthesia is performed using a rebreathing system, the fresh gas flow should always be as low as possible. This is the only way in which the emission of excess anaesthesia gases can be reduced to a minimum and the advantages of improved respiratory gas conditioning achieved.

Low-flow, minimal-flow and metabolic-flow anaesthesia  
Clinical techniques for use with rebreathing systems  
Christian Hornemann, Bert Mierke

Therefore, in everyday clinical practice where inhalational anaesthesia is performed using a rebreathing system, the fresh gas flow should always be as low as possible.

Benefits of low-flow anaesthesia

- Education
- Clinical benefits
- Ecological benefits
- Economic benefits

Clinical benefits

- Low- and minimal-flow techniques offer an effective yet easy way to humidify and warm respiratory gas
- Low-flow anaesthesia are less impairment of pulmonary function, better protection of the heat and humidity of the respiratory system
- Mucociliary clearance are better preserved with a LFA

Bigli M et al Eur J Anaesthesiol 2011;28:279-283  
Buttwell M et al Can J Anaesth/Can Anaesth (2012) 59:785-797

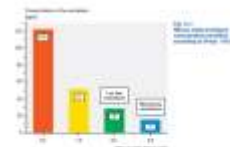
Education

- Theoretical knowledges are put into practice
- The pharmacokinetics of anesthetics are better learned
- Anesthesia machines are better learned
- Anesthesia depth is better titrated
- Patient follow-up becomes more enjoyable



Ecological benefits

- Reducing the fresh gas flow has a potential beneficial impact on workplace air quality.
- Lessening global pollution, greenhouse gases, and damage to the ozone layer



The water molecule is very stable and has a life expectancy of 150 years, and the increase in concentration in the atmosphere is 0.25% per year.

Langdon T, et al Br J Anaesth 2005; 95: 61-67  
Kliewer P, Wenzel H, Berg 2011; 122: 227-7  
Bauer M, et al Anaesth Analg 2010; 111: 83-8

Cost savings—economic benefits

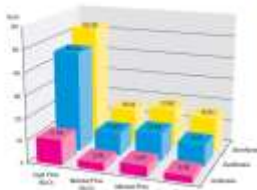


Fig. 25.7 Gas consumption and cost savings, calculated for 15-min duration anaesthesia. Outpatient, high flow at 5 L/min and Minimal Flow at 0.5 L/min with nitrous oxide versus Minimal Flow and Closed System Anaesthesia without nitrous oxide.

Parameter	Value
MAC	0.3
MACawake	1.0
Consumption	48 ml / 5 hr
Efficiency	84 %
Cost	8 EURO / 5 hr

**Brief review: Theory and practice of minimal fresh gas flow anaesthesia**  
Sato, Nakai, et al. PFD - Springer, Berlin-Heidelberg, 2014  
Frank, Ruedel, et al. PFD - Jay Lippincott, VA, 2014

**Low-Flow Anaesthesia**  
Does it have Potential Pharmacoeconomic Consequences?  
Hofler, Grottel, and Jochen, 2014

Benefits of third-generation inhaled anesthetics when used in minimal-flow anaesthesia

The low blood and tissue solubility of third-generation inhaled anesthetics in a dose of 1.0 MAC when using flow rates as low as 0.5 L/min with rebreathing systems. The low fresh gas flow rates, with low tissue solubility and low anesthetic potency, can be justified only if the efficiency of administration is optimized by using low-flow anaesthetic techniques.

Implementation: Desflurane and sevoflurane, as opposed to isoflurane or enflurane, have a low blood-gas solubility coefficient. Therefore, it is easier to use desflurane or sevoflurane with low fresh gas flows, while still maintaining tight control of anaesthesia, than with other agents. The low solubility of the new inhaled anaesthetics results in a low uptake of these substances and, therefore, it provides greater economy at lower uptake rates.

CONCLUSION

- FRESH GAS FLOW
- 0.5 L/min
- 0.5 - 1 L/min

**ORAL PRESENTATIONS**



**O001****ELECTROLITE CHANGES IN THE SERUM AFTER TUR (TRANSURETRAL) PROSTATE.**

Haxhire GANI<sup>1</sup>, Greta Gani<sup>1</sup>, Majlinda NACO<sup>1</sup>, Vjollca SHPATA<sup>1</sup>, Franceska BEQIRI<sup>1</sup>, VALBONA MUCA<sup>1</sup>  
UHC"Mother Teresa".Tirana,Albania.

**Purpose:** The purpose of this study is to evaluate the electrolyte changes in the serum after TUR (Transuretral) Prostate as well as what causes them.

**Materials and Methods:** The study analyzes 120 patients aged 50-80 years old which have undergone TUR Prostate. K, Na levels have been measured pre and post-surgery. Furthermore, the weight of the prostate, duration of the intervention, how much sol. Is being used (Sol. Glucose 5%) have been evaluated. Patients have been categorized in three groups according to the duration of the intervention: G1 < G2 < G3. p value

**Results:** From a total of 120 patients, 10 belonged to G<sup>1</sup>, 90 to G<sup>2</sup> and 20 to G<sup>3</sup>. We noticed that all patients from G<sup>2</sup> and G<sup>3</sup> had a decrease in post-surgery Na levels compared to the pre-surgery levels, especially in G<sup>3</sup> with p value 0.5, thus not statistically significant. The duration of the intervention was dependent also on the prostate weight, the heavier the prostate, the longer the intervention took. However, this was not always the case, as different surgeons working on prostates of the same weight had different durations, which can be explained by the fact that some surgeons are more experienced. Consume of sol. Glucose 5% was also dependent on the duration of the intervention. In G<sup>1</sup>. 6±2 Liters .Na. 135±5, (p > 0.5) K. 4.4±0.6, (p > 0.5) G<sup>2</sup>. 10±5 liters, Na 132±5, (p > 0.5) K. 5.1±0.7 (p > 0.5), while in G<sup>3</sup>. 40±15 liters, Na 125±10. (p < 0.01) K. 5.2±1 (p > 0.5). Worth mentioning is that the level of experience of the surgeon was of essential importance for this study, given that for the same size and volume of prostates, different surgeons had to use different amounts of sol. Glucose 5%, hence different hyponatremia values.

**Discussion:** After TUR Prostate hyponatremia and hyperkalemia occur, which are more excessive the longer the intervention lasts, the bigger the prostate is, and the more Sol. Glucose 5% is used. An interesting finding of the study was that besides the size of the prostate, the level of experience of the surgeon had a vital impact on the duration of the intervention.

**O002****THE ROLE OF AGE IN THE INCIDENCE OF HEMODYNAMIC CHANGES, HYPOTENSION AND BRADYCARDIA, FOR THE SAME LEVEL OF THE SPINAL BLOCK, IN PATIENTS THAT HAVE UNDERGONE SURGERY IN UROLOGY**

Haxhire GANI<sup>1</sup>,Greta Gani<sup>1</sup>,Majlinda NACO<sup>1</sup>,Vjollca SHPATA<sup>1</sup>,Franceska BEQIRI<sup>1</sup>,Hektor SULA<sup>1</sup>  
UHC"Mother Teresa".Tirana,Albania.

**Background and Goal of Study / Background:** This study aims to highlight the role that age has on the incidence hemodynamic changes post spinal anaesthesia, in patients who have undergone surgery in urology, for the same level of spinal block.

**Materials and Methods / Case report:** This study includes 200 patients(100 patients aged > 65, 100 between the ages of 18-40). Patients >65 and between the ages of 18-40 were further separated into two groups: GH(high group) received spinal block at the L2-L3 level and GL(low group) received spinal block at the L3-L4 level, each with 50 members. Blood pressure was monitored every 2 minutes for the first 10 minutes, then every 5 minutes for 20 minutes, then every 10 minutes for the rest of the procedure. Data was analyzed using Student's T-test and Fisher's exact test to detect significant differences among the groups. p value< 0.05 was deemed to be statistically significant.

**Results and Discussion / Discussion:** With regard(age >65) to GH,out of 50 patients, hypotension occurred in 15 (30%) and bradycardia in 12 (24%).In the(age>65)GL group, hypotension happened in 9 patients (18%) and bradycardia in 8 (16%).In patients above the age of 65, the difference between GH and GL values does statistical significance (p<0.05). Within group below 40, the GH group saw bradycardia in 25 patients (50%) and hypotension in 22(44%) and the GL group had bradycardia occurred in 24 patients (48%) and hypotension in 21(42%).In regards to the group below 40, the difference in hypotension and bradycardia values between the GL and GH groups did not reach statistical significance (p>0.05).It was noted that bradycardia and hypotension were more pronounced for the same level of spinal anesthesia for patients below 40 years old than when compared to patients above 65 years old (p<0.01).

**Conclusion(s):** It was observed that the incidence of hemodynamic changes, hypotension and bradycardia, in the elderly patients, was higher in the higher block (P<0.05). On the other hand,the incidence of hemodynamic changes, hypotension and bradycardia,in the younger patients was not dependent on the block (P>0.05), However, an interesting finding was that for the same level of block, the incidence was higher in younger patients compared to the elderly (P<0.01).

**O003****POSTOPERATIVE CARE IN ELDERLY PATIENTS WITH UROLOGICAL SURGICAL INTERVENTION.**

Xhesika MUÇA, Greta GANI, Françeska BEQIRI, Haxhire GANI,  
UHC "Mother Teresa". Tirana, Albania.

**Background and Goal of Study / Background:** Surgical intervention in elderly people lead to higher risk of complications asking for specific care. The issue for which this study is raised is to evaluate the efficacy and safety of surgical interventions in elderly patients, determination of factors affecting postoperative performance. Assessment of risk for postoperative complications in elderly patients in order to improve nursing practices.

**Materials and Methods / Case report:** : A descriptive transversal study (over a period of time in a selected population sample) was performed, evaluating early postoperative outcomes and complications in patients aged 65 or older. The patient group included 118 patients who underwent a surgical procedure at Clinic of urology, between January 2019 and May 2019 (random sampling). The average age of the patients was 74 years.

**Results and Discussion / Discussion:** The study duration was 5 months. All malignant tumor interventions were performed successfully and with total resection. In total 36 (31%) complications were recorded. The most serious were: one (0.8%) patient died after transfer to intensive care unit. Two (1.2%) patients had recurrence of the problem. The most common complications include mild respiratory insufficiency, delirium, urosepsis, etc.

**Conclusion(s):** The majority of patients were HBP cases (32%), urinary bladder tumors, and renal calculus. Comprising only 5% of patients with postoperative complications. Complications were also assessed depending on the mode of presentation, in patients presenting with urgency accounted for 56% of the number of complications. It was found that there is a professional medical nursing team working with profound knowledge and communication ability to be respected. Surgical interventions in elderly patients were effective and safe. The cornerstone of care is the careful preparation and handling of obstacles, adequate treatment by medical staff of any complication and patient condition. Men perform several times more surgical interventions than women. Complications were mainly encountered in people over 70 years of age as a result of urgent procedures and in major interventions such as nephrectomy. We understand the importance of nursing staff and the importance of focusing on more detailed care in patients aged > 70 as they are associated with higher risk for complications. We acquire the ability to properly explain each procedure and treatment steps the patient is heading.

**O004****THE CHALLENGES IN TREATMENT OF AUTOTRANSPLANTED PATIENT IN CARDIAC INTENSIVE CARE UNIT****CASE REPORT**

Edin KABIL, Ermina MUJIČIĆ, Slavenka ŠTRAUS, Nermir GRANOV, Sanja GRANOV-GRABOVICA  
Clinic for cardiovascular surgery, University Clinical Center Sarajevo, Bosnia and Herzegovina

**Background and Goal of Study / Background:** Comprehensive Cardiac Intensive Care Unit (ICU) provides ultimate care for a highly complex and divertive patient population. The main challenge in medical treatment of this population is mainly driven by delayed medical care provided, and a list of assigned comorbidities in time. Cardiac autotransplantation is a feasible technique for complex mitral valve surgery or cases of cardiac malignancy, and role of an anesthesiologist is crucial. An important role in the management of patients predicted for autotransplantation is correct strategy developed for ICU treatment after surgery. Effective implementation of clear strategy, considering whole aspects of acquired comorbidities, can simplify treatment and give the best results in the end.

**Materials and Methods / Case report:** In our first state case of autotransplantation we have admitted 55 years old patient after previous history of valvular disease for 37 years, and history of cerebral stroke 10 years earlier, based on absolute arrhythmia. Patient has been avoiding surgical treatment for prolonged period of time and has been presented on admittance with severe mitral valve insufficiency, large atrial enlargement, multivessel coronary disease, pulmonary hypertension, chronic obstructive pulmonary disease, carotid artery occlusion and stenosis, and mechanically induced disarthria. Preoperative CT scan has shown megaatrium measuring 193 mm in the largest diameter. Patient has been prepared for a previous six months, and three days after final admittance operation has been performed with mitral valve replacement, tricuspidal valve repair and two coronary bypass grafts performed. Patient has been in the ICU for another 20 days and on 35th day was released for a further physiatrist treatment.

**Results and Discussion / Discussion:** We herein report the challenges in the ICU for the management of this condition and benefits of multidisciplinary approach.

**Conclusion(s):** With the correct ICU strategy particularly developed for the improved and shorten recovery time, we have ability to cope with numerous challenges here described, shorten ICU and hospital time and perform a complete restitution in quality of life.

**O005**

**ERECTOR SPINAE PLANE BLOCK FOR COMPUTED TOMOGRAPHIC SCAN GUIDANCE  
PERCUTANEOUS RADIOFREQUENCY ABLATION OF PULMONARY METASTASIS:  
THREE CASES**

Derya ÖZKAN<sup>1</sup>, Emine ARIK<sup>1</sup>, Azad HEKİMOĞLU<sup>1</sup>, Özge YAMANKILIÇ MUMCU<sup>1</sup>, Onur ERGUN<sup>1</sup>  
Dışkapı Yıldırım Beyazıt Eğitim ve Araştırma Hastanesi<sup>1</sup>

**Background and Goal of Study / Background:** Radiofrequency ablation(RFA)is a minimal invasive approach for treating solid tumors.A CT-guided electrode is inserted percutaneously into the tumor.The electromagnetic current causes coagulation and necrosis in the tumor.In this procedure, the local temperature rises above 90°C, especially in large and close to the chest wall, serious pain occurs.Although RFA procedures can be performed with local anesthesia-sedation or general anesthesia,LA can lead to less postoperative complications and has the advantage of short hospital stay.ESP is a recently described technique that provides analgesia in abdominal,breast and thoracic surgerie.The LA administered during ESP block spreads in the paravertebralspace, leading the effective analgesia for somatic and visceral pain.

**Materials and Methods /** In this report,we presented ESP block in three cases for periprocedure analgesia in CT guided-RFA due to lung metastasis.The first patient, 51 years old male with colorectal cancer. He had a 17x15mm metastasis in the left lung.The second patient,45 years old female with breast cancer.She had a 4x4mm metastasis in the right lung.The third patient, 60 years old female with endometrium cancer. She had a 7x7mm metastasis in the right lung.Ablation was performed at 90°C for 1<sup>2</sup>, 15 and 10 min, respectively.Patients were monitorized with electrocardiography,mean arterial pressure(MAP),pulsioximeter(SpO2) and noninvasive endtidal carbondioxide(ETCO2).Nasal canulla of the ETCO2 monitor and oxygen(2L/min) were placed to the patients in prone position.Patients were sedated with dexmedetomidine(1mcg/kg) in 10min intravenously.An ultrasound-guided ESP block was performed unilaterally in the sitting position before the procedure.The linear ultrasound transducer was placed in a sagittal plane 2-3 cm lateral to the T5 spinous process. A hyperechoic shadow of the transverse process and erector spinae was defined.An in-plane approach was used with atraumatic needle.When the appropriate needle tip location was confirmed,17ml of 0.5% bupivacaine and 3ml saline injected.Sonographic confirmation of the LA spread was observed as an anechoic shadow in the ESP from T5-T9.Propofol(0.5-1 mg/kg/h) was infused to achieve a Ramsay sedation score of 2–3.

**Results and Discussion / Discussion:** RSS(2), MAP(65-70mmHg), HR(70-75beat/min), SpO2(100), ETCO2(32-35mmHg), Integrated Pulmonary Index(IPI)(9-10)of the patients were in normal range during the procedure.No additional local anesthetic infiltration or opioids were required.

**Conclusion(s):** We consider that ESP block with sedation is a suitable option for anesthesia and analgesia in percutaneous RFA of pulmonary metastasis.

**O006****THE USE OF ULTRASONOGRAPHY IN THE DIAGNOSIS OF COMPARTMENT SYNDROME AFTER TOTAL KNEE ARTHROPLASTY**Ilkay Baran AKKUS<sup>1</sup>, Alp ALPTEKIN<sup>1</sup>, Gokcen KULTUROGLU<sup>2</sup>

1-SBU Diskapi Yildirim Beyazit Training and Research Hospital, Ankara, Turkey

2-Bunyan Public Hospital, Kayseri, Turkey

**Background and Goal of Study / Background:** The ultrasound-guided IPACK block (Interspace between the Popliteal Artery and the Capsule of the posterior Knee) and the periarticular injection are used effectively to prevent postoperative pain without motor block after total knee arthroplasty (TKA). The use of the ultrasonography (USG) has reduced the complication rates as it provides simultaneous imaging in the regional anesthesia and also enables the detection of the possible some complications at the bedside.

**Materials and Methods /** A sixty-five-year-old female patient underwent TKA surgery with spinal anesthesia. After completion of surgery, periarticular injection (20 ml 0,25% bupivacaine) and the ultrasound-guided IPACK block (20 ml 0,25% bupivacaine) were performed. At postoperative first day the patient was consulted because she had pain that did not respond to analgesic drugs. On examination there was pain in the ipsilateral knee and anterior part of upper leg (VAS 7) and increased with knee flexion (VAS 9). Pain or swelling was not observed at the back of the knee, where the IPACK block was applied. The sensation, motor and pulse examination of the lower limb were normal. No reason was found to explain the severe pain, so USG imaging was performed. The hematoma was not seen and flow was sufficient in popliteal artery and vein in the doppler imaging. USG scan was performed from the femoral artery in the inguinal region and showed impaired echogenicity and dense hypoechoic areas in the 1/3 proximal part of the femur. Femoral artery could not be shown in this area. In the light of these findings, compartment syndrome (CS) was considered and the patient was operated urgently.

**Results and Discussion / Discussion:** Compartment syndrome in the thigh region after TKA is extremely rare. Possible cause may be pneumatic tourniquet or surgical bleeding. In the early period, it may progress with disproportionate pain without paresthesia and loss of pulse. Edema can be confused with operation-related tissue edema. In this case, USG can give an idea for differential diagnosis.

**Conclusion(s):** Disproportionate pain is a serious symptom for CS and possible complications should be reviewed before focusing on pain treatment. USG provides early recognition of surgical or regional anesthesia complications.

**O007****COMPARISON OF THE ERECTOR SPINA PLANE BLOCK, OBLIQUE SUBCOSTAL TRANSVERSUS ABDOMINIS PLANE BLOCK AND LOCAL ANESTHESIC INFILTRATION METHODS IN LAPAROSCOPIC CHOLECISTECTOMY**

Burak NALBANT<sup>1</sup>, Asli DONMEZ<sup>1</sup>, Savas ALTINSOY<sup>1</sup>  
Diskapi Education and Research Hospital, Ankara, TURKEY

**Background and Goal of Study / Background:** This study aimed to compare ultrasonographic guided erector spina plan (ESP) block, oblique subcostal transversus abdominis plan (OSTAP) block and trocar site local anesthetic infiltration in terms of postoperative pain scores and opioid analgesic consumption in laparoscopic cholecystectomy (LC) operations.

**Materials and Methods:** The study was designed as double-blind randomized controlled trial. 100 patients were divided into four groups as Group E, Group T, Group L and Group K by computer assisted randomization method. ESP and OSTAP block were performed unilaterally. Standard multimodal analgesia was applied to Group K as a control group. Postoperative pain scores, tramadol consumption, additional analgesic requirement, nausea and vomiting scores and complications were recorded. Data were analyzed with the SPSS 17.0 statistical program.

**Results and Discussion / Discussion:** Postoperative pain scores were lower in Group E and L than Group K. Although there were lower postoperative pain scores in Group T compared to Group K, the Bonferroni correction showed no significant statistical difference. Tramadol consumption was significantly lower in Group E and T compared to Groups K and L. In Group T, E and L, additional analgesic requirement was significantly lower than Group K. No local anesthetic toxicity, vascular injection and allergic reaction developed in any patient. No statistically significant difference was found between the groups in terms of nausea-vomiting scores and incidence of shoulder pain.

**Conclusion(s):** As a result of this study, we found that both ESP and OSTAP blocks in LK provided less postoperative analgesic and tramadol consumption, and especially ESP block was more effective in terms of VAS scores. We believe that unilateral OSTAP and ESP blocks may be preferred for postoperative analgesia in order to provide effective analgesia and require less analgesic use.

**O008****ROLE OF ANTERIOR NECK SOFT TISSUE QUANTIFICATIONS BY ULTRASOUND IN PREDICTING DIFFICULT LARYNGOSCOPY AND INTUBATION IN OBESE PATIENTS**Basak GULEL<sup>1</sup>, Emine ARIK<sup>1</sup>, Azad HEKIMOGLU<sup>1</sup>, Derya OZKAN<sup>1</sup>University of Health Sciences Diskapi Yildirim Beyazit Education and Research Hospital<sup>1</sup>

**Background and Goal of Study / Background:** Endotracheal intubation is the most important administration for airway safety. Currently, the rate of difficult intubation is 1.5-13%. These rates reduce the reliability of routine screening tests. Obesity is known to increase the difficulty of intubation. The best way to predict difficult laryngoscopy and difficult intubation in these patients is still controversial. Nowadays, ultrasonography is used frequently in anesthesia practise. In this study, we aimed to demonstrate that measurements of neck soft tissue thickness by USG in obese patients in preoperative period will be effective in predicting difficult laryngoscopy and difficult intubation.

**Materials and Methods:** In this prospective study, routine screening tests were used in airway examination in sixty obese patients. In addition, the USG (SonoSite M-Turbo) liner probe was used to measure neck soft tissue thickness at 4 different levels (hyoid bone-skin, epiglott-skin, thyroid istmus-skin, anterior commissure-skin distance). Difficult laryngoscopy was evaluated with Cormack-Lehane score, and difficult intubation was evaluated with Intubation Difficult Scale score. The role of ultrasonographic measurements in predicting difficult laryngoscopy and difficult intubation, and the relationship between routine screening tests and ultrasonographic measurements were compared.

**Results and Discussion / Discussion:** Patients' ultrasonographic measurements of neck soft tissue thickness were statistically significant in predicting difficult intubation at anterior commissure and thyroid level. ( $p = 0.011$   $p = 0.017$ ) The distance between epiglottis and skin above  $22.16 \pm 3.13$  mm is cut off value for predicting difficult airway. There was a correlation between preepiglottic distance and neck circumference measurement which is one of the routine tests. When the measurements between hyoid bone-skin, epiglot-skin, anterior commissure-skin, thyroid isthmus-skin exceed 9.35, 18.7, 5.65, 6.55 mm respectively, the image of the larynx was impaired.

**Conclusion(s):** The distance between epiglottis and skin above  $22.16 \pm 3.13$  mm could be used for predicting difficult intubation in obese patients. According to these results, better outcomes can be obtained in difficult airway prediction by combining ultrasonographic measurements with neck circumference measurement.



0009

**COLOR DOPPLER IMAGING OF THE OPHTHALMIC ARTERY DURING HEART TRANSPLANTATION**Eda BALCI<sup>1</sup>, Aslı DEMİR<sup>1</sup>, Ayşegül ÖZGÖK<sup>1</sup>

1 Ankara City Hospital

**Background and Goal of Study / Background:** Heart failure(HF) is a serious condition caused by the heart not being able to pump blood in proportion to the metabolic requirements of the tissues. A complex neurohormonal system takes part in an attempt to compensate for heart failure, which aims to guarantee a proper perfusion of tissues. However, studies show that cerebral blood flow can be reduced in these patients. In addition to existing heart failure, many other factors can affect cerebral blood flow and perfusion during cardiac surgery, such as unrecognized carotid artery stenosis, cardiopulmonary bypass(CPB), non-pulsatile blood flow, circulatory arrest, hypothermia, or embolism. The Ophthalmic Color Doppler(OCD) imaging is a noninvasive, fast and easy access ultrasound technique, used in ophthalmology practice to measure the blood flow velocity of the orbital vessels. Estimation of cerebral perfusion from color Doppler imaging of the ophthalmic artery is a technique with great potential in this field. In this presentation, we would like to report a case in which we used OCD to evaluate cerebral perfusion during a cardiac transplantation surgery in a patient with heart failure.

**Materials and Methods:** A 54-year-old male patient with inotrope and ECMO-dependent heart failure underwent orthotopic heart transplantation. The ophthalmic artery blood flow velocity was measured and evaluated parameters as systolic velocity, diastolic velocity, mean velocity, pulsatility(PI) and resistance index(RI). First intraoperative ultrasonographic monitoring was started 15min after anesthesia induction. We performed the second measurement at the lowest temperature during CPB, and the third measurement when the sternum was closed after the patient's surgery was completed(Figure1-2-3). Besides OCD, bilateral NIRS and haemodynamic information were also recorded(Table1).

**Results and Discussion / Discussion:** In the present case, we monitored blood flow in the ophthalmic artery by ultrasonography during heart transplantation, and we obtained important information about the adequacy of the perfusion. Color Doppler imaging of the ophthalmic artery can be a useful method, which can be applied routinely for monitoring cerebral perfusion during heart transplantation and all cardiac operations, in order to detect impaired cerebral blood flow. NIRS is also a monitoring method that takes place in terms of evaluating cerebral perfusion.

**Conclusion(s):** Monitoring brain blood flow and perfusion in cardiac surgery with these two noninvasive methods can make important contributions.

Table 1: Intraoperative variables

	15 min after anesthesia induction	Lowest temperature of CPB (28 C)	At the end of the operation
OA systolic velocity	41	36	70
OA diastolic velocity	20	23	33
OA mean velocity	27 cm/sec	28 cm/sec	40 cm/sec
NIRS left / right	43/45	58/63	55/58
Bispectral index	30	50	35
Systolic Arterial pressure	83		135
Diastolic Arterial pressure	63		64
Mean Arterial pressure	69	66	87
HR	AF 110 min <sup>-1</sup>	-	Pace 100 min <sup>-1</sup>
PaO <sub>2</sub>	128	145	138
PaCO <sub>2</sub>	32	37	35
SaO <sub>2</sub>	99	99	99
Cardiac output	3.5	4.2(pump flow)	6.9
Sistemic vascular resistance	670	-	980
Stroke volume	40	-	68
Hb	8.5	7.6	8.2

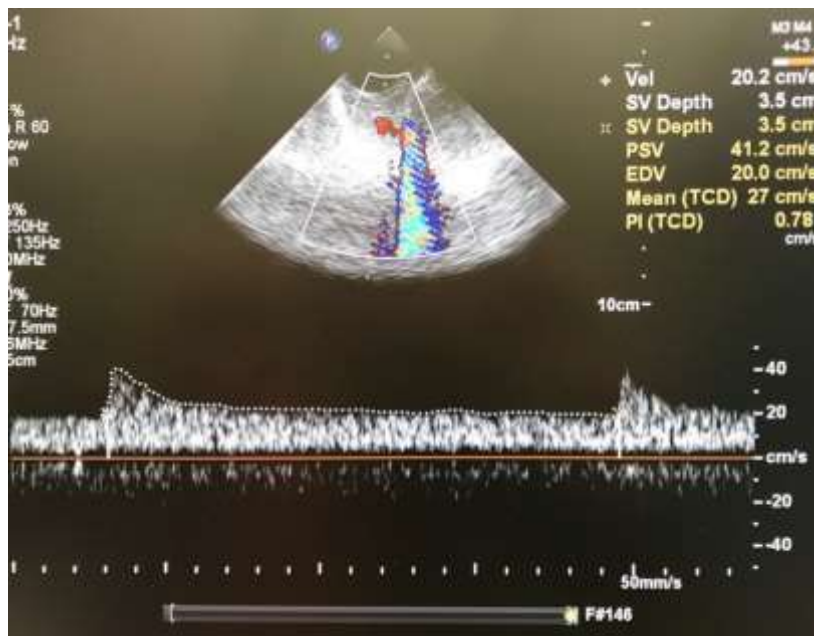


Figure 1: Ophthalmic artery color doppler imaging, 15 min after anesthesia induction

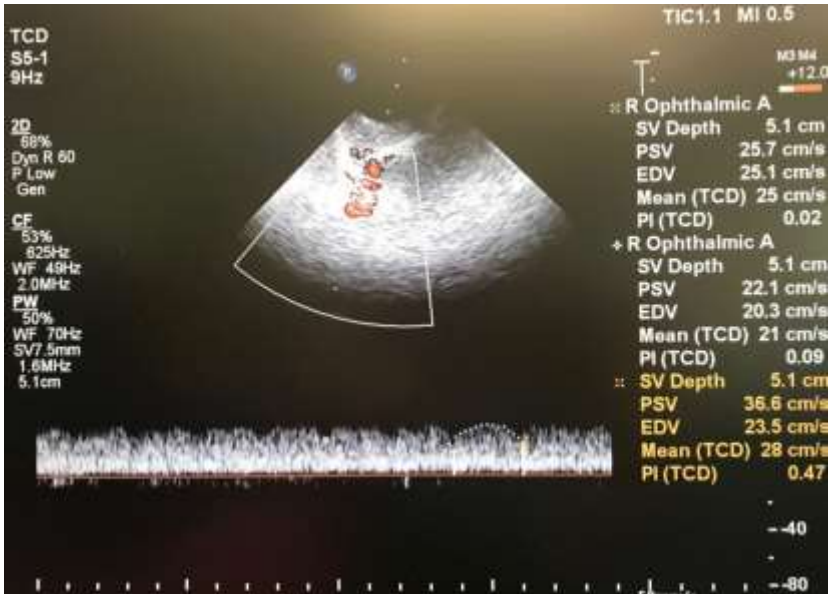


Figure 2 : Ophthalmic artery color doppler imaging at lowest temperature of CPB (28 C)

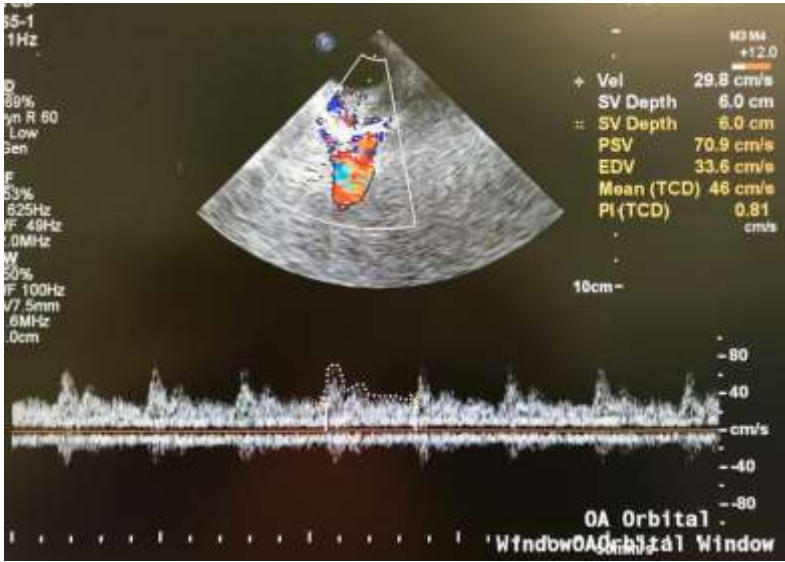


Figure 3: Ophthalmic artery color doppler imaging at the end of the operation

## O010

### UNDERSTANDING THE MEASURES OF NOSOCOMIAL INFECTION FREQUENCY WITH CALCULATION OF THE RATES

Monika BELBA<sup>1</sup>, Besnik FASKAJ<sup>1</sup>, Albana ALEKSI<sup>2</sup>, Ilir NEZHA<sup>2</sup>

<sup>1</sup>University of Medicine, Tirana, Albania, <sup>2</sup>University Hospital Center Tirana, Albania

**Background and Goal of Study / Background:** Many types of nosocomial infections can be present in the burned patient. The purpose of this study is to calculate the rates for nosocomial infections in the Intensive Care Unit of the Service of Burns and Plastic Surgery in University Hospital Center in Tirana, Albania.

**Materials and Methods:** The study is prospective, clinical and analytical. The study is continued / longitudinal because monitors all patients with severe burns during a specified time period (1 year). For data analysis was used SPSS 19.0

**Results and Discussion / Discussion:** The infection prevalence rate was 12 infected patients per 100 patients. The colonization prevalence rate was 43 colonized patients for 100 patients. The most frequent infection microorganisms were *Pseudomonas aeruginosa* and *Staphylococcus aureus* (67 % and 24%). Incidence of Bloodstream Infections (BSI) was 3 BSI for 1000 hospitalization days. The incidence of catheter-related bloodstream infection (CRBSI) was 1<sup>1</sup>, 7 BSI for 1000 catheter days. Colonization of the tip of the central catheter (CTC) was 15.6 for 1000 catheter days.

**Conclusion(s):** Burn wound infections in our ICU are presented with a not very high prevalence, 12 infected patients for 100 patients but on the other hand, the colonization prevalence is significant, 43 colonized patients for 100 patients, which should make us more attentive in treating these patients. The epidemiology of burn wound infections as well as the definitions have changed due to important changes in burn wound treatment but further studies should be done to document the factors that can reduce the burn wound infection rates.

**O011****COMPARISON OF TWO DIFFERENT TECHNIQUES IN ULTRASOUND GUIDED  
INFRACLAVICULAR BLOCK PROCEDURE: JEDI TECHNIQUE AND CLASSIC TECHNIQUE**

Süleyman CAMGÖZ<sup>1</sup>, Miyase Serap DİKER<sup>1</sup>, Betül GÜVEN AYTAÇ<sup>1</sup>, İsmail AYTAÇ<sup>1</sup>

<sup>1</sup>Ankara City Hospital Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Ultrasonography-guided nerve blocks requires an auxiliary person in the process for injecting local anesthetics. This causes unnecessary control injections, more local anesthetic usage and inability to perceive pressure of syringe. “Jedi grip” technique provides both ability of imaging and injecting alone for the practitioner. Thus, the practitioner holds the ultrasound probe with one hand and clamps the needle hub between the middle phalanx of the index and middle finger of the other hand, the syringe is held in the palm with the ring and the little finger, while aspiration or injection is performed with the thumb. In this study, we aimed to compare the block characteristics of the “jedi grip” with the classical technique that performed with an assistant.

**Materials and Methods:** After obtaining approval of the ethics committee and patient consent, 78 patients were included. They were randomly divided into two groups (Group I: Jedi grip and Group II: Classical technique). A total of 20 ml of LA was applied in both groups from 10 ml of 0.5% bupivacaine +10 ml of 2% prilocaine mixture. By a blind observer, the block characteristics were evaluated and recorded every 5 minutes for the first 30 minutes after each block. When the sensory block score was 7 and the total score was 14 or above, the block was considered successful and the patient was ready for surgery.

**Results and Discussion / Discussion:** The difference between the groups in terms of block characteristics such as block pain, number of attempts, arterial puncture, sensory and motor block start and end times, time to be ready for surgery, tourniquet pain, use of additional anesthesia method, use of postoperative analgesia were insignificant. The duration of block application was 158±47 sec in the Jedi group and 121±83 sec in the control group.

**Conclusion(s):** The Jedi technique is applicable with the same confidence compared to the classical method in terms of block success and complications. It also has the advantage of applying peripheral nerve block in the absence of experienced staff.

**References:**

1. Pappin D, Christie I. The Jedi Grip: a novel technique for administering local anaesthetic in ultrasound-guided regional anaesthesia. *Anaesthesia*. 2011 Sep;66(9):845. doi:10.1111/j.1365-2044.2011.06845.x.

**O014**

**THE EFFECTS OF DRIVING PRESSURE ON  
OXYGENATION DURING CORONARY BYPASS GRAFTING**

Fatih TOPTAN<sup>1</sup>, Havva KOÇAYIĞIT<sup>1</sup>, Ali Fuat ERDEM<sup>2</sup>, Halil İbrahim ERKENGEL<sup>3</sup>

1Sakarya University Training and Research Hospital, Department of Anesthesiology;

2Sakarya University School of Medicine Department of Anesthesiology,

3Sakarya University School of Medicine Department of Cardiovascular Surgery.

**Background and Goal of Study / Background:** In patients undergoing coronary artery bypass graft (CABG) surgery, atelectasis may occur during cardiopulmonary bypass (CPB). Therefore, hypoxia due to atelectasis is common after CABG surgeries. This study is aimed to examine the effect of recruitment maneuver (RM) on ventilation and oxygenation after CABG.

**Materials and Methods:** This study is a prospective randomized trial on 34 patients who underwent CABG surgery. Patients were divided into two groups; recruitment group (Group R, n=17) and control group (Group C, n=17). At the end of CPB the RM was performed to the patients in Group R using driving pressure, and then they were ventilated according to the results of RM. The patients in Group C were ventilated with 8 ml / kg TV and 5 cmH<sub>2</sub>O PEEP after CPB.

**Results and Discussion / Discussion:** There was no significant difference between the two groups in terms of demographic data, preoperative PaO<sub>2</sub>/FiO<sub>2</sub>, preoperative ejection fraction, bypass time, cross clamp time and extubation time. There was no difference between patients with normal compliance in terms of PaO<sub>2</sub>/FiO<sub>2</sub> values (p=0.958), but in patients with low compliance (< 50 mL/cmH<sub>2</sub>O), PaO<sub>2</sub>/FiO<sub>2</sub> values were better in Group R than Group C (p=0.016).

**Conclusion(s):** Recruitment maneuver using driving pressure does not affect oxygenation in patients with normal compliance but improves oxygenation of patients with low compliance.

**O016**

**COMPARISON OF RECOVERY AND SIDE EFFECTS AFTER OPTIMAL  
ISOFLURANE/SEVOFLURANE / DESFLURANE ANESTHESIA WITH BIS MONITORING OF  
PATIENTS UNDERGOING LAPAROSCOPIC ABDOMINAL SURGERY**

Nilgün ŞAHİN<sup>1</sup>, Sacide DEMİRALP<sup>2</sup>

1 Dr. Sami Ulus Kadınoğum, Çocuk sağlığı ve hastalıkları Eğitim ve Araştırma Hastanesi

2 Ankara Üniversitesi Tıp Fakültesi Anesteziyoloji ve Reanimasyon ABD

**Background and Goal of Study / Background:** Rapid recovery of the patient after the surgery is important for the patient to gain consciousness quickly and full wakefulness is important for both anesthesiologist and for the patient; spontaneous respiratory sufficiency, adequacy of protective airway reflexes minimizes respiratory sideeffects during recoveryperiod (1). In patients under generalanesthesia, EEG activity reverts from low-voltage fast waveform to high-voltage slow waveform. BIS anesthesia, as an EEG variant, is a simple, easy-to-use monitor that measures the depth of anesthesia. With this monitor, it is easier to measure the depth of anesthesia and evaluate the recovery. In our study, we aimed to evaluate the difference between recovery time and side effect rates after isoflurane(GroupI) / sevoflurane(GroupII) / desflurane(GroupIII) anesthesia monitored with BIS.

**Materials and Methods:** 50patients in ASAII risk group between 18-60 years of age whose elective laparoscopiccholecystectomy was planned in hospital were included in our research. Patients were induced fentanyl;2 µg/kg, propofol; 2.5 mg/kg, rocuronium; 0.6 mg/kg for generalanesthesia. After intubation, 0.5-1.5%isoflurane was given to group I, 1-4%sevoflurane to Group II, 2-6%Desflurane to Group III inhaler agents. The intraoperative BIS score was kept around 40. Postoperative recovery findings(spontaneous respiration, eyeopening), nausea and vomiting were recorded

**Results and Discussion / Discussion:** In patientgroups for which demographic data don't have any statistically significant difference, monitoring with BIS reduces the amount of anesthetic used in 3groups. Postoperative BIS values and recoveryscores were correlated. When compared between groups Desflurane was the fastest recovered group with fastest rising BIS score due to the low blood/gas partitionlevels. However, contrary to our expectations, sevoflurane wasn't very different from Isoflurane. In addition, contrary to expected, the incidence of nausea after extubating was higher in this group. But at the end of the 1st hour, emetic symptoms were significantly higher in the sevoflurane group.

**Conclusion(s):** BIS use reduces the amount of inhaler agent use in anesthesia depth measurement (2). In patients with optimal anesthesia depth, postoperative recovery is fast and side effects such as nausea and vomiting reduce. In our study, we determined that Desflurane, which is an agent with low blood/gas partition coefficient, was the fastest to be recovered compared to othergroups.

**References:**

1. Burrow B<sup>1</sup>, McKenzie B, Case C. Do anaesthetized patients recover better after Bispectral Index Monitoring? *Anaesth Intensive Care*. 2001 Jun;29(3):239-45. DOI:10.1177/0310057X0102900303
2. Pavlin DJ<sup>1</sup>, Hong JY, Freund PR. The effect of bispectral index monitoring on end-tidal gas concentration and recovery duration after outpatient anesthesia. *Anesth Analg*. 2001 Sep;93(3):613-9. DOI:10.1097/00000539-200109000-00017

**O017**

**OGILVIE SYNDROME AFTER VASCULAR SURGERY IN ELDERLY PATIENT. A CASE REPORT**

Ass.Dr. Darko ANGJUSHEV<sup>1</sup>, Prof.Dr. Andrijan KARTALOV<sup>1</sup>, Doc.Dr. Marija SRCEVA<sup>1</sup>, Ass.Dr. Anita KOKAREVA<sup>1</sup>, Dr.Spec. Marija KOTEVSKA-ANGJUSHEV<sup>2</sup>

1. UC TOARILUC Medical Faculty, University of "St. Ciril and Methodius" Skopje
2. UC Cardiosurgery Medical Faculty, University of "St. Ciril and Methodius" Skopje

**Background and Goal of Study / Background:** Introduction: Acute colonic pseudo-obstruction (ACPO), otherwise known as Ogilvie's syndrome (OS), is a rare disorder of the right colon usually in debilitated medical and surgical patients.(1) Aim: We present a successful conservative management of ACPO in 71y old male as a complication after vascular surgery.

**Materials and Methods:** Case report: Patient with diabetes mellitus for 15y and multiple cerebrovascular insults was admitted to vascular surgery department with a diabetic gangrene of the left foot. 3 days after the left foot amputation the patient developed acute abdomen distension and circulatory instability. Native roentgen of abdomen and computer tomography scan confirmed right colon distension, with diameter of the caecum of 6cm. The diagnosis of Ogilvie syndrome was confirmed. Patient was transferred to ICU and conservative treatment was started. Patient was kept nil per mouth and total parenteral nutrition was started. As the abdominal distension didn't improve after 24h, a colonoscopic decompression of the right colon was performed but with limited success. After mechanical obstruction was ruled out, empirically 2.0mg neostigmine intravenously was given over the period of 3-5min. The same procedure was repeated the next morning. The signs of abdominal distension gradually decreased over the following 24h. After 4 days the patient was transferred to abdominal surgery department and after 7 days he was discharged from hospital.

**Results and Discussion / Discussion:** Discussion: If untreated the rate of spontaneous perforation of the colon is 3-15% and the mortality rate exceeds 50%.(2,3)

**Conclusion(s):** Conclusion: ACPO although is rare it should be early recognized.(2) Conservative management of a ACPO offers a safe and successful treatment, omitting the dangerous operation of total colectomy.(1)

**References:**

1. Manappallil R, Suresh Ch, Kadengil D, Thomas P, Jayaraj J. A case of Ogilvie's syndrome associated with electrolyte imbalance in a healthy individual Asian J of Medical Sciences, Jan-Feb 2017, Vol 8, Issue 1;
2. Wells C, O'Grady G, Bissett I. Acute colonic pseudo-obstruction: A systematic review of aetiology and mechanisms. World J Gastroenterol 2017 August 14; 23(30): 5634-5644;
3. Tenofsky P, Beamer L, Smith S.: Ogilvie Syndrome as a postoperative complication. Arch Surg. 2000;135:682-687



**O018****MANAGEMENT OF ANAPHYLAXIS AFTER GENERAL ANESTHESIA INDUCTION IN PATIENT WITH NO ALLERGY HISTORY: A CASE REPORT**

Iskra NEDELKOVA<sup>1</sup>, Jasna BUSHINOSKA<sup>1</sup>, Marija TOLESKA<sup>1</sup>,  
Tatjana DAVITKOVSKA<sup>1</sup>, Leutrim SULEJMANI<sup>1</sup>, Ljubomir OGNJENOVICH<sup>2</sup>

1University Clinic for Anesthesia, Reanimation and Intensive Care, Medical Faculty,  
"Ss' Cyril and Methodius" University, Skopje, R. N. Macedonia

2University Clinic of Abdominal Surgery, University of St. Cyril and Methodius,  
Skopje, R. N. Macedonia

**Background and Goal of Study / Background:** Anaphylaxis during anesthesia can present as cardiovascular collapse, airway obstruction, and/or skin manifestation. (1) The two primary causes of anaphylaxis in patient under anesthesia are muscle relaxants and latex allergy. (2)

**Materials and Methods:** We present a 67 yr old female patient (weight 79kg), for incisional hernia repair, ASA III classification. She had undergone three surgeries with general anesthesia in the past with no side effects. She denied history of atopy or drug allergy. Induction in general anesthesia was performed with midazolam (0,1mg/kg), lidocaine (1mg/kg), fentanyl (2mcg/kg), propofol (2mg/kg), suxamethonium (1.0 mg/kg) and pancuronium (0,06 mg/kg). During intubation we noticed bradycardia of 45 BPM, rapid O<sub>2</sub> desaturation with SpO<sub>2</sub> of 85%, hypotension of 50/45mmHg, generalized urticaria and low ETCO<sub>2</sub>. Manual as well as mechanical ventilation was difficult to perform. We excluded esophageal intubation, so bronchospasm was considered with absence of auscultation sounds. Methylprednisolone 80mg, Chloropyramine hydrochloride 20mg,, Phenylephrine 100mcg + 100mcg and Epinephrine 0,5 + 0,5 mg was titrated and applied intravenous. Salbutamol was sprayed into the ETT along with i.v. fluid therapy, crystalloids plus HES. After few seconds, we noticed ventricular tachycardia with HR 220min which spontaneously converted to bradycardia of 35 BPM. We performed CPR and applied 1mg Epinephrine and 3mg Atropine. After hemodynamic stabilization we transported the patient in the ICU. The same day the patient was extubated and stable with no major consequences. She was transferred to the abdominal surgery ward for further examinations. Tests for allergic reactions to drugs showed severe allergic reaction to Suxamethonium, which in our case was the trigger to severe anaphylactic shock.

**Results and Discussion / Discussion:** It was shown that Suxamethonium has highest incidence (11.1 per 100 000) to cause anaphylaxis than any other NMBA's. We managed to recognize and treat the early symptoms of anaphylaxis. We proved the reason for hypersensitivity reaction and prevented further unwanted anesthesia events.

**Conclusion(s):** It's essential to diagnose and treat anaphylaxis early in order to prevent mortality and residual brain damage.

**References:**

1. Shrikant M. Anaphylaxis during the perioperative period. NCBI. 2012;6(2):124–133
2. Levy JH, Yegin A. Anaphylaxis: What is monitored to make a diagnosis? How is therapy monitored? *Anesthesiol Clin North Am.* 2001;19:705–15

**0019****ANESTHESIA EXPERIENCE ON A PATIENT WITH BIOTINIDASE DEFICIENCY**Merve BAYRAKTAROGLU<sup>1</sup>, Yesim MACİT<sup>1</sup>, Onur OZLU<sup>1</sup>Department of Anaesthesiology and Reanimation,  
TOBB University of Economics and Technology, Ankara, Turkey.

**Background and Goal of Study / Background:** Biotinidase deficiency is an autosomal recessive disorder with multisystemic involvement. Biotin is the cofactor of amino acid catabolism, fatty acid synthesis and gluconeogenesis. The incidence of this disease in Turkey, which occurs as the biotin that binds protein unbinds and cannot be used again, is well above the world average (1). Its manifestations include dermatitis, alopecia, hypotonia, apnea, developmental retardation, immunodeficiencies, and malign hyperthermia. Treatment of this disease with biotin, which might result in coma and death if left untreated, provides a rapid clinical and biochemical recovery.

**Materials and Methods:** Due to nasolacrimal duct obstruction in left eye, probing under general anesthesia was planned for an 18-month-old and 9 kg female patient. The patient who was diagnosed with biotinidase deficiency at the age of 3 months has been using 5 mg/day tablets of biotin. The biotin dose of the patient, whose preoperative evaluation showed normal physical examination findings and laboratory values, was doubled by the pediatrician for a duration of one week in the postoperative period. The patient was administered 0.3 mg/kg of oral midazolam along with premedication and routine monitorization. When spontaneous respiration was suppressed following preoxygenation and induction with 2 mg/kg of IV propofol and 1 mcg/kg of fentanyl, size 1.5 LMA-classic was inserted. 1 MAC of sevoflurane and 50% NO<sub>2</sub>:O<sub>2</sub> were used for maintenance of anesthesia. Anesthesia time was 35 minutes, and postoperative analgesia was maintained with 10 mg/kg of IV paracetamol in the patient who was extubated unproblematically. The patient was discharged on postoperative day 1.

**Results and Discussion / Discussion:** Since convulsions are common in biotinidase deficiency; hypoxia, hypocarbia and acidosis should be avoided as they will decrease the convulsion threshold. We intubated the patient without using a muscle relaxant agent due to her tendency for hypotonia. Succinylcholine should be avoided due to risks of malign hyperthermia, hyperkalemia and seizure (2,3).

**Conclusion(s):** It was seen that general anesthesia can be performed safely by taking comorbidities into consideration and paying attention to hemodynamic stabilization in anesthetic management of patients with biotinidase deficiency.

**References:**

1. Baykal T, et al. Acta Paediatr, 1998;87(10):1102-3. 2) Saettele AK, et al. Anesthesiology. 2013;119:443-6. 3) Goktas U, et al. J Anaesthesiol Clin Pharmacol. 2014;30:126.

**O020****ANESTHESIA IN CRANIOSYNOSTOSIS SURGERY WITH TURNER SYNDROME**İklil GEMLİK<sup>1</sup>, Hüsne ŞAHİN<sup>1</sup>, Merve BAYRAKTAROĞLU<sup>1</sup>, Onur ÖZLÜ<sup>1</sup>Department of Anaesthesiology and Reanimation,  
TOBB University of Economics and Technology, Ankara, Turkey.

**Background and Goal of Study / Background:** Turner syndrome (TS) is a disease characterized by functional monosomy in the P arm of the X chromosome . They may have congenital heart disease, renal anomalies, spine and facial deformities . Craniosynostosis is an early fusion of the sutures results in asymmetrical or limited craniofacial growth .

**Materials and Methods:** We presented a patients with Turner syndrome underwent cranial remodeling due to trigecephaly with general anesthesia. Our 16-month-old, 73 cm tall and 8.9 kg weight patient had Turner Syndrome and trigecephaly. The physical examination and laboratory findings were normal except horseshoe kidney, detected by urinary ultrasonography. Midazolam 0,5 mg/kg, PO was used for sedation . Addition to routine monitorization, right femoral artery and right jugulary vein were cannulated, rectal temperature probe and urinary catheter were inserted. Sevoflurane and N2O were the induction agents. After rocuronium 0,5 mg /kg, iv injection endotracheal intubation was performed with number 3,5 cuffed tube. ETT was sutured to the patient's lower lip. Anesthesia was maintained using remifentanil infusion and sevoflurane. Surgery and anesthesia durations were 4 and 4,5 hours respectively. Total urine out put was 58 ml. Total amount of 50% SF in 5% dextrose, erythrocyte suspension and fresh frozen plasma were 400 ml, 100 ml and 50 ml respectively. Meperidine and paracetamol were the postoperative analgesic agents. She stayed in intensive care unit for 24 hours and she was discharged on the 4th day postoperatively.

**Results and Discussion / Discussion:** Patients with turner syndrome may have difficult mask and intubation; due to microcephaly, micrognathia, presence of neck fold and short neck size. Other problems that can be encountered in this syndrome; there may be haemodynamic changes due to cardiovascular anomalies. Anesthetists should be wary of possible complications such as hypothermia, hypercarbia, hypocarbia, hypocalcaemia, electrolyte imbalances, and metabolic acidosis in the craniosynostosis surgery.

**Conclusion(s):** Massive blood loss, air embolism, hypothermia are challenging factors during anesthesia. Closed monitoring of the patients and timely intervention undergoing remodelling surgery for craniosynostosis are essential and life saving.

**O021****ANESTHETIC MANAGEMENT OF A PATIENT WITH MYASTHENIA GRAVIS AND ANKYLOSING SPONDYLITIS UNDERGOING VIDEOASISTED THORACOSCOPIC THYMECTOMY**Hüsne BAYRAK SAHIN<sup>1</sup>, Merve BAYRAKTAROGU<sup>1</sup>, İklil GEMLIK<sup>1</sup>, Onur OZLU

Department of Anaesthesiology and Reanimation, TOBB University of Economics and Technology, Ankara, Turkey

**Background and Goal of Study / Background:** Myasthenia gravis(MG) is an autoimmune disorder characterized by weakness of skeletal muscle due to destruction or inactivation of postsynaptic acetylcholine receptors in the neuromuscular junction. Many young patients have clinical improvement following thymectomy. Ankylosing spondylitis(AS) is a challenging disorder with respect to difficult airway management. The anesthetic management of an AS and MG patient for videothoroscopic thymectomy was presented.

**Materials and Methods:** A 38-year-old male patient weighing 79 kg and 170 cm tall has complaints as double vision, difficulty in swallowing and speech for two months. Because of myasthenia gravis with bulbar involvement diagnosis, 180 mg pyridostigmine daily was his medication. He has been using salazopyrin and indomethacin for 10 years because of AS. Right videothoracoscopy were planned for thymectomy under general anesthesia. His neck movements were restricted and Mallampati score was II during preoperative examination. Routine anesthetic and neuromuscular monitorization were performed before induction without preoperative sedation. Difficult airway equipments were ready. Anesthesia was induced using propofol mg/kg 2.5 and fentanyl 1.5 mcg/kg. After 10 mg rocuronium injection, TOF stimulations were observed. Rocuronium 5 mg was injected three more times intermitantly, until TOF ratio was 0%. The patient was intubated using left sided double lumen bronchial tube. The tube location was confirmed using a flexible bronchoscope. Anesthesia was maintained with, sevoflurane, 50% oxygen in air and remifentanyl infusion(0.1-0.2 mcg/kg/min). When TOF ratio reached to 25%, rocuronium 5 mg was injected. Duration of the surgery was 95 minutes and total rocuronium dosage was 40 mg at the end of surgery. When TOF value reached to 11%, sugammadex 2 mg/kg was administered for neuromuscular block reversing. Nearly 200 seconds after, TOF value was 95% and he could squeeze our hands. The patient was transferred to PACU for 1 day and discharged on postoperative day 4.

**Results and Discussion / Discussion:** Entubation and extubation were difficult in our patient because of MG and AS comorbidities. Neuromuscular monitorization is important for titration of muscle relaxants dosage. Anticholinesterases which reverse depolarizing muscle relaxations can trigger a cholinergic crisis characterized by high doses of muscle weakness, hypersalivation and bradycardia. Cholinergic and myasthenic crisis may be confused. Sugammadex can safely antagonize muscle relaxants due to lack of cholinergic side effects.

**Conclusion(s):** Sugammadex and neuromuscular monitorization improve the safety in patient with MG and AS.

**O022****ANESTHESIA MANAGEMENT of CABG OPERATION PERFORMED for a LIVER TRANSPLANT RECIPIENT OPERATED 10 YEARS AGO**

Hija YAZICIOĞLU<sup>1</sup>, Gökçe SELÇUK SERT<sup>1</sup>, Perihan KEMERCİ<sup>1</sup>, Büşra TEZCAN<sup>2</sup>

1 T.C. Ministry of Health Ankara City Hospital Department of Anesthesiology & Reanimation,

2 T.C. Ministry of Health Ankara City Hospital Department of Intensive Care Units

**Background and Goal of Study / Background:** Non-transplant operations done to solid organ transplant recipients increased significantly for the last decades as the new immunosuppressive agents (IS) prolongs survival rates and the patients refer to hospitals for other health problems (1). This case presentation reports such a patient.

**Materials and Methods:** Liver Transplantation (LTx) was performed 10 years ago to a 64 year-old male patient who now refers to our hospital for unstable angina complaints. He had developed hepatocellular carcinoma and liver failure following chronic HBV infection and had undergone LTx. He was on tacrolimus, sirolimus and anti-viral therapy. He had femur fracture operation in 2012 and had hypertension, DM and hyperlipidemia at that time. Myocardial perfusion scintigraphy done for suspected angina showed evidence of ischemia and he was on medical therapy since then. His symptoms were worsened to unstable angina in 2019 and he was scheduled for CABG following coronary angiography. Preoperative visit revealed normal liver function. On the day of surgery following invasive and non-invasive monitorization, he was given midazolam 0.1 mg/kg, lidocaine 1mg/kg, fentanyl 5 mcg/kg and 0.6 mg/kg rocuronium for anesthesia induction. Maintenance was provided with remifentanyl infusion, sevoflurane %1.5 MAC and fentanyl, midazolam and rocuronium bolus injections according to BIS. As it was planned to be an off-pump CABG, esmolol infusion was started for controlling heart rate. Besides he was on insulin infusion for DM. Internal mammary artery, LAD anastomosis was done while an ACT of 250sec was provided. Naturally short periods of hemodynamic instability was noted during the operation. He was extubated 6th hour postoperatively and discharged from the hospital on the 5th day with no complications.

**Results and Discussion / Discussion:** All of these co-morbidities; DM, HT, osteoporosis and CAD were related to long-term IS utilization (2). Dose adjustments of IS were necessary during perioperative period for decreasing poor healing.

**Conclusion(s):** Even though management of beating heart CABG anesthesia is challenging, off-pump surgery is favorable for such patients as it shortens operation time and eliminates undesirable effects of CPB.

**References:**

1. Whiting J. Perioperative concerns for transplant recipients undergoing nontransplant surgery. *Surg Clin N Am* 2006;86:1185-1194
2. Toivonen HJ. Anesthesia for patients with a transplanted organ. *Acta Anaesthesiol Scand* 2000;44:812-833.

**O023****A CHALLENGING ANESTHESIA MANAGEMENT of HEART TRANSPLANTATION to A RECIPIENT WHO HAD LVAD IMPLANTATION TWO YEARS AGO**

Hija YAZICIOĞLU<sup>1</sup>, Perihan KEMERCI<sup>1</sup>, Gökçe SELÇUK SERT<sup>1</sup>, Büşra TEZCAN<sup>2</sup>

1 T.C. Ministry of Health Ankara City Hospital Department of Anesthesiology & Reanimation,

2 T.C. Ministry of Health Ankara City Hospital Department of Intensive Care Units

**Background and Goal of Study / Background:** Heart Transplant (HTx) recipient profile has been changed for the last decades. Patients with ventricular assist devices(VAD) become new candidates for transplantation (1). Anesthesia management and transoesophageal echocardiography (TEE) usage for these operations are challenging. In this case report we present such a patient.

**Materials and Methods:** A 38 year-old, cachectic, male patient was diagnosed hypertrophic kardiomyopathy in 2000. A-V block, % 30 ejection fraction, global hypokinesia, and RV hypertrophy were initially detected and an ICD was implemented at that time. Few months later he developed atrial fibrillation and warfarin was started. Trans-thoracic echocardiography done 7-years later revealed % 33 EF, SPAP 50mmHg. While receiving i.v. milrinon and dopamine, LVAD was implemented to him. He was in good condition for 2 years. However his heart deteriorated and he was added for HTx list while on multiple inotropic support. Finally he was undergone emergent HTx operation after a donor was available. Following routine invasive and non-invasive monitorization, anesthesia was induced with 1mg midazolam, 50 mg ketamin and 40mg rocuronium for this 45kg patient. Maintenance was with TIVA including remifentanyl, midazolam, rocuronium and multiple inotropic support. TEE was used during the operation.

**Results and Discussion / Discussion:** We want to draw attention to some tricky points during anesthesia management for patients with LVAD (2). Such as; 1)No arterial waveform was detected as the patient was supported by a VAD. 2)We were faced with hemodynamic instability at all times 3)Bleeding management was very challenging as there were a lot of adhesions and the patient was on anticoagulation drugs. Rational use of blood/blood products are essential 4)There was technical problems while removing VAD. 5)Donor heart has a very short ischemia period. 6)TEE was helpful for removal of intracardiac air, evaluation of RV, LV functions and anastomosis (fig 1).

**Conclusion(s):** Anesthesia management become very challenging for HTx during the last decades. Most of the recipients are with VAD which causes bleeding problems, technical difficulties and hemodynamic instability during the whole operation.

**References:**

1. Christopher T. Holley, Laura Harvey, Ranjit John. "Left ventricular assist devices as a bridge to cardiac transplantation" J Thorac Dis 2014;6(8):1110-1119
2. Kevin W.Southerland,,CarmeloA.Milano," Heart Transplantation After Left Ventricular Assist Device" <http://dx.doi.org/10.1053/j.optechstcvs.2014.03.003>.



Fig 1.

**O024****IS AUDIOVISUAL INTERACTIONS WITH VIDEO GAMES OR DISTRACTION WITH CARTOONS AN ALTERNATIVE TO MIDAZOLAM TO PREVENT EMERGENCE DELIRIUM? PROSPECTIVE RANDOMISED TRIAL**Reyhan POLAT<sup>1</sup>, Bahar SAKIZCI UYAR<sup>1</sup>, Sibel CATALCA<sup>2</sup>, Aslı ZOROGLU DONMEZ<sup>1</sup><sup>1</sup>Diskapı Yıldırım Beyazıt Research and Training Hospital, Ankara; <sup>2</sup>Hakkari State Hospital

**Background and Goal of Study / Background:** Emergence delirium (ED) may cause adverse clinical outcomes such as injury to child, to the accidental removal of surgical dressings, catheters, and drains. Therefore ED must be prevented.

**Materials and Methods:** We enrolled 139 patients aged 2 to 5 years undergoing elective surgery. Before our intervention in the preoperative holding area, patients' baseline anxiety levels were evaluated using the modified Yale Preoperative Anxiety Scale (mYPAS). Oral midazolam was given to Group M, a tablet with video games was given to Group G and the cartoon 'Suko Is Being Operated' was played to Group S. Following the interventions, mYPAS scores were recorded. Patients' ED was assessed in 5 minute intervals during the first 25 minutes in PACU using the Pediatric Anaesthesia Emergence Delirium (PAED) scale. Their pain levels were also evaluated using the Face, Legs, Activity, Crying, Consolation (FLACC) scale.

**Results and Discussion / Discussion:** We observed the mean PAED scores to be similar between Groups G and M, and significantly lower in Group S ( $p < 0.001$ ). The prevalence of ED, defined as a PAED score  $> 10$  was significantly lower in Group S compared to Groups M and G at T0 and T15 ( $p = 0.00^3$ ,  $p = 0.04^2$ , respectively). However, it was higher in Group M than in Groups G and S at T20 and T25 ( $p = 0.010$ ,  $p = 0.00^3$ , respectively). We observed significantly lower mYPAS scores than respective baselines after the interventions in all groups ( $p < 0.01$ ). Although there is no statistically significant difference among groups ( $p = 0.624$ ), the highest delta was observed in Group S. At all time marks, pain scores were comparable among groups at PACU ( $p > 0.05$ ). In patients who had ED, we found correlation between PAED and mYPAS scores but not between PAED and FLACC scores.

**Conclusion(s):** In preschool children, watching cartoon was found to be a valuable method to reduce pre-operative anxiety and consequentially ED.



0025

**ANESTHETIC MANAGEMENT OF A CHILD WITH  
MIS-C PRESENTING FOR APPENDECTOMY: CASE REPORT**Gulsen KESKİNDepartment of Anesthesiology and Reanimation,  
Health Sciences University Diskapi Yildirim Beyazit Training and Research Hospital, Ankara, Turkey

**Background and Goal of Study / Background:** The clinical course of coronavirus disease (COVID-19) has been reported as mild in children. While the complications in adults are well documented, morbidities in children have only recently become clear. Most children who become infected with the virus have only mild illness. However, multisystem inflammatory syndrome in children (MIS-C) due to COVID-19 has just been defined. Anesthetic management of these patients can be challenging. In this case report, we present anesthetic management of a child with MIS-C for appendectomy.

**Materials and Methods:** A 7-year-old boy, weighing 24 kg with a diagnosis of perforated appendicitis was admitted to the hospital complaining fatigue, abdominal pain, fever and vomiting. He had no history of COVID-19, but his mother was COVID-19 infected three weeks ago. Physical examination revealed tenderness in the right lower abdomen. His PCR test was negative but serological testing for COVID-19 antibodies was positive. Lower abdomen ultrasonography and CT findings showed perforated appendicitis and massive peritoneal fluid. Thorax CT was normal. Laboratory examinations and echocardiography findings are compatible with MIS-C (Table 1). His blood pressure, heart rate, respiratory rate, SpO<sub>2</sub>, and temperature were 110/69 mmHg, 130/min, 28/min, 96% and 38°C respectively. Two units of cryoprecipitate was administered preoperatively due to high INR value (INR:2.44). Lidocaine, propofol, fentanyl and rocuronium iv were administered for anesthesia induction and anesthesia was maintained with propofol and remifentanyl infusions. At the end of the surgery dexketoprofen was given for postoperative analgesia and he was transferred to the intensive care unit fully awake. Histopathological evaluation revealed gangrenous appendicitis and periappendicitis.

**Results and Discussion / Discussion:** The effects of anesthetic agents on SARS-CoV-2 are not clearly known yet. The use of inhalation agents may increase the risk of COVID-19 transmission to the environment by causing increased upper airway reactivity and cough. We used propofol for TIVA which is known to have antioxidant, anti-inflammatory and bronchodilator properties. These properties may have advantages on controlling inflammation in COVID-19 patients. More case reports/studies will be informative.

**Conclusion(s):** We had an uneventful intraoperative and postoperative period in child with MIS-C presenting where we applied TIVA with propofol and remifentanyl for appendectomy.

**References:**

1. Whittaker E, Bamford A, Kenny J, et al. Clinical characteristics of 58 children with a pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2. JAMA 2020;324:259–269.
2. Stewart M, Thalerb A, Huntb P, et al. Preferential use of total intravenous anesthesia in ambulatory otolaryngology surgery during the COVID-19 pandemic. Am J Otolaryngol 2020;41(5):102570.

Table 1. Patient characteristics and laboratory values.

Characteristics	Values
Age (years)	7
Sex	Male
SARS-Cov-2 PCR	Negative
Covid-19 IgG+IgM	> 10.00 (Reaktif) (0 – 0.99)
Leucocytes (10 <sup>9</sup> /L)	3.74 (4.8-12)
Platelets (10 <sup>9</sup> /L)	279 (180–415)
Neutrophils (%)	81.9 (33-74)
Lymphocytes (%)	8.3 (22-51)
C-reactive protein (g/L)	0.2075 (0-0.005)
Fibrinogen (g/L)	5.72 (1.7- 4.2)
D-dimers (mg/L)	12.76 (<0.55)
Ferritin (µg/L)	398 (7–140)
İnterlökin 6 (IL 6) (pg/mL)	577 (0-3.4)
Direct bilirubin (mg/dL)	0.2 (0-0.1)
NT-pro BNP (Pro-Brain Natriuretic Peptide) (ng/L)	554 (<125)
Transthoracic echocardiographic	Septum apical zone mildly hypokinetic. LMCA 2.4 mm. RCA 2.2 mm. perivascular brightness in RCA LV EF 66% ECG in normal sinus rhythm. QRS axis was in right Minimal pleural effusion on the right and left

**O026****A RARE PATHOLOGY THAT MAY BE FATAL IF LEFT UNDIAGNOSED: A TRACHEAL HEMANGIOMA**Ali HASPOLAT<sup>1</sup>, Yaşar Gökhan GÜL<sup>2</sup>, Ali Şefik KÖPRÜLÜ<sup>3</sup>, Yavuz DEMIRARAN<sup>4</sup>

- (1) Anesthesiology and Intensive Care - Asist. Prof. Dr. Kolan International Hospital, Department of Anesthesiology,
- (2) Anesthesiology and Intensive Care - Medical Doctor, Medipol University Medipol Mega Hospital, Department of Anesthesiology,
- (3) Anesthesiology and Intensive Care, Assoc. Prof. Dr. İstanbul Yeni Yüzyıl University Medical Faculty Head of the Department of Anesthesiology and Reanimation
- (4) Anesthesiology and Intensive Care, Prof. Dr. İstanbul Medipol University English Medical Faculty Head of the Department of Anesthesiology and Reanimation

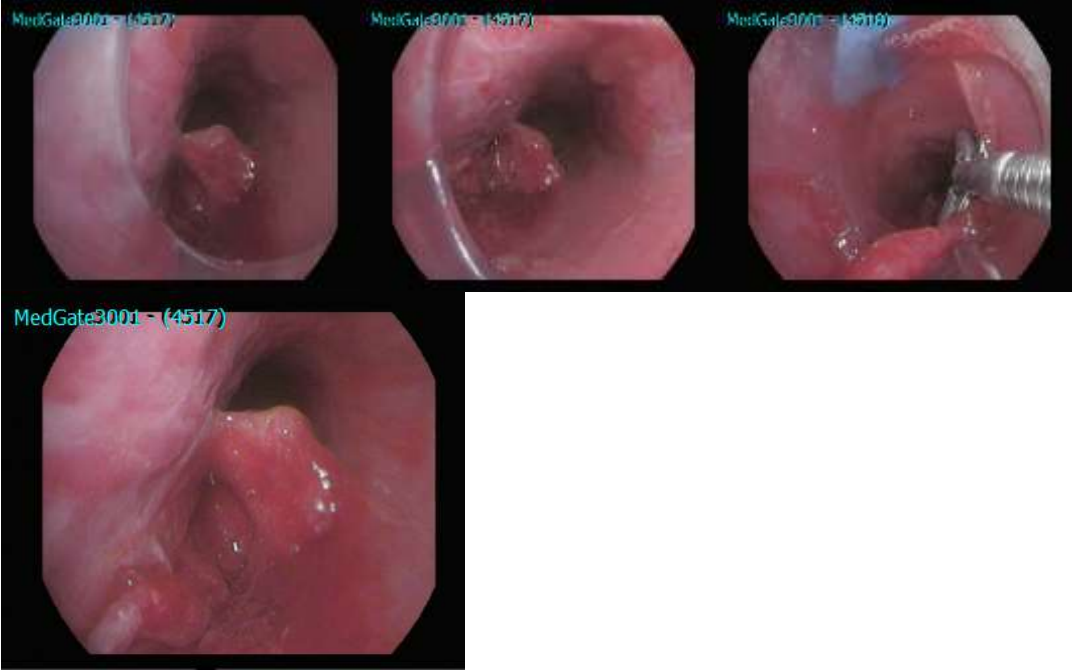
**Background and Goal of Study / Background:** The present study discusses tracheal capillary hemangioma, which is rare in adults, presenting the case of a patient who sustained severe hypoxia and cardiac arrest following massive hemoptysis. The study aims to draw attention to the rare pathology that may have dramatic consequences if remains undiagnosed in adults.

**Materials and Methods:** We pointed out the medical history, diagnosis and treatment process of a 24 year old female patient who was referred to our intensive care unit after sustaining hypoxia and cardiac arrest following a massive pulmonary hemorrhage that was reversed following 20 minutes of CPR. The patient's medical history was remarkable for coughing up blood. It was understood that all laboratory tests, and direct chest x-ray/thoracic CT scans showed normal findings, with no evidence of any pathological condition and that the patient was discharged after being advised. The patient did not consult a doctor afterwards due to spontaneous recovery, with only rare episodes of cough and hemoptysis. Thoracic CT scans were obtained to determine the cause of bleeding, and a diagnostic fiber optic bronchoscopy was performed upon the observation of pathological findings in our ICU. The posterolateral wall of the trachea was found to be perforated in the midline, and a lesion with partially flap/polypoid fragment was observed (8x5 mm) that was suggestive of a tracheal hemangioma. A biopsy was performed. Later, it was discovered that the patient had undergone the removal of a small vascular lesion (hemangioma?) from her cervical region when she was 6–7 years in a new meeting with the family. The examination of the biopsy specimen showed findings consistent with cavernous hemangioma.

**Results and Discussion / Discussion:** Malignant tumors, bronchiectasis, pneumonia, bronchitis, and infections such as tuberculosis, cardiovascular pathologies and inflammatory diseases are the most common causes of cough-hemoptysis in adults. Radiological tests showing normal findings should prompt a bronchoscopy in patients presenting with these symptoms. Patients with hemangiomas on any part of the body in particular should undergo a detailed upper and lower airway examination.

**Conclusion(s):** It should be remembered that a pathological condition that can be easily diagnosed/treated with interventional bronchoscopic methods may have dramatic consequences if left undiagnosed without medical follow-up.

**Photo** – Appearance of the trachea during bronchoscopy



**O027****UNILATERAL NEGATIVE PRESSURE PULMONARY EDEMA: REPORT OF TWO CASES**

Dilek ÜNAL YAZICIOĞLU, Yusuf ÖZGÜNER, Murat SAYIN

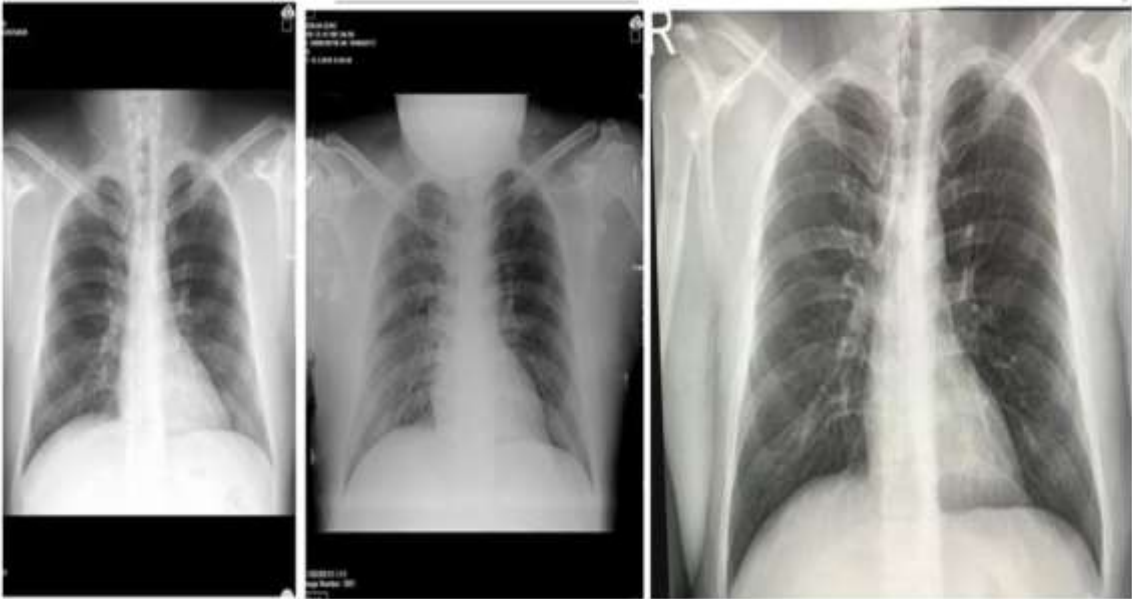
University Of Health Sciences Diskapi Yildirim Beyazit Training And Research Hospital

**Background and Goal of Study / Background:** Negative pressure pulmonary edema (NPPE) is a well known complication that may develop after upper airway obstruction. Here we present two cases with unilateral NPPE: a rare form of this life threatening complication

**Materials and Methods:** Case 1: A 28 years old male in American Society of Anesthesiologists (ASA) physical class I, presented for endoscopic sinus surgery. Airway examination revealed Mallampati class I; laboratory evaluations were normal. Baseline blood pressure (BP): 122/72 mmHg; heart rate (HR): 67 beats/min; peripheral oxygen saturation (SpO<sub>2</sub>): 96%. Propofol, fentanyl and rocuronium was used for anesthesia induction and intubation; anesthesia was maintained with sevoflurane in oxygen/air mixture and remifentanil infusion. At the end of surgery, nasal tampons were placed in both nostrils. Neostigmin-atropine was administered for the reversal of neuromuscular blockade; patient was extubated after observing clinical signs of adequate muscle function. Short after extubation laryngospasm and respiratory distress was observed; SpO<sub>2</sub> dropped to 60%; BP: 167/87 mmHg; HR: 112 beats/min. Patient was transferred to the intensive care unit (ICU). Chest X-ray showed unilateral pulmonary edema (Figure). Patient was treated with non-invasive continuous positive pressure ventilation (CPAP), diuretics and pulmonary dilatators and discharged after two days. Case 2: A 32 years old male in ASA physical class II (smoking) presented for septoplasty. Airway examination revealed Mallampati class I and laboratory evaluations were normal. Baseline BP: 133/76 mmHg; HR: 72 beats/min; SpO<sub>2</sub>: 94%. Anesthesia induction and intubation was commenced with propofol, fentanyl and rocuronium and maintained with sevoflurane-oxygen/air and remifentanil infusion. At the end of surgery, nasal tampons were placed in both nostrils. Neuromuscular reversal was provided with neostigmin-atropine. After extubation patient became desturated while spontaneously breathing, SpO<sub>2</sub> 23%, reintubation was commenced and patient was transferred to the ICU, Chest X-ray showed unilateral pulmonary edema (Figure). Patient was treated with invasive CPAP, diuretics, dopamine and discharged to the ward after two days. Patient' consents were obtained

**Results and Discussion / Discussion:** NPPE is encountered 0.094% in general anesthesia practice, and in 11% in patients with acute postoperative upper airway obstruction.

**Conclusion(s):** Unilateral NPPE is rare, however, it is an emergency that can cause severe respiratory failure and requires vigilance and early treatment.



**0028****RETROSPECTIVE EVALUATION OF ADHERENCE TO STRESS ULCER PROPHYLAXIS GUIDELINES IN ICU PATIENTS AND THE INCIDENCE OF GASTROINTESTINAL BLEEDING**Dilek UNAL, Melis SUMAK HAZIR, Elif Sule OZDEMIR, Murat SAYIN

University of Health Sciences Diskapi Yildirim Beyazit Training And Research Hospital

**Background and Goal of Study / Background:** Mucosal damage is encountered in 75-100% of the intensive care unit (ICU) patients, and may increase morbidity and mortality. Although stress ulcer prophylaxis (SUP) is recommended only in risk groups; many critically ill patients receive SUP. The aim was to investigate and report the use of SUP and incidence of gastrointestinal (GI) bleeding in our ICU's

**Materials and Methods:** Retrospective observational study in four ICUs in Diskapi Yildirim Beyazit Teaching Hospital. Medical records of consecutive patients admitted to the ICUs between November 2019 and February 2020 were assessed. Pediatric patients were excluded. Ethical approval was obtained.

**Results and Discussion / Discussion:** A total of 317 patients were enrolled, 164 (51%) of them were males, the mean age of the study population was  $67.4 \pm 17.3$  years [median 70 (minimum 19- maximum 99)] years. Postoperative care [total 229 patients (72.25%) of which 61 (19.2%) underwent major abdominal and urologic surgery, and 96 (30.2%) underwent trauma surgery] and medical conditions (total 42 patients, 13.4%) were the main diagnosis for admittance. The mean Acute Physiology and Chronic Health Evaluation (APACHE) score was  $14 \pm 7.6$ ; median 12 (0-55); 93 (29.3%) patients were mechanically ventilated. From the patients 266 (84.0%) were prescribed with ranitidine and 44 (14.0%) with pantoprazole. A documented major risk factor for SUP was present in 94 (29.6%) and a minor risk factor was present in 72 (22.7%) patients. Among those who received SUP 166 (52.3%) were adhering to guidelines and 151 (47.4%) received unnecessary SUP. New onset clinical significant GI bleeding or overt bleeding during ICU stay was not observed in any patient ((Table).

**Conclusion(s):** Discussion and Conclusions: The results showed that a substantial proportion of ICU patients receive unnecessary SUP in our hospital which may cause for adverse drug reactions and morbidity and/or mortality with eventual increased cost. New onset clinical significant GI bleeding or overt bleeding during ICU stay was not detected and occult bleeding on the other hand was not assessed. SUP should be individualized for every patient and should not be a part of a routine order in ICUs.

**Table 1. Patient characteristics, admission reasons and ICU therapies**

Total patients	(n)	317
Sex n (%)	Male	165 (52%)
	Female	154 (48%)
Age ( years)	Mean $\pm$ sd	67.4 $\pm$ 17.3
	Median (range)	70 (19-99)
n (%)	<18	9 (2.8%)
	$\geq$ 65	206 (64.5%)
APACHE II Score	Mean $\pm$ sd	14 $\pm$ 7.6
	Median (range)	12 (0-55)
Causes of ICU admission, n (%)		
Postoperative care		229 (72.25%)
Abdominal surgery		61 (19.2%)
Trauma surgery		96 (30.2%)
Head trauma		5 (1.5%)
Respiratory failure		31 (9.7%)
Multi trauma		20 (6.3%)
Sepsis		7 (2.1%)
GI bleeding on admission		6 (1.8%)
Post arrest syndrome		4 (1.2%)
Days of ICU stay	Mean $\pm$ sd	5.4 $\pm$ 10.7
	Median (range)	2(1-87)
Days of mechanical ventilation	Mean $\pm$ sd	2.6 $\pm$ 9. <sup>2</sup>
	Median (range)	3(1-83)
Mechanical ventilation at initial admission, n (%)		38 (12.0%)
Mechanical ventilation during ICU stay, n (%)		53 (16.6%)
Nutrition, n (%)	Enteral	121 (37.9%)
	Parenteral	58 (18.1%)
	Enteral+Parenteral	31 (9.7%)
NPO status, n (%)	1 day	96 (30.0%)
	2-4 days	68 (21.3%)
	> 5 days	25 (7.8%)

APACHE: Acute Physiology and Chronic Health Evaluation; GI: Gastrointestinal; NPO: Nil per os.

There are patients with >1 cause for admittance.

**Table 2. Stress ulcer prophylaxis related data**

N:317	n (%)
Patients receiving medication	313 (98.7%)
Ranitidine	266 (84.0%)
Pantoprazole	44 (14.0%)
Did not receive SUP medication	4 (1.2%)
Patients having major risk factors for SUP*	94 (29.6%)
Patients having minor risk factors for SUP**	72 (22.7%)
Adherence to SUP medication guidelines	166 (52.3%)
Unnecessary SUP medication	151 (47.4%)
New onset clinical significant GI bleeding during ICU stay	-

SUP: Stress ulcer prophylaxis; GI: Gastrointestinal.

\*Presence of mechanical ventilation, coagulopathy.

\*\*Sepsis, head trauma, burn injury, steroid medication, anticoagulant medication, prolonged non steroid anti-inflammatory medication, hepatic-renal insufficiency/failure, multi trauma, nil per os status for  $\geq$ 5 days and occult/overt GI bleeding



0029

**NOT JUST FOCUS ON THE SPINE IN FAILED BACK SURGERY SYNDROME :  
TWO CASES WITH PARATHYROID ADENOMA AND MENINGIOMA**

Damla YÜRÜK<sup>1</sup>, Hüseyin Alp ALPTEKİN<sup>1</sup>

Ankara Dışkapı Yıldırım Beyazıt Training and Research Hospital Algology Clinic

**Background and Goal of Study / Background:** We presented two cases in which we emphasized the importance of appropriate patient selection and accompanying comorbidity before lumbar surgery in the development of failed back surgery syndrome (FBSS).

**Materials and Methods:** Case-1: A 41-year-old female patient presented with pain in the low back, hip and legs that continued to increase after three laminectomy-discectomy operations. Due to widespread pain in the chest, knee, and back she could not walk without support. Postoperative fibrotic tissue, calcification in the paravertebral muscle, and osteopenia in the pelvis were detected on lumbar CT imaging. In laboratory examination PTH 785 pg/dl (10-50) and Ca 16.3 mg/dl (100-250) in 24-hour urine was detected. The postoperative pathology result of 09x10x15 mm echopenic lesion at the lower right parathyroid in USG was adenoma. After the postoperative treatment of calcitriol 0.5 mcg/day and calcium 1200 mg/day, PTH level decreased to 256 pg/dl. Patient's pain was reduced by 50% and started walking without support. Case-2: A 50-year-old female patient presented with pain and loss of strength in the right leg that continued after L4-5 laminectomy-discectomy operation two years ago. Right thigh flexion was 4/5, foot dorsal and plantar flexion were 3/5 muscle strength. T5 level below was hyperesthetic, right patella and achil reflexes were increased, clonus and babinski were positive. In thoracic MR imaging, an intradural extramedullary hypointense enhancing mass that push the spinal cord to the left and posterior was observed at the level of T4. The pathology result of the mass removed by microsurgical technique was meningioma. The loss of strength and pain of the patient completely disappeared after 1 month.

**Results and Discussion / Discussion:** FBSS is defined as persistent and/or increased back and/or leg pain after back surgery.(1) Epidural fibrosis, spinal stenosis, arachnoiditis, foraminal stenosis and recurrent herniation are the most common causes. (2) Treatment is only possible by determining the cause of the syndrome. For this reason, the physician should not focus only on the area where the patients are operated.

**Conclusion(s):** With a multidisciplinary approach physical examination, metabolic and radiological evaluation should be done for other causes related to FBSS.

**References:**

1. Chan CW, Peng P. Failed back surgery syndrome. Pain Med. 2011;12:577 –606 2. Hussain A, Erdek M. Interventional pain management for failed back surgery syndrome. Pain Pract. 2014;14(1):64–78. doi:10.1111/ papr.12035

## O030

### THE CHALLENGES OF THE MEDICAL DOCTORS WORKING IN THE INTENSIVE CARE UNIT DURING COVID-19 PANDEMIC

Helin ŞAHİNTÜRK<sup>1</sup>, İrem ULUTAŞ ORDU<sup>1</sup>, Aykan GÜLLEROĞLU<sup>1</sup>,  
Fatma İrem YEŞİLER<sup>1</sup>, Manat AITHAKANOVA<sup>1</sup>, Ender GEDİK<sup>1</sup>, Pinar ZEYNELOĞLU<sup>1</sup>

Başkent University

**Background and Goal of Study / Background:** Healthcare professionals working in intensive care unit (ICU) have been in the frontline from the beginning of COVID-19 pandemic. We aimed to evaluate the technical and psychological difficulties encountered by medical doctors working in the ICU of the hospitals within Başkent University Faculty of Medicine during this pandemic.

**Materials and Methods:** A questionnaire consisting of 52 questions was applied to the medical doctors working in the ICUs of Başkent University affiliated centers.

**Results and Discussion / Discussion:** Out of the 73 ICU physicians who were invited to participate, 62 (84.9%) of them completed the survey. Out of 59.7% of the participants stated that they did not feel safe while caring for the patients. The most common reason for their insecurity was the fear of contamination (70.3%). Out of 69.4% ICU physicians stated that their anxiety level was moderate. It was observed that the anxiety level of ICU physicians decreased as the number of patients followed up increased ( $p = 0.025$ ), the increase in the number of hospital beds was found to be significantly associated with increased anxiety level ( $p = 0.015$ ). It was found that the presence of anxiety complaint increased the state of having high anxiety related to COVID-19 disease 28.3 times ( $p = 0.001$ ).

**Conclusion(s):** We found that more than half of the physicians participating in our study didn't have any problem of PPE deficiency, which is one of the most important technical difficulties. When it comes to psychological difficulties, we found that doctors who had anxiety complaints before had much more difficulties in managing the pandemic process than others.

**O031****WHICH OBJEKTIVE METHOD IS A RELIABLE AND EARLY INDICATOR OF THE INFRACLAVICULAR BRACHIAL PLEXUS BLOCK SUCCESS; FIVE CANDIDATES, ONE WINNER.**

Abdulahkim ŞENGEL<sup>1</sup>, Mahmut Alp KARAHAN<sup>2</sup>, Nuray ALTAY<sup>2</sup>,  
Orhan BİNİCİ<sup>2</sup>, Veli Fahri PEHLİVAN<sup>2</sup>, Ahmet ATLAS<sup>2</sup>

1: Şanlıurfa İl Sağlık Müdürlüğü Siverek Devlet Hastanesi, 2: Harran Üniversitesi Tıp Fakültesi

**Background and Goal of Study / Background:** This study aims to investigate whether perfusion index (PI), non-invasive tissue hemoglobin monitoring (SpHb), tissue oxygen saturation (StO<sub>2</sub>), tissue hemoglobin index (THI) and body temperature are reliable and objective methods to evaluate the adequacy of infraclavicular blockage, as well as to describe the time course of changes in these parameters after the peripheral nerve block has been surgically achieved.

**Materials and Methods:** An ultrasound-guided infraclavicular brachial plexus block was applied to 100 healthy American Society of Anesthesiologists (ASA) I-II adult patients aged 18–65 years who were scheduled for elective forearm surgery. PI, SpHb, StO<sub>2</sub>, THI and body temperature measurements were recorded 5 min before the block procedure, right after the procedure, and until the 25th minute after the procedure at 5-min intervals. These values were compared between the blocked limbs and non-blocked limbs while being statistically compared between the successful and failed block groups.

**Results and Discussion / Discussion:** There were significant differences between the groups of blocked extremity and non-blocked extremity in terms of StO<sub>2</sub> (P = 0.001), THI (P = 0.001), PI (P = 0.001) and body temperature (P = 0.001), there was no significant difference between these groups in terms of SpHb (P > 0.05). Moreover, a significant difference was detected between the groups of successful block and failed block in terms of StO<sub>2</sub> (P = 0.002), PI (P = 0.002) and body temperature (P = 0.005), while there was no significant difference between these groups in terms of THI (P > 0.05) and SpHb (P > 0.05). The sensitivity and specificity of the parameters that were found to be significant were determined by The receiver operating characteristic (ROC) analysis of the variables. StO<sub>2</sub> was found to be more significant among the parameters that we applied ROC analysis.

**Conclusion(s):** StO<sub>2</sub>, PI and skin Temperature measurements in infraclavicular plexus blocks are simple, objective, noninvasive techniques to evaluate the success or failure of blocks. StO<sub>2</sub> is the parameter with the highest specific and sensitivity among these parameters.

**O032****MECHANICAL POWER MEASUREMENTS IN PEDIATRIC MECHANICAL VENTILATION**Ahmet YÜKSEK

Department of Anesthesiology and Reanimation, Bozok University, Yozgat, Turkey

**Background and Goal of Study / Background:** Mechanical Power (MP) is a single and new variable in place of major damage causes due to mechanical ventilation in the lungs. MP above 12.6 Joule/minute, independent risk factor in mortality due to mechanical ventilation (1). In this study, we aimed to test the results of the MP formula in laparoscopic pediatric cases.

**Materials and Methods:** MP calculated by the formula of Becher et al. ( $MPPCV = 0.098 \times RR \times VT \times (\Delta P_{insp} + PEEP)$ ) in cases under 1 year of age with laparoscopic inguinal hernia repair and pressure controlled ventilation (2).

**Results and Discussion / Discussion:** In this retrospective preliminary study, 8 pediatric cases under 1 year of age were included. MP measured according to the formula was found to be  $1.78 \pm 0.31$  j / min. While the MP / FRC ratio was  $9.05 \pm 1.7^2$ , this ratio was higher than the MP / FRC ratio (5.04) of a 70 kg adult patient. While driving pressures were 13 cmH<sub>2</sub>O in all of the patients, 6 patients had applied > 10ml / kg tidal volume (TV). However, the mean MP measured was  $1.78 \pm 0.3^1$ , which was far below the reference value given for adults in the literature (2). The MP / FRC ratio was observed to be much higher than an adult patient of ideal weight. Similarly, Guanzioli et al. showed that MP applied in pediatric intensive care patients with and without ARDS is mostly used to defeat the resistances and the resistive component of the mechanical power was higher than in adults (3).

**Conclusion(s):** Our results showed that the MP formula applied in pediatric cases undergoing laparoscopic inguinal hernia operation is not useful alone according to the MP / FRC ratio and it is not suitable as warning criteria. It was also concluded that more studies are needed in this area.

**References:**

1. Silva PL, Ball L, Rocco PRM. et al. Power to mechanical power to minimize ventilator-induced lung injury?. ICMx. 2019; (7): 38. doi.org/10.1186/s40635-019-0243-4
2. Becher T, van der Staay M, Schädler D, Frerichs I. and Weiler N. Calculation of mechanical power for pressure-controlled ventilation. Intensive Care Med. 2019; 45:1321–1323. doi.org/10.1007/s00134-019-05636-8
3. Guanzioli M, Chiumello D, Marino A et al. European Respiratory Journal. 2017;(50): PA1869; DOI: 10.1183/1393003.congress-2017.PA1869

**0033****VALIDATION OF BOBI SCORE FOR OUTCOME PREDICTION**Besnik FASKAJ, Monika BELBA

University of Medicine, Tirana, Albania ,University Hospital Center Tirana, Albania

**Background and Goal of Study / Background:** Burn mortality indicators and prognostic scores are fundamental in arrange to triage burned patients in agreement to the seriousness of the problem. Belgium Outcome Burn Injury (BOBI) score is a score that is validated in numerous studies. The aim of this presentation is to validate the use of the BOBI prognostic score in our patients.

**Materials and Methods:** The study is designed as a retrospective clinical and analytical cohort of 1515 patients hospitalized in ICU of the service of Burns, University Hospital Center "Mother Teresa" in Tirana Albania during 2010-2019. The BOBI score uses absolute values of age which is divided into four groups(0-3 points), BSA(%) which is divided into 5 groups(0-4 points), and the presence of inhalational burn(No=0 point; yes=3 points). This formula predicts mortality by total score. Based on the total score (0-10 points), predicted mortality ranges between 0.1% and 99%(Table 1). The Receiver Operator Characteristic (ROC) curve was used to test the score for mortality.

**Results and Discussion / Discussion:** During this period 1515 patients were included. The mean age of the patients was  $25.7 \pm 3.1$  years, 40% of the total number have flame as the causative agent. In the children group, mortality was lower 0.9% (7 deaths of 763 patients 0-14 years), in the adult group mortality was 7.7 % (42 deaths of 539 patients) while in the elderly population the mortality was 27.2%. In table 2 we have presented the prediction of the BOBI score for mortality and the real outcome. In figure 1 we have presented the ROC curve for validating this score (0.965,  $p < 0.0001$ )

**Conclusion(s):** BOBI score is a very good predictor of mortality in burn patients

**O034****ANESTHESIA MANAGEMENT IN THE INTERVENTION OF FOREIGN BODY ASPIRATION IN A PATIENT WITH DANDY-WALKER MALFORMATION: A CASE REPORT**

Murat IZGI<sup>1</sup>, Yasemin KILIC<sup>1</sup>, Nuriye Sidar ARSLAN<sup>1</sup>, Ismail GUZELKAS<sup>2</sup>, Nagehan EMIRALIOGLU<sup>2</sup>

1 Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation, Ankara, TURKEY

2 Hacettepe University, School of Medicine, Department of Pediatric Pulmonology, Ankara, TURKEY

**Background and Goal of Study / Background:** Dandy-Walker syndrome is an extremely rare congenital disorder characterized by the triad of cerebellar vermis hypoplasia, cystic dilatation of the fourth ventricle, and hydrocephalus symptoms. It is a congenital malformation that should be approached carefully in terms of difficult mask ventilation because of craniofacial anomalies.

**Materials and Methods:** An 8-month-old, patient with DWM, accompanied by symptoms of cough and wheezing, was evaluated by the pediatric pulmonology department. Congenital lobar emphysema was suspected in the left lower lobe. It was decided to perform flexible bronchoscopy. The patient was taken to the operating room, and standard ASA monitoring was performed. After sevoflurane induction, an intravenous catheter was placed. Following 3 mg/kg propofol administration, a size 1.5 laryngeal mask airway (LMA) was placed in the patient. Flexible bronchoscopy was performed through the LMA, and a foreign body was seen in the lower lobe basal segment of the left lung. Then it was decided that the patient would undergo rigid bronchoscopy by pediatric surgery department. Because the first attempt to enter the airway with a rigid bronchoscope was unsuccessful, the patient could not be ventilated for a while, and the oxygen saturation decreased to 52% and pulse rate to 60 beats/min, the patient was switched to mask ventilation by administering 0.01 mg/kg atropine, and the patient was ventilated successfully. The procedure lasted about 45 minutes. The foreign body was removed successfully. After staying in the recovery unit for a while, the child was transferred to the pediatric intensive care unit for further follow-up.

**Results and Discussion / Discussion:** One of the main points to be considered in anesthesia management in patients with DWS is avoiding maneuvers that may increase intracranial pressure, drugs that lower the convulsion threshold, as well as situations that may change the cerebrospinal fluid physiology and pressure such as hypotension and hypertension (1). At the same time, mask ventilation and intubation can be difficult due to cleft lip-palate, micrognathia, craniofacial and skeletal anomalies, cardiopulmonary complications, and difficult airway management may become important in these patients (2).

**Conclusion(s):** Complications due to ventilation difficulties should be kept in mind and it should be remembered that rapid intervention is life-saving.

**References:**

1. Demircioğlu et al: Anesthesia for the patient with Dandy-Walker syndrome. *Journal of Anesthesia* 2012; 20 (4): 245 – 248
2. Tümtürk AF ve Öktem İS: Dandy-Walker malformation. *Journal of Turkish Neurosurgery* 2013; 23(2), 180-184



## O035

### MANAGEMENT OF AN INTRACTABLE PAIN DUE TO BILATERAL LOWER LIMB COMPARTMENT SYNDROME AS A COMPLICATION OF BREAST RECONSTRUCTION SURGERY

Duygu DEMİRİZ GÜLMEZ<sup>1</sup>, Hilal KIRCI<sup>2</sup>, Alparslan APAN<sup>1</sup>, Özgün CUVAŞ APAN<sup>1</sup>

1: Giresun University Medical Faculty, Department of Anesthesiology and Reanimation.

2: S.B. Rize State Hospital Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Compartment syndrome is a serious complication that compromise circulation of the lower extremity and rarely reported after plastic surgery (<sup>1</sup>, 2). This case represents bilateral compartment syndrome in lower extremity diagnosed after long lasting breast surgery.

**Materials and Methods:** Signed informed consent was obtained for scientific report. Breast cancer was diagnosed in 39 years old female patient and ablative surgery was performed and silicone breast prosthesis was inserted. Reoperation for silicone breast prosthesis displacement was performed but the result of the operation was unsatisfied. Therefore patient was undergone breast reconstruction lasting 13 h in a remote center. Bilateral compartment syndrome was diagnosed the day after surgery and fasciotomy was performed. Skin grafting was performed for skin defects. Patient referred to our emergency service with intractable extremity pain, and she was transferred to our pain polyclinic. She had a severe pain (Numeric rating scale = 8). Her pain was relieved in time with pregabalin, long lasting morphine, duloxetine BID. After one week her pain level was reduced nearly zero.

**Results and Discussion / Discussion:** Compartment syndrome is a serious complication that threatens viability of lower extremity and urgent surgery is mandatory for restoring the circulation. Efficient pain management in the immediate period is required to prevent chronic postoperative pain. In our case, the origin of her pain was either somatic or neuropathic. The patient's pain was terminated with a medical treatment that affected both mechanisms of pain.

**Conclusion(s):** Necessary precautions should be taken against the risk of the compartment syndrome in long term surgical operations. If compartment syndrome develops, adequate pain treatment is important to prevent the pain to be chronic.

#### References:

1. Malahias M, et al. Ann R Coll Surg Engl 2012;94:e155-6. 2. Tashakkor Y, et al. Can J Plast Surg 2012;20:103-6.



**O036****BAROTRAUMA DURING MECHANICAL VENTILATION IN COVID-19 PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME IN THE INTENSIVE CARE UNIT: A CASE SERIES**Öznur DEMİROLUK<sup>1</sup>, Arzu YILDIRIM AR<sup>1</sup>, Yıldız YİĞİT<sup>1</sup><sup>1</sup>University of Health Sciences Fatih Sultan Mehmet Health Research and Application Center, Anesthesiology and Reanimation Department, Istanbul, Turkey.

**Background and Goal of Study / Background:** In Coronavirus-19 (Covid-19) patients with acute respiratory distress syndrome (ARDS) elevated airway pressures can be observed during invasive mechanical ventilation (IMV) and barotrauma can result. Barotrauma can prevent optimal ventilation and worsen patient outcomes. (1) We aim to share our experience with five patients who developed barotrauma in the intensive care unit (ICU) during IMV for ARDS caused by Covid-19.

**Materials and Methods:** Five PCR (+) patients with worsening dyspnea and hypoxia were transferred to the ICU for Covid-ARDS and treated with IMV for the 0-5 days of their admission. These patients with elevated inflammatory parameters developed sudden desaturation, hypotension, and/or subcutaneous emphysema while ventilated at prone or supine positions. Bedside imaging with thoracic ultrasound, x-ray, or computed tomography revealed pneumothorax and/or pneumomediastinum. (Figure 1, Figure 2) For the treatment of barotrauma, patients with prone positioning were reverted to supine positions, airway pressures were lowered, and chest tubes were inserted when necessary. One patient was discharged following 35 days of IMV, while four patients died in the following 1-7 days after barotrauma with worsening hypoxia. (Table 1, Table 2, Table 3)

**Results and Discussion / Discussion:** Among patients receiving IMV, ARDS is an important risk factor for barotrauma. (1) Barotrauma has been associated with high tidal volumes and increased airway pressures in patients with ARDS. However, despite lung-protective ventilation techniques, patients with Covid-19 ARDS had higher rates of barotrauma than non-Covid-19 ARDS patients. (2,3) The increased fragility of lung tissue increases the risk of barotrauma in these patients. (2) In Covid-19 patients with barotrauma, disease-associated inflammatory parameters are higher than in Covid-19 patients without barotrauma. (1) Our patients had elevated inflammatory parameters consistent with severe Covid-19 infection. In these patients with difficulties in ventilation due to low PO<sub>2</sub>/FiO<sub>2</sub> ratios and low lung compliance, severe lung damage in addition to elevated airway pressures plays an important role.

**Conclusion(s):** Clinicians should be aware of the higher risk of barotrauma during IMV in severe Covid-19 ARDS patients with already impaired pulmonary functions to timely manage this complication. Key words: COVID-19; Barotrauma; Mechanical Ventilation; ARDS

**References:**

1. Elsaaran H, AlQinai S, AlTarrah D, et al. Prevalence and risk factors of barotrauma in Covid-19 patients admitted to an intensive care unit in Kuwait; a retrospective cohort study. *Ann Med Surg (Lond)*. 2021 Mar;63:102141. doi: 10.1016/j.amsu.2021.01.089
2. Lemmers DHL, Abu Hilal M, Bnà C, et al. Pneumomediastinum and subcutaneous emphysema in COVID-19: barotrauma or lung frailty?. *ERJ Open Res*. 2020 Nov 16;6(4):00385-2020. doi: 10.1183/23120541.00385-2020.

3. McGuinness G, Zhan C, Rosenberg N, et al. Increased Incidence of Barotrauma in Patients with COVID-19 on Invasive Mechanical Ventilation. Radiology. 2020 Nov;297(2):E252-E262. doi: 10.1148/radiol.2020202352.

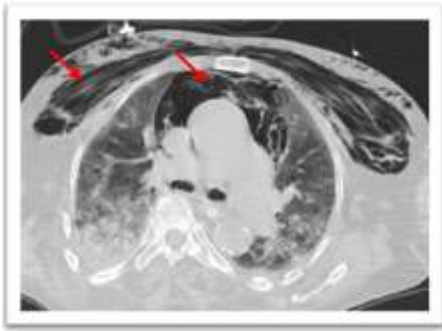


Figure 1: Subcutaneous emphysema/ pneumomediastinum

Figure 2: Pneumothorax in Case-5 in Case-3.

Table 1: Demographic and Clinical Characteristics of the Patients

	Case 1	Case 2	Case 3	Case 4	Case 5
Age	62	68	88	52	54
Gender	Male	Female	Female	Male	Female
BMI	28	31	29	25	29
APACHE II Score	18	7	26	13	18
Comorbidities	-	HT/DM	HT	-	HT
Time between symptom onset and hospital admission (days)	5	5	7	3	4
Hospital stay before ICU (days)	4	5	12	11	3
Supplemental O2 before IMV	Non-rebreathing O2 mask/ HFNO	Non-rebreathing O2 mask /NIMV	Non-rebreathing O2 mask	HFNO/ NIMV	Non-rebreathing O2 mask / HFNO
Time between ICU admission and onset of IMV (days)	0	2	0	5	0
IMV time (days)	3	12	20	35	11
ICU length of stay (days)	3	13	20	39	11
Survival	Deceased	Deceased	Deceased	Alive	Deceased

BMI: Body mass index, APACHE II: Acute Physiology and Chronic Health Evaluation II, HT: Hypertension, DM: Diabetes mellitus,

NIMV: Non invasive mechanical ventilation, HFNO: High flow nasal oxygen

Table 2: Inflammatory and Ventilation Parameters

	ICU Admission n:5 (With Non-rebreathing O2 mask) Median(Min-Max)	Before Barotrauma n:5 (With IMV) Median(Min-Max)	After barotrauma n:5 (With IMV) Median(Min-Max)
HB g/dl	11.6 (10.1-14.8)	9.1 (8.5-14.3)	8.7 (8.3-9.1)
WBC 10 <sup>3</sup> /uL	10.4 (6.3-20.5)	10.5 (5.1-13.1)	10.1 (4.5-12.2)
LYM 10 <sup>3</sup> /uL	0.4 (0.2-1)	0.4 (0.2-0.4)	0.3 (0.2-0.4)
NLR	16 (14-50)	29 (11-43)	26 (21-38)
LDH u/L	642 (295-703)	437 (243-1168)	690 (499-902) *
Ferritin ng/mL	702 (345-1246)	833 (244-1897)	618 (491-734) *
Fibrinogen mg/dL	658 (483-761)	706 (493-1016)	459 (206-770) *
D-Dimer µg/ml	2.1 (0.6-5.7)	3.14 (1.5-5.69)	2.2 (1.7-2.8)*
IL-6 pg/ml	37 (18-122)	46 (10-82)	13.4 (10.4-26.7) *
CRP mg/L	6.9 (5.3-10)	12.3 (5-21.7)	19.7 (6.6-31.4) *
PO2/FiO2	60 (52-72)	116 (85-141)	62 (49-116)
SaO2 %	80 (55-89)	96 (93-97)	89 (79-96)

\* n=4. HB: Hemoglobin. WBC: white blood cell. LYM: Lymphocyte. NLR: Neutrophil to lymphocyte ratio. LDH: Lactate dehydrogenase. IL-6: Interleukin 6. CRP: C-reactive protein. SaO2: Arterial oxygen saturation

Table 3: Ventilator parameters, Patient positioning and Barotrauma Management

	Mode	PS	PEEP	FiO2	RR	IMV duration (days)	Prone Position	Barotrauma Type	Treatment
Case-1	SIMV-PS	20	12	0.8	18	2	+	Subcutaneous emphysema / pneumomediastinum	Careful monitoring
Case -2	SIMV-PS	24	10	1.0	18	7	+	Bilateral pneumothorax	Bilateral tube drainage
Case -3	SIMV-PS	22	8	0.7	15	7	-	Subkutan amfizem/ pneumomediastinum	Bilateral tube drainage
Case -4	SIMV-PS	23	10	0.8	16	2	-	pneumomediastinum	Careful monitoring
Case -5	SIMV-PS	22	12	1.0	17	5	+	Unilateral pneumothorax	Unilateral chest tube drainage

PS: Pressure support. PEEP: Positive end expiratory pressure. RR: Respiratory rate, FiO2: Fraction of inspired oxygen.

**0037****NEGATIVE PRESSURE PULMONARY EDEMA OCCURRING  
DURING THE POSTOPERATIVE PERIOD: A CASE REPORT**Murat IZGI<sup>1</sup>Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation, Ankara,  
TURKEY

**Background and Goal of Study / Background:** Negative pressure pulmonary edema (NPP) is a non-cardiac form of pulmonary edema, which was first described in 1977 and usually occurs due to strong inspiratory effort against the obstructed airway and rarely due to some medications and hypersensitivity reactions (1).

**Materials and Methods:** A 29-year-old male patient with rotator cuff tear was scheduled for elective surgery by the orthopedics and traumatology department. The patient's ASA score was I, and his chest radiography (Figure 1) was also normal. At the end of the operation, the patient, who was taken to the recovery room for follow-up postoperatively and did not experience any problems during the 30-minute follow-up, was deemed appropriate to be transported to the service. In the second hour, the patient had respiratory distress in the ward, and his blood pressure was 90/60, pulse: 137/min, respiratory rate: 32/min, SpO<sub>2</sub>: 80%. PA chest radiography of the patient was taken (Figure 2). Chest diseases consultation was requested. During this period, 2 mg/kg methylprednisolone, 40mg furosemide, salbutamol nebule, ipratropium nebulae were administered to the patient, but he was consulted for intensive care admission due to the persistence of pink foamy pulmonary secretions and severe cough. Computed thoracic tomography (CT) was requested with the pre-diagnosis of pulmonary edema, the results were suitable for the pre-diagnosis and the patient was transferred to the intensive care unit. The patient was followed up in the ICU for two days. Oxygen therapy was stopped after the regression of respiratory distress. The patient, whose oxygen support was stopped, was taken to the service 18 hours later. Vital findings after 24-hour follow-up in the ward: SpO<sub>2</sub>: 97-98%; arterial blood pressure: 120/75mmHg and respiratory rate: 12-13/minute. The patient recovered completely on the 4th postoperative day and was discharged with relief.

**Results and Discussion / Discussion:** The diagnosis of NPP is usually made in the early period with sudden shortness of breath and pink foamy sputum. However, it has been reported that NPPO may occur in the late period (2-3). The primary goal of treatment is to eliminate respiratory distress and reduce edema with diuretics.

**Conclusion(s):** In conclusion, NPP is a rare but serious complication that can lead to morbidity and mortality if left untreated.

**References:**

1. Oswalt CE, Gates GA, Holmstrom FM. Pulmonary edema as a complication of acute airway obstruction. JAMA 1977; 238:1833–1835.
2. Goldenberg JD, Portugal LG, Wenig BL, et al. Negative-pressure pulmonary edema in the otolaryngology patient. Otolaryngol Head Neck Surg 1997; 117:62–66.
3. Lang SA, Duncan PG, Shephard DA, et al. Pulmonary oedema associated with airway obstruction. Can J Anaesth 1990; 37:210–218.



**O038****COMPARISON OF THE EFFECTS OF GENERAL ANESTHESIA AND EPIDURAL ANESTHESIA ADDED TO GENERAL ANESTHESIA IN THE ANESTHETIC MANAGEMENT OF GYNECOLOGICAL ONCOLOGICAL SURGERY**İrfan MEHMET<sup>1</sup>, Mete Gürol UĞUR<sup>2</sup>, Mehmet CESUR<sup>1</sup>, Süleyman GANİDAĞLI<sup>1</sup>, Berna KAYA UĞUR<sup>1</sup>

(1)Gaziantep University School of Medicine Department of Anesthesiology and Reanimation,

(2)Gaziantep University School of Medicine Department of Obstetrics and Gynecology

**Background and Goal of Study / Background:** The aim of the study to investigate the effects of epidural analgesia(EA) added to general anesthesia(GA) in cases who have undergone major gynecological oncologic surgery under GA on the perioperative and postoperative complications that may occur due to GA.

**Materials and Methods:** We retrospectively searched the archive records of patients who underwent gynecological-oncological laparotomy at Gaziantep University Şahinbey Research Hospital between 01.01.2015-01.09.2020. Data of 690 patients were scanned retrospectively and 223 patients who met the study criteria were included in the study.

**Results and Discussion / Discussion:** Patients were divided into two groups as patients who received GA(Group G,n = 123), and those who received EA in addition to general anesthesia (Group E,n = 100). The mean ages of the patients were found to be significantly higher in Group E. There was no significant difference between the two groups in terms of body mass indicis, ASA physical status, and primary malignancies. Duration of operation found to be lower in group G than in E. Obesity rate in group G and presence of asthma in group E were found to be statistically significantly higher. Blood pressure was found to be more stable in Group E. It was observed that fibrinogen transfusion was applied at a higher rate in Group G. However, intraoperative bleeding rates were found to be less in group E than group G. There was no significant difference between the two groups in terms of fluid and albumin transfusion. Postoperatively, the first analgesic requirement time of group E was found to be significantly longer than group G. First mobilization times were found to be significantly lower in Group E. Thrombosis and cardiac complications were found to be significantly lower in group E. In Group E, it was observed that the length of stay in the hospital and intensive care unit was shorter, whereas allergic complications were more common.

**Conclusion(s):** In our study, we concluded that the addition of EA to GA in gynecological oncological surgical operations has a positive effect on morbidity, decreases the need for postoperative analgesic and hospital stay. We believe that our results should be supported by further prospective studies on this subject.

**O039****RECROSPECTIVE ANALYSIS OF PATIENTS WHO HAVE BEEN IMPLEMENTED  
NEUROANESTHESIA FOR BRAIN SURGERY BETWEEN 2015-2019 AT ONDOKUZ MAYIS  
UNIVERSITY FACULTY OF MEDICINE HOSPITAL**

Hasan ÇETİNKAYA<sup>1</sup>, Bahriye Binnur SARIHASAN<sup>1</sup>  
Ondokuz Mayıs University Faculty Of Medicine Hospital<sup>1</sup>

**Background and Goal of Study / Background:** It was aimed to prepare a guiding data source by evaluating the preoperative and intraoperative anesthesia record forms of patients who underwent neuroanesthesia in Ondokuz Mayıs University medical faculty hospital.

**Materials and Methods:** The study was conducted at the Ondokuz Mayıs University medical faculty hospital after the approval of the local ethics committee. Anesthesia record forms of 5172 patients who received neuroanesthesia due to operation in neurosurgery between 01.01.2015 and 31.12.2019 were accessed, data were collected and statistical analysis was performed.

**Results and Discussion / Discussion:** 52.9% of the patients were male, the average age was 43.2. It was observed that herniopathy and shunt/EVD operation were most frequently applied to the patients. It was observed that 51.3% ASA2 and 77.3% of the patients were admitted to surgery electively. 63.7% of the patients had concomitant systemic disease and 48.6% of them had cardiovascular diseases. It was observed that thiopental, NMB rocuronium and analgesic remifentanil were mostly used in induction. It was found that the most TIVA component propofol was used for maintenance. It was observed that 33.6% of the patients had invasive artery monitoring and 22.2% CVP monitoring. It was found that 21.1% steroid, 21.3% diuretic and 30% antiemetic were administered to the patients. The use of inotropic agents was 5.1% and blood transfusion was 6.6% of the patients. It was found that 24.1% of the patients developed complications, and 71.9% had cardiovascular complications. Intraoperative arrest rate was 0.4%. Preoperative GCS of 93.8% of the patients was 15 and anesthesia duration was 145.9 minutes on average. Intensive care need of the patients was 24.8% and postoperative analgesic need was 37.3%.

**Conclusion(s):** Many studies including large patient series from regular and systematic anesthesia records can be performed in a healthy way. Anesthesia registration forms in our clinic contain most of the information about patients. It was concluded that the repetition of retrospective studies at regular intervals would contribute to the development of anesthesiology by allowing both the evaluation of practices in the same clinic and comparison between clinics.

**O040****THE COMPARISON OF VIDEO FIBERSCOPE AND DCI VIDEO LARYNGOSCOPE PERFORMED BY TWO PRACTITIONERS IN PATIENTS WITH EGRI SCORE > 4**Halil CEBECI<sup>1</sup>, Gunes COMBA CEBECI<sup>1</sup>, Ersin KOKSAL<sup>1</sup>

Department of Anesthesiology and Reanimation, School of Medicine, Ondokuz Mayıs University, Samsun ,Turkey

**Background and Goal of Study / Background:** Endotracheal intubation plays an important role in general anesthesia. Complications can be prevented by using alternative airway devices in predetermined difficult intubation cases. In this study, we aimed to compare the results of endotracheal intubation with video fiberscope and DCI video laryngoscope devices of two different experienced physicians (E and H).

**Materials and Methods:** In this randomized and prospective study, 60 patients with EGRI score > 4 and ASA score <<sup>4</sup>, operated between 1 October 2018 and 1 March 2019 in Ondokuz Mayıs University School of Medicine Hospital were included. Endotracheal intubation was performed by two practitioners using two different devices. Intubation times, number of attempts, failed attempts, postoperative complications and hemodynamic responses were recorded.

**Results and Discussion / Discussion:** There was no significant difference between demographic data, number of attempts, unsuccessful attempts, postoperative complications and hemodynamic data. When DCI video laryngoscope was used, it was observed that the E practitioner performed intubation in a statistically significant time compared to the H practitioner ( $p = 0.047$ ). It was seen that the E practitioner performed intubation with DCI video laryngoscope in a statistically significantly shorter time than the use of video fiberscope ( $p = 0,014$ ).

**Conclusion(s):** In our study, unlike other studies in the literature, endotracheal intubation was performed by two experienced and inexperienced practitioners with two different devices in difficult intubation cases. We found that the experienced practitioner (E) provided endotracheal intubation with DCI videolaryngoscope both in a shorter time than with a video fiberscope and in a shorter time than inexperienced practitioner (H). We think that the comparison of the two devices by different practitioners in different conditions of intubation difficulty may give a different perspective to the studies in the literature.

**References:**

1. El-Ganzouri A. R., McCarthy R. J., Tuman K. J., Tanck E. N., Ivankovich A. D. Preoperative airway assessment: predictive value of a multivariate risk index. *Anesthesia & Analgesia* 1996; 82(6):1197-204.
2. Abdellatif A. A., MA A. GlideScope videolaryngoscope versus flexible fiberoptic bronchoscope for awake intubation of morbidly obese patient with predicted difficult intubation. *Middle East J Anaesthesiol* 2014; 22(4):385-92.



**O041****ANESTHETIC MANAGEMENT OF PARTURIENT FOR CESAREAN SECTION BABY DELIVERY,  
WITH DILATED CARDIOMYOPATHY AND LOW EJECTION FRACTION**

Churlinov K.<sup>1</sup>; Sivevski A<sup>1</sup>.; Spasovski S.<sup>1</sup>

University Clinic of Gynecology & Obstetrics - Department of Anesthesiology, Reanimation & Intensive Care Medicine; Skopje, Republic of N. Macedonia

**Background and Goal of Study / Background:** Dilated cardiomyopathy (DCM) is a form of cardiomyopathy characterized by left ventricular or biventricular dilatation and impaired ventricular contractility. The goals of anesthetic management include maintenance of optimal ventricular preload and afterload while avoiding any anesthesia induced myocardial depression. Comprehensive and synchronized anesthetic-obstetric approach, quick, emergency and efficient access. Improving systolic function preventing sudden death due to ventricular arrhythmias. To improve systolic function, patient should initially be managed medically with administration of diuretics, beta blockers, angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers. Myocardial depression should be avoided. Maintains of normovolemia. Avoid overdose of drugs during induction as the circulation time is slow. Ventricular afterload should be avoided. Avoid sudden hypotension when regional anesthesia is the choice. This review describes the perioperative evaluation and anesthesia considerations of patients with DCM undergoing cesarean section baby delivery

**Materials and Methods:** Semi - randomized study of 50 parturients with cesarean section baby delivery, with clinical signs of dilated cardiomyopathy and low ejection fraction - EF. Parturients were examined during 2 years period. A standard and additional haemodynamic profile was in use. Both, general and regional anesthesia have been used

**Results and Discussion / Discussion:** Major centro-neuraxial blockade may actually improve myocardial performance by reducing the after load on the left ventricle without improving contractility which may be beneficial in a situation of poor ventricular function, where no outflow tract obstruction is present. Epidural anesthesia can safely and effectively be used with carefully titrated dose of local anesthetics, and hemodynamic monitoring in parturient with DCM. General anesthesia is a big challenge, too. It have to be carefully titrated, by avoiding sudden hemodynamic changes. Pregnancy is poorly tolerated in some women with pre-existing DCM, with the potential for significant deterioration in LV function. Predictors of maternal mortality are NYHA class III/IV and EF <40%

**Conclusion(s):** Anesthetic management for caesarean section in parturient with DCM is a challenging task. The goals of anesthetic management are avoidance of myocardial depression, maintaining normovolemia. Avoiding overdose of drugs during induction as the circulation time is slow and to avoid sudden hypotension when regional anesthesia is the choice

**O042****AVAILABILITY OF PLETH VARIABILITY INDEX IN PREVENTION OF TURP SYNDROME IN TRANSURETHRAL PROSTATE RESECTION**Behiç GİRGIN<sup>1</sup>, Umut KARA<sup>2</sup>, Mehmet Burak EŞKİN<sup>2</sup>, Engin KAYA<sup>3</sup>, Ahmet COŞAR<sup>2</sup>Ankara City Hospital Department of Anesthesiology and Reanimation <sup>1</sup>,  
Health Sciences University Gulhane Training and Research Hospital Department of Anesthesiology  
and Reanimation <sup>2</sup>,  
Health Sciences University Gulhane Training and Research Hospital Department of Urology <sup>3</sup>

**Background and Goal of Study / Background:** Patients with bladder outlet obstruction due to benign prostatic hypertrophy (BPH) are successfully treated with transurethral resection of the prostate (TURP) (1). Although TURP is frequently applied to geriatric patients with cardiovascular and respiratory system problems, it is a procedure with a high morbidity rate due to many side effects such as bleeding, TURP syndrome and bladder perforation. Along with the large size of the prostate and the prolongation of the operation time, after the passage of irrigation fluid to the systemic circulation, confusion, dyspnea, arrhythmia and seizures can cause a picture known as TURP syndrome (2). The most important point in treatment is early diagnosis (3). Our aim was to reveal whether there is a statistical relationship between serum sodium (Na) and pleth variability index (PVI) values in the perioperative period in patients who underwent TURP. When this relationship was revealed, we predicted that we could benefit from PVI measurement in order to prevent the development of fluid overload (hypervolemic hyponatremia) and possible TURP syndrome.

**Materials and Methods:** We investigate demographic data and perioperative values of 33 patients who will undergo TURP under spinal anesthesia in our hospital. Venous blood samples were taken before and after the procedure for Na values; PVI values were recorded at 5-minute intervals from the preoperative period to the postoperative period with Masimo Radical-7® Pulse CO-Oximeter®. Resection time, prostate size, irrigation and intravenous fluid amount were recorded.

**Results and Discussion / Discussion:** The PVI data we obtained were correlated with postoperative osmolarity, postoperative sodium, resection time and irrigation amount, in terms of fluid overload and being an early predictor of a possible TURP syndrome.

**Conclusion(s):** The usability of PVI monitoring is a non-invasive method and necessary to enlighten its effectiveness on fluid management in more comprehensive studies. We think that it provides an advantage in early diagnosis with continuous monitoring from the preoperative period to the postoperative period.

**References:**

1. Feng F, Chen Z, Cromer J, Doerr A, Glow A, Horstman-Reser A ve ark. Anesthetic Concerns for Patients Undergoing a Transurethral Resection of the Prostate (TURP). Urol Nurs. 2016 Mar-Apr;36(2):75-81.
2. McGowan-Smyth S., Vasdev N., Gowrie-Mohan S. Spinal Anesthesia Facilitates the Early Recognition of TUR Syndrome. Curr Urol 2015;9:57-61
3. Kumkum Gupta, Bhawna Rastogi, Manish Jain, Prashant K. and Deepak Sharma. Electrolyte changes: An Indirect Method to Assess Irrigation Fluid Absorption Complications During Transurethral Resection of Prostate: A Prospective Study. Saudi J Anaesth. 2010 Sep-Dec; 4(3): 142–146.

**O043****AN EYE-POPPING EXPERIENCE DUE TO INTUBATION: A CASE REPORT**

Ülkü Ceren KÖKSOY<sup>1</sup>, Hakan YILMAZ<sup>1</sup>, Baturay Kansu KAZBEK<sup>1</sup>,  
Aybeniz Elif YILDIRIM<sup>1</sup>, Perihan EKMEKÇİ<sup>1</sup>

1: Ufuk University, Faculty of Medicine, Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** The aim of this case report is to increase the awareness of anesthesiologists about rare complications caused by intubation, especially ocular complications, and to underline the importance of preoperative evaluation. There is no data concerning ocular proptosis caused by orbital varices secondary to endotracheal intubation in the literature.

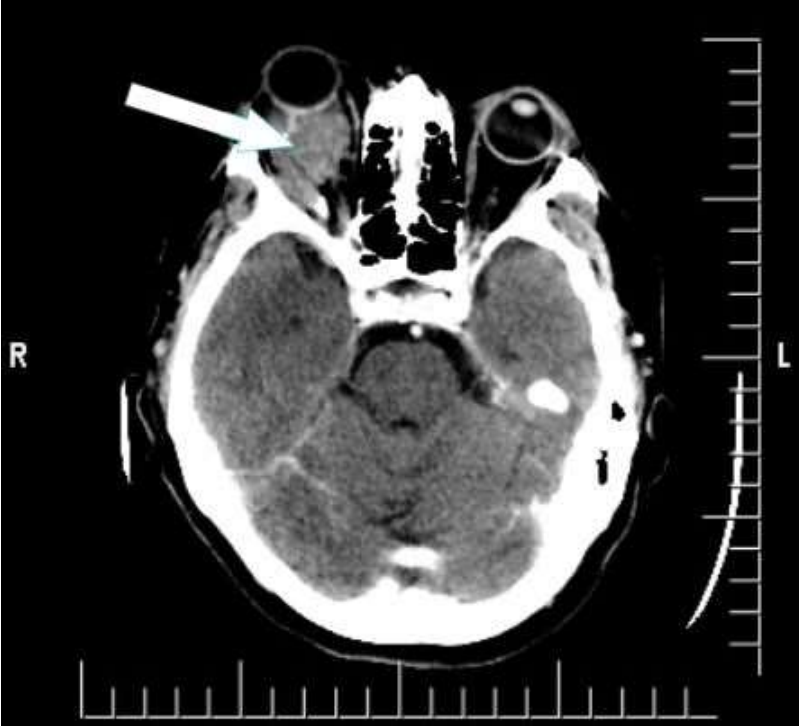
**Materials and Methods:** Written informed consent and permission for the publishing of photographs has been given by the patient. The patient, who was 67 years old, weighed 100 kg and 150 cm tall, was scheduled to undergo elective laparoscopic Spiegel hernia repair. Her past surgeries included uneventful total abdominal hysterectomy bilateral salpingoophorectomy and bilateral inguinal hernia repair. The patient had neglected to mention her orbital varix diagnosis during the preoperative visit. Following a routine and eventless intubation, blood pressure was 167/111 mmHg (mean 138 mmHg) which dropped to 130/80 mmHg after 5 mg nitroglycerin. Upon examination, a right sided orbital protrusion was observed (Figures 1 and 2). Bilateral pupils were isocoric and myotic. The surgery was postponed and the patient was extubated. Ocular examination which was performed after extubation revealed that visual acuity and visual field were normal. Bilateral anterior cameras were slightly narrow. Fundus examination was within normal limits. The proptosis disappeared spontaneously. The patient admitted to having a diagnosis of proptosis, which was exacerbated by bending forward. The patient later underwent laparotomic hernia repair under neuraxial anesthesia and protrusion did not repeat.

**Results and Discussion / Discussion:** Dynamic proptosis cases caused by straining such as Valsalva maneuver or bending forward in the presence of intact boney structures of the orbita are of venous origin(1). Thrombosis or hemorrhage can cause rapid proptosis which can result in orbital compartment syndrome and blindness(2).

**Conclusion(s):** A thorough anamnesis and physical examination is an indispensable part of the preoperative evaluation, regional techniques should be chosen in patients with a history of orbital varix and proptosis and if general anesthesia is necessary, intubation should be performed under ideal conditions.

**References:**

1. Bullock JD, Bartley GB. Dynamic Proptosis. Am J Ophthalmol. 1986;102(1):104-110.
2. Topilow NJ, Tran AQ, Koo EB, Alabiad CR. Etiologies of Proptosis: A review. Intern Med Rev (Wash DC). 2020;6(3):10.18103/imr.v6i3.852.



**O044****ANTIFIBROTIC TREATMENT FOR PULMONARY FIBROSIS INDUCED BY COVID-19**

Bahar SAKIZCI UYAR<sup>1</sup>, Kerem ENSARİOĞLU<sup>2</sup>, E. Bahar KURT<sup>2</sup>, Derya ÖZKAN<sup>1</sup>, Serra ÖZBAL GÜNEŞ<sup>3</sup>

1 University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Anesthesiology and Reanimation

2 University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Pulmonary Medicine 3 University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Radiology

**Background and Goal of Study / Background:** COVID-19 infection clinical presentation varies from asymptomatic cases to acute respiratory distress syndromes. In some cases, pulmonary fibrosis is observed after or during the disease. Pirfenidone is an agent approved for the treatment of idiopathic pulmonary fibrosis. Here we report a patient treated with pirfenidone for pulmonary fibrosis related to COVID 19.

**Materials and Methods:** A 64-year-old male with known hypertension and chronic obstructive pulmonary disease presented to emergency department with fever and cough. Bilateral opacities, predominantly on lower peripheral zones were observed on posteroanterior chest x-ray. Reverse-transcription polymerase chain reaction (RT-PCR) testing for SARS-CoV-2 RNA was found negative, however patient was found positive for COVID-19 rapid antibody test which evaluates presence of any antibody. Patient was then hospitalized with diagnosis of SARS-COV-2 pneumonia due to clinical, radiological and rapid antibody test positivity. Within two days, patient's general status deteriorated and he was transferred to intensive care unit (ICU). High flow nasal cannula at 60 L/min with 100% fractional inspired oxygen (FiO<sub>2</sub>) was initiated along with and intermittent continuous positive airway pressure (CPAP) support. Tocilizumab at a total dosage of 800 mg (8 mg/kg) was administered for a possible cytokine release syndrome. Treatment response was observed with limited improvement in hypoxia and reduction in opacities in chest x-ray. Thirty days after initial diagnosis of COVID-19, the patient's general condition once again deteriorated in ICU. Hypoxia and normocarbica were present in arterial blood gas analysis. Due to suspicion of fibrosis in the requested chest x-ray, high resolution chest computed tomography was performed and diffuse pulmonary fibrosis was confirmed (Figure1). Methyl-prednisolone 1000 mg IV was administered for three days. Since hypoxia did not improve, Pirfenidone treatment was started. Maximum dosage of 2400 mg per day was reached within 9 days. Patient's saturation was improved and SPO<sub>2</sub>>90 could be seen with an oxygen mask at 6 L/min O<sub>2</sub> (Figure2).

**Results and Discussion / Discussion:** Pirfenidone downregulates anti-fibrotic processes, mainly by modifying fibroblast activity. While licensed for IPF treatment, pirfenidone had been tested on other interstitial lung diseases with limited success.

**Conclusion(s):** Pirfenidone could be used in the treatment of COVID-19 induced pulmonary fibrosis, with non-life-threatening side effects and possible beneficial effects.



**O045****A RARE COMPLICATION OF NEUTROPENIA AND HEMATOPOIETIC STEM CELL TRANSPLANTATION: SEPSIS RESULTING FROM ACUTE CHOLECYSTITIS**Büşra Tezcan

Ankara City Hospital Intensive Care Clinic

**Background and Goal of Study / Background:** The frequency of acute cholecystitis reported in neutropenic patients is between 0.4-1.65% and in hematopoietic stem cell transplant(HSCT) patients is %5.Clinical manifestations differ from general population as well as clinical approach, diagnosis and treatment.In this case report we aim to present the intensive care management of a neutropenic and HSCT patient who has developed sepsis resulting from acute cholecystitis.

**Materials and Methods:** Thirtyfour years old female patient who was diagnosed as T-Lymphoblastic Leukemia developed neutropenia secondary to chemotherapy and HSCT and was hospitalized in hematology ward.She was transferred to our intensive care unit because of tachypnea,tachycardia and hypotension.She was diagnosed as sepsis.Abdominal ultrasonography revealed acute acalculous cholecystitis,teicoplanin and meropenem were started empirically after the cultures.Despite administration of sufficient fluid resuscitation;metabolic acidosis and hypotension persisted;Continue Renal Replacement Therapy(CRRT) was initiated and she was mechanically ventilated with her clinical worsening.Despite high doses of inotropic agents,CRRT,broad spectrum of antibiotics and mechanical ventilation she had cardiac arrest and died at the second day of intensive care admission.

**Results and Discussion / Discussion:** Biliary sludge is very common in HSCT recipients as well as neutropenic patients.It is usually asymptomatic although it may be a cause of acute "acalculous" cholecystitis.Diagnosis of cholecystitis after HSCT is difficult because of the high frequency of gall bladder abnormalities on ultrasound or CT in asymptomatic patients.Furthermore;some patients may develop subsequent septic shock and don't present with common clinical symptoms like right upper quadrant pain,positive Murphy sign or these symptoms can be masked with the symptoms of septic shock.Hematologic disease is an important factor to consider when planning treatment because most patients will need transfusion of blood products prior to any invasive procedure.Since there are no guidelines for acute cholecystitis in these patients,their treatment should be individualized,according to the patients' general condition.Sepsis with multiorgan failure is the main cause of death.

**Conclusion(s):** Acute cholecystitis may have an atypical presentation in neutropenic,HSCT patients and should always be considered as a differential diagnosis.Intensive care management of these patients can be challenging,early clinical suspicion and microbiological diagnosis are key factors in reducing mortality.

**References:**

1. Clemente-Gutiérrez U,et al. Acute cholecystitis in neutropenic patients. Ann Hepatobiliary Pancreat Surg. 2019
2. Bagley SJ,et al. Acute cholecystitis is a common complication after allogeneic stem cell transplantation and is associated with the use of total parenteral nutrition. Biol Blood Marrow Transplant. 2015

**O046****MANAGEMENT of DIFFICULT AIRWAY WITH CLASSIC METHODS**Yağmur Sitem AKBULUT<sup>1</sup>, Hija YAZICIOĞLU<sup>1</sup>, Sumru ŞEKERCİ<sup>1</sup>

1 T.C. Ministry of Health Ankara City Hospital Department of Anesthesiology &amp; Reanimation

**Background and Goal of Study / Background:** Obesity, oropharynx pathologies were twice as likely to be present with adverse airway events(1) We present a patient with difficult airway(DA) who was obese with short neck and had two loose incisor teeth scheduled for emergent CABG operation.

**Materials and Methods:** Preoperative evaluation of fifty-nine years old male patient with 32 kg/m<sup>2</sup>BMI revealed short neck and two loose incisor teeth and a mallampati score 3. Past medical history involved appendectomy 25 years ago with no evidence of DA, probably because of his normal weight at that time. He had DM, hypertension and an inferior MI diagnosis. We advised teeth extraction but canceled because of urgent operation. Following routine monitorization while on preoxygenation, all the equipment for DA were prepared. However we have neither fiberoptic bronchoscope (FOB) nor video-laryngoscope (VL). Induction was hemodynamically optimum with lidocaine 100mg, midazolam 4mg, fentanyl 400mcg, propofol 100mg and rocuronium 60mg. Following successful mask ventilation in HELP position senior resident found out cormack-lehane score as 4 and failed to intubate. Staff anesthesiologist also could not intubate with machintosh blade and switch to Heine flex tip. Desaturation or hemodynamic instability was not observed; slow bolus propofol was injected if needed. One of the loose incisors which makes laryngoscopy impossible was removed by hand. The other was dislocated from the maxilla and disappered from sight while he was successfully intubated on the third attempt(fig1,2). The missed tooth was not found either in the oropharynx or in the nasogastric tube. Lung aspiration suspicion was confuded when the missing teeth was found in the groove of the blade(Fig3). He was given anti-acid drug, prednisolon and extubated next day uneventfully.

**Results and Discussion / Discussion:** Optimum preparation for this anticipated DA was unfulfilled; loose teeth wasn't extracted as this was an emergent operation. We could not follow the DA algorithm(2) such as SGAD could not be used because of prolonged surgery. New techniques for DA manipulation; FOB, VL and applications of THRIVE was not available in the OR.

**Conclusion(s):** This challenging intubation was achieved only by classic approach like changing blades, optimum management of hemodynamics and oxygenation and existence of an experienced anesthesiologist while sacrificing loose teeth.

**References:**

1. J Hews, K El-Boghdadly, I Ahmad; Difficult airway management for the anaesthetist. British Journal of Hospital Medicine, August 2019, Vol 80, No 8
2. Frerk C, Mitchell VS, McNarry AF et al; Difficult Airway Society intubation guidelines working group. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. Br J Anaesth. 2015 Dec;115(6):827–848. <https://doi.org/10.1093/bja/aev371>





Fig 1.



Fig 2.



Fig 3.

**O047****ANESTHESIA MANAGEMENT OF A PATIENT SUSPECTED WITH COVID-19 DURING ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY PROCEDURE**

Murat TÜMER, Asena KARAKUŞ, Ayşe Heves KARAGÖZ, Meral KANBAK

Hacettepe University Faculty of Medicine, Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Endoscopic retrograde cholangiopancreatography (ERCP) is used for diagnosis or treatment of biliary and pancreatic diseases. Here, we report our anesthesia management of a patient suspected with COVID-19 infection during ERCP procedure.

**Materials and Methods:** A 59-year-old male applied to the emergency department due to fever, weakness, tachypnea, and abdominal pain. His COVID 19 polymerase chain reaction (PCR) test was negative but peripheral ground glass opacification was detected in chest computerized tomography (CT). He was suspected of COVID 19 pneumonia due to clinical condition and CT scan. ERCP was planned with a preliminary diagnosis of cholecystitis and/or pancreatitis. At the beginning of the pandemic, all ERCP procedures were performed in operating room, as there were not enough protective measures in the wards. All team members were present with full personal protection equipment (PPE) in the operating room. 200 mg Propofol, 50 mcg Fentanyl and 50 mg Rocuronium were used as rapid sequence induction. Intubation was performed with 8.5 mm endotracheal tube by video laryngoscope (VL). Sevoflurane was used for the maintenance of anesthesia. After the ERCP process was completed, endotracheal aspiration was obtained for PCR sample. Extubation was performed after reversing muscle relaxation with 200 mg iv sugammadex. His recovery was provided in the operating room. Bronchoalveolar lavage PCR reported as negative. Favipiravir treatment completed and meropenem treatment planned to continue 5 more days.

**Results and Discussion / Discussion:** There is no consensus on the anesthesia method of ERCP. Although general anesthesia (GA) is routine in some centers, some centers perform GA only if sedation is at high risk for airway safety (1,2). We preferred GA because of the poor lung capacity of the patient and to examine bronchoalveolar lavage PCR. Although general anesthesia is considered safer at the beginning of the pandemic, now, ERCP is performed under sedation in the service by taking necessary precautions.

**Conclusion(s):** ERCP is a risky process in terms of covid 19 transmission. So, it is recommended to use PPE during the ERCP procedure (3). Regardless of the type of anesthesia, it is important to use PPE in ERCP during pandemia.

**References:**

1. El-Sherif,Y., Hunt,J., Suddle,A., Prater,B., Reffitt,D., Devlin,J., Harrison,P. &Joshi,D. (2018). Day case ‘treat and transfer’ ERCP service under general anaesthesia. *Frontline Gastroenterology*, 9(4), 317-322.
2. Liang,C.M., Kuo,C.M., Lu, L.S., Wu,C.K., Tsai,C.E., Kuo, M.T., Chiu,Y.C., Tai,W.C., Kuo, Y.H., Kuo,C.H., Chuah,S.K. & Changchien,C.S. (2019). A comparison between non-sedation and general endotracheal anesthesia for retrograde endoscopic common bile duct stone removal:A tertiary center experience. *Biomedical Journal*, 42(2), 131-136.
3. An,P., Huang,X., Wan,X., Xiao,Y., Zhang,J., Kang,J.,Liu,j., Hu,D., Wang,Y., Ren,H.,Chen,D., Wang,X.,Zhou,Z. Yu,H. (2020). ERCP during the pandemic of COVID-19 in Wuhan, China. *Gastrointestinal Endoscopy*.

**O048****EVALUATION OF MULTIMODAL ANALGESIA METHODS IN PATIENTS WHO UNDERWENT INTERSPACE BETWEEN THE POPLITEAL ARTERY AND THE CAPSULE OF THE POSTERIOR KNEE (IPACK) IN TOTAL KNEE ARTHROPLASTY SURGERY**İlkay BARAN AKKUS<sup>1</sup>, Taylan AKKAYA<sup>2</sup>, Dilek YAZICIOĞLU ÜNAL<sup>3</sup>, Melis SUMAK HAZIR<sup>4</sup>, Elif Şule ÖZDEMİR<sup>5</sup>

University of Health Science Diskapi Yildirim Beyazit Training and Research Hospital

**Background and Goal of Study / Background:** Aim: Periarticular infiltration (PAI) or adductor canal blocks (ACB) can be used for postoperative analgesia in total knee arthroplasty (TKA). IPACK block is an attractive analgesic technique that can assist in providing full knee analgesia after TKA. This study aims to evaluate the analgesic efficacy of adding IPACK block to either PAI or ACB in patients undergoing TKA as a part of a multimodal analgesic regimen.

**Materials and Methods:** Methods-materials: This prospective, randomized, triple-blind study was conducted between December 2019 and March 2020, after obtaining ethical approval and written informed patient consent. Eighty two patients were included and randomised into two groups to receive either ACB+ IPACK or PAI + IPACK blocks. Postoperative analgesia (numeric rating scale: NRS), time to ambulation, first ambulation distance, time to first analgesic request, additional analgesic requirement, sleep quality and patient satisfaction (Likert scale) were evaluated.

**Results and Discussion / Discussion:** Discussion and Conclusion: Addition of IPACK block to PAI block and ACB in the multimodal analgesia plan of patients undergoing TKA provided effective pain relief and a comfortable postoperative period, patient satisfaction and sleep quality was high in both groups. The addition of IPACK block to PAI block was superior in terms of postoperative analgesia at 12th and 24th hours after TKA.

**Conclusion(s):** Results: There was no difference between the two groups in terms of demographic and operative data. Patients in the IPACK+PAI block Group had lower pain scores at 12 and 24 hours compared to the IPACK+ACB Group (ambulation  $p = 0.005$ ,  $p < 0.001$ ; rest  $p = 0.004$ ,  $p < 0.001$ ). Groups were comparable regarding time to ambulation ( $7,7 \pm 2,0$  vs.  $7,9 \pm 1,6$   $p = 0,253$ ); first ambulation distances at 24 and 48 hours were similar (24;  $63,2 \pm 44,1$  vs.  $52,6 \pm 34,7$   $p = 0,345$ )(48;  $97,8 \pm 34,1$  vs.  $85,2 \pm 29,8$   $p = 0,055$ ); time to first analgesic request ( $2,2 \pm 3,5$  vs.  $3,1 \pm 4,5$   $p = 0,470$ ); additional analgesic requirement (15 vs. 16  $p = 1,000$ ); sleep quality ( $p = 0.578$ ) and patient satisfaction (1/3/6/14/16 vs. 1/2/16/16/7  $p = 0.071$ ).

**0049****THE COMPARISON OF THE USE OF REMIFENTANIL WITH INFUSION AND PATIENT-CONTROLLED METHODS FOR SEDATION**

Oya G.KALE, Jülide HALLIOĞLU, İ.Haluk GÜMÜŞ  
Sbü Dişkapi Yildirim Beyazit E.A.H.

**Background and Goal of Study / Background:** In this study, the use of remifentanil with infusion and PCA device was compared in order to provide sedation under local anesthesia for patients who were planned to undergo varicocele operation.

**Materials and Methods:** After taking hospital ethics committee and patient's approvals, 30 male ASA I-II patients aged between 15-45years were included in the study. The patients were randomly divided into 3 groups and were premedicated. During the operation blood pressure, heart rate, respiratory rate and peripheral oxygen saturation were monitorized and recorded at 5 minute intervals and 30 minutes after the operation. Sedation levels and cooperation scores were recorded intraoperatively at intervals of 5 minutes. The infusion group received 0.1 µg/kg/min remifentanil and physiological saline solution with PCA device. PCS (patient controlled sedation) group received 0.5 µg /kg dose of bolus remifentanil on each request. In addition, physiological saline solution was given to the control group with the PCA device. When the oxygen saturation observed during the operation fell below 93%, oxygen with mask was given at 3-4 lt/min. Satisfaction of the patient was evaluated at the end of the operation.

**Results and Discussion / Discussion:** Respiratory depression was more common in the infusion group. Intraoperative oxygen was required for 7 patients in the infusion group and for 4 patients in the PCS group. Respiratory rate did not fall below 8, but decreased significantly in the infusion group compared to the other groups. Although the requested PCA numbers were not found different, 4 patients in the infusion group, 2 patients in the PCS group and 1 patient in the control group did not require any additional medication. The total amount of drug consumption was significantly lower in PCS group (64.4 µg) compared to infusion group (147.5µg). The adequate levels considered for conscious sedation were 2-3. While 3,5 there was no loss of cooperation. During the intraoperative period, pain was observed in 4 patients in the control group and in 2 patients in infusion and the PCS groups.

**Conclusion(s):** In this study, it was concluded that remifentanil sedation applied with a PCA device can be safely used during local anesthesia procedure under respiratory system monitoring.

**O050****ROLE OF EDUCATION IN COMPLIANCE TO HAND HYGIENE PRACTICES AMONG HEALTH CARE WORKERS**Nilgün ALTIN<sup>1</sup>Diskapi Yildirm Beyazit Ed. and Res. Hosp., Ankara, Turkey<sup>1</sup>

**Background and Goal of Study / Background:** Hospital infections occur most often due to inappropriate healthcare practices. Achieving a change in behavior of healthcare workers (HCWs) is one of the most difficult issues in infection control.

**Materials and Methods:** This prospective and observational study was performed in 3 different intensive care units (ICUs) in Ankara Numune Training and Research Hospital and the effect of training and performance feedback in hand hygiene compliance of HCWs was investigated. A total of 13,263 post-patient contacts with 74 HCWs and their hand hygiene compliance were evaluated. The study was performed in 3 stages, including uninformed observation, post-education observation, and post-feedback observation.

**Results and Discussion / Discussion:** In the first stage; the mean ratio of non-compliance of HCWs was determined to be 92%. The mean non-compliance rates of Unit A significantly decreased from 92% to 58% in the second stage after education program. In the third stage, the mean ratio of non-compliance significantly decreased from 58% to 24%. Therefore, when compared to the first stage, there was no statistically significant decrease in the second and third stages in Units B and C. Six months after the education program an another uninformed observation was performed. Ratio of non-compliance among HCW was found to be 63%.

**Conclusion(s):** Hand hygiene compliance of HCWs in ICUs was shown to be poor according to the present results. In addition to theoretical information, interactive and practical education is effective in improving compliance. However, performance feedback is the most efficacious method in improving hand hygiene compliance.

**O051****EVALUATION OF THE EFFECT OF THE POSITION ON INTRAOPERATIVE CEREBRAL OXYGENATION AND POSTOPERATIVE COGNITIVE FUNCTIONS IN PATIENTS WITH SHOULDER SURGERY**

Murat İZGİ<sup>1</sup>, Meriç BAYRAM<sup>1</sup>, Gazi HURİ<sup>2</sup>, Almıla Gülsün PAMUK<sup>1</sup>, Fatma SARICAOĞLU<sup>1</sup>

1 Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation, Ankara, TURKEY

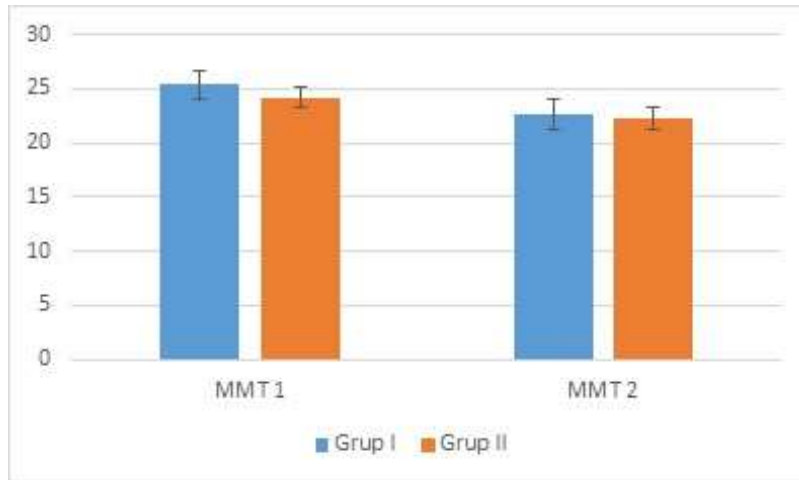
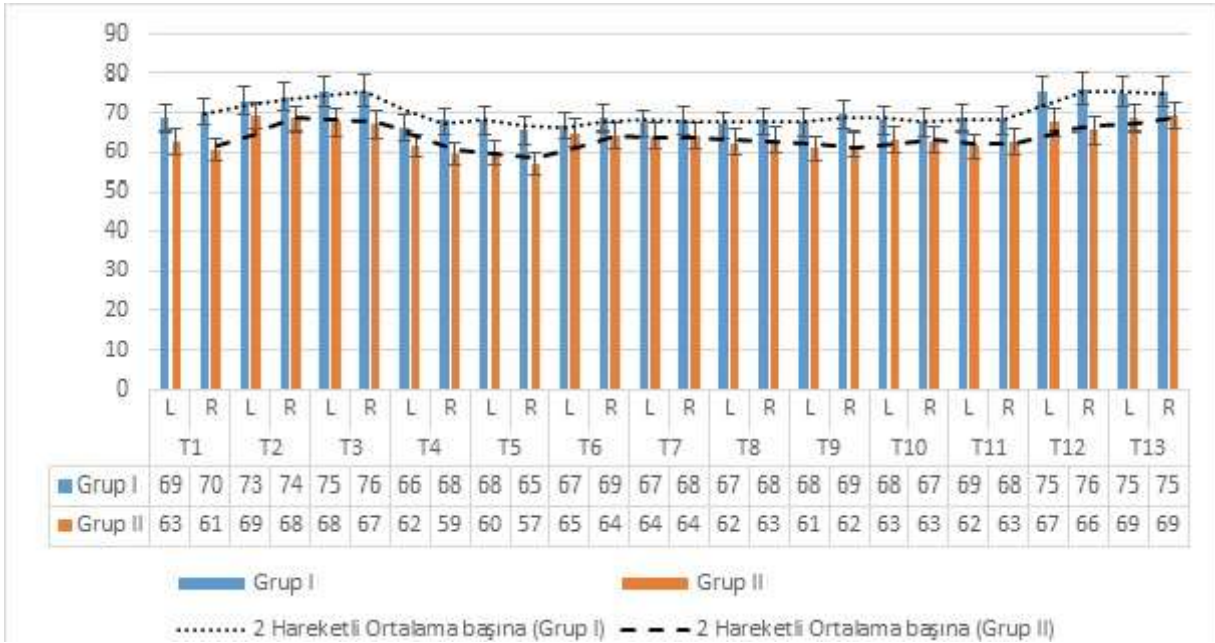
2 Hacettepe University, School of Medicine, Department of Orthopedics and Traumatology, Ankara, TURKEY

**Background and Goal of Study / Background:** The beach chair position, which has been frequently preferred in shoulder surgery since 1980, is a surgical position with various disadvantages in terms of stabilization of hemodynamics as well as its advantages in terms of surgery. In our study, we aim to evaluate the effect of beach chair position on intraoperative cerebral oxygenation and postoperative cognitive functions by comparing the data of patients under 65 years of age with those over 65 years of age.

**Materials and Methods:** Fifty patients who underwent shoulder surgery at our hospital were included in the study. Intraoperative hemodynamic and brain oxygenation monitoring was performed with invasive arterial blood pressure and Near Infrared Spectroscopy (NIRS), and the data of the patients were recorded in the follow-up forms prepared for the study. Neurocognitive functions were evaluated with the Mini Mental Test (MMT), which was applied during the pre-operative visit and within the first 24 hours postoperatively.

**Results and Discussion / Discussion:** The difference between the two groups in terms of height ( $p = 0.037$ ), ASA score ( $p < 0.001$ ) and comorbidities ( $p < 0.001$ ) was statistically significant. During the perioperative follow-up, there was no statistically significant difference between the groups in the recorded NIRS, blood pressure, heart rate, EtCO<sub>2</sub> values at all times, but when evaluated within the group, the difference between the measurement times was statistically significant. Pre-operative (MMT1) and postoperative (MMT2) MMT results were similar when evaluated between groups ( $p = 0.377$ ). However, in the in-group evaluations, while there was a significant difference between MMT1 and MMT2 in group I ( $p < 0.001$ ), and also in Group II ( $p = 0.027$ ). the MMT1 measurement was found to be higher

**Conclusion(s):** In conclusion, considering the data of this study, there are fluctuations in hemodynamic parameters and parallel to this in brain tissue oxygenation, regardless of the age of the patients, in shoulder surgeries performed in the beach chair position. The MMT test results we applied to detect possible changes in the cognitive status of the patients were similar in both elderly and young patients when evaluated between groups. In this regard, we are of the opinion that larger-volume studies using different test batteries should be carried out.



**O052****SWALLOWING FUNCTION ASSESSMENT WITH FIBEROPTIC ENDOSCOPY IN PALLIATIVE CARE UNIT: CASE REPORT**

Gülten ÜTEBEY<sup>1</sup>

Health Sciences University Dışkapı Yıldırım Beyazıt Training and Research Hospital,  
Anesthesiology and Reanimation Clinic

**Background and Goal of Study / Background:** Swallowing dysfunction is a common finding in neurological diseases, especially in stroke patients. We think that the evaluation of swallowing function with fiberoptic endoscopy (FE) is important in palliative care patients.

**Materials and Methods:** 87-year-old male patient. He has a history of hypertension and coronary artery disease. In January 2021, he applied to the Emergency Department with weakness in his left arm and leg and impaired consciousness. He was hospitalized in the Anesthesia Clinic Covid Intensive Care unit because he had a right internal carotid artery infarction, the Covid 19 PCR test was negative, but there were suspicious areas on his AC tomography. High flow oxygen, intermittent non-invasive ventilation and antiviral therapy were appropriate. Nutrition of the patient was provided with a nasogastric tube. He was admitted to the palliative care unit after 20 days. Swallowing exercises were recommended for swallowing function evaluation with FE in the palliative care unit. In the repeated examination after 2 weeks, the patient who had no residue was started to be fed orally with nutritional products.

**Results and Discussion / Discussion:** Swallowing is a complex function performed by a large sensorimotor neural circuit, involving interaction with both cerebral hemispheres and muscles involved in swallowing, along with corticobulbar pathways up to the pons and medulla . It has been reported to be 42-67% in the first three days after stroke . Special positioning techniques, exercises and swallowing reflex stimulation are recommended for the treatment of swallowing functions. FE method has advantages such as assessment of swallowing function, bedside applicability and no need for contrast agent application.

**Conclusion(s):** We wanted to emphasize the importance of early swallowing exercises in palliative care units, especially in stroke patients, and the importance of swallowing function evaluation with FE. Key words: Palliative care unit; swallowing function evaluation; stroke.

**References:**

1. Özgü İnal. Postürün Oral-Motor Yapılar Üzerine Etkisi . Türkiye Sağlık Bilimleri ve Araştırmaları Dergisi, 1(1), 2018, 63-68.
2. Tuncay ve ark. İnmede Yutmanın Değerlendirilmesi . J PMR Sci 2011;14: 33-8. 3) Talan L. Literatür Özeti Yoğun Bakım Derg 2015; 6: 17-8.



0053

**NUTMEG INTOXICATION**

Atakan SEZGİ<sup>1</sup>, Elif Şule ÖZDEMİR<sup>1</sup>, Mehmet CEYLAN<sup>2</sup>, Reyhan İŞLEK<sup>1</sup>,  
Gülşen ÇIĞŞAR<sup>2</sup>, Savaş ALTINSOY<sup>1</sup>, Mehmet Murat SAYIN<sup>1</sup>

1. Department of Anesthesiology University of Health Sciences Diskapi Yildirim Beyazit TRH,  
2. Department of Emergency University of Health Sciences Diskapi Yildirim Beyazit TRH

**Background and Goal of Study / Background:** Aim: Nutmeg poisoning is an extremely rare occurrence with a high mortality, but probably not sufficiently reported as it can be abused. Being widely available, nutmeg is known to provoke hallucinogenic effects in high dosages. The effects of nutmeg intoxication are thought to be due to myristicin, the largest chemical portion of the volatile oil of nutmeg. Nutmeg produces a biological effect similar to an anticholinergic toxidrome, with altered mental status, skin flushing, dry mucus membranes, tachycardia/bradycardia, and hypertension. A key feature to distinguish nutmeg toxicity from an anticholinergic agent is miosis. In this report, we present with the consent of the patient, a case of nutmeg intoxication due to the use of nutmeg tea for the purpose of sedation.

**Materials and Methods:** Case: The 34-year-old female, who had no known chronic disease or a history of drug use, was admitted to the emergency department with the complaints of dizziness, weakness, dry mouth and restlessness after drinking 7 cups of nutmeg tea. The patient was conscious-oriented and laboratory parameters were within normal limits when admitted to the ICU. Her blood pressure was normal with a decreased HR of 46/min and with a SpO<sub>2</sub> level of 99% with nasal 2 L/minute oxygen. Neurological examination findings were unremarkable. A 12 lead ECG showed a sinus bradyarrhythmia (rate 42-50/minute) with no ischemic or hypertrophic changes. Intravenous atropine treatment was given to the patient when her heart rate fell below 45/minute. During the follow-up, the patient's symptoms such as dry mouth, weakness decreased. The patient was discharged after 72 hours of ICU stay under observation since her hemodynamic profile was stable.

**Results and Discussion / Discussion:** Discussion: The emergence of acute psychotic symptoms accompanied by CNS neuromodulatory symptoms should alert the physician of this rare but possibly underreported possibility.

**Conclusion(s):** The emergence of acute psychotic symptoms accompanied by CNS neuromodulatory symptoms should alert the physician of this rare but possibly underreported possibility.

**O054****THE EFFECTS OF DESFLURANE AND SEVOFLURANE ON ANESTHETIC DEPTH AND RECOVERY IN MINIMAL FLOW ANESTHESIA: RANDOMIZED PROSPECTIVE STUDY**

Baturay Kansu KAZBEK<sup>1</sup>, Hakan YILMAZ<sup>1</sup>, Ülkü Ceren KÖKSOY<sup>1</sup>, Perihan EKMEKÇİ<sup>1</sup>

1: Ufuk University, Faculty of Medicine, Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Minimal flow anesthesia has economic and environmental advantages in addition to providing speed of recovery. The number of studies investigating the effect of minimal flow (0,5 l/min) anesthesia on recovery is limited. The primary aim of this study is to compare the effects of sevoflurane and desflurane on recovery parameters while the secondary aim is to compare these agents in terms of anesthetic depth using bispectral indeks (BIS).

**Materials and Methods:** Patients scheduled to undergo elective surgery under general anesthesia of ASA I-II risk group and 18-65 years of age were recruited. Patient refusal, uncontrolled diabetes mellitus, advanced cardiac, pulmonary, hepatic or renal disease, emergency operation and utilization of another analgesic technique were the criteria for exclusion. The patients were randomized into Group S (sevoflurane) or Group D (desflurane) using closed envelope technique. Sevoflurane or desflurane was used following intubation in addition to 50%/50% oxygen-air mixture, depending on the patient's group. Ventilator settings were: 4 l/min fresh gas flow until minimum alveolar concentration (MAC) 1 was achieved followed by 0.5 l/min, tidal volume 6-8 ml/min, frequency 12/min, PEEP 4 cmH<sub>2</sub>O. FiO<sub>2</sub> was increased to 100% in case of low oxygen warning. Volatile agent was turned off at the beginning of saturation and fresh gas flow increased to 10 l/min with 100% oxygen. The patients were extubated at MAC<0,3. Time to extubation, spontaneous eye opening and Aldrete score >9 was recorded.

**Results and Discussion / Discussion:** Groups were demographically similar. There were no statistically significant differences concerning mean arterial pressure, MAC values and remifentanil consumption. BIS values were significantly lower in Group D at all times except T<sub>0</sub> (Table 1). Time to reach MAC 0,3, extubation, eye opening and Aldrete >9 was significantly shorter in Group D (Table 2).

**Conclusion(s):** A balanced anesthesia targets hypnosis, analgesia and immobility. Desflurane provides lower BIS values in similar MAC values compared to sevoflurane (1). This study shows that desflurane ensures early recovery in addition to a greater anesthetic depth.

**References:**

1. Ryu KH, Song K, Lim TY, Choi WJ, Kim YH, Kim HS. Does Equi-Minimum Alveolar Concentration Value Ensure Equivalent Analgesic or Hypnotic Potency?: A Comparison between Desflurane and Sevoflurane. *Anesthesiology*. 2018 Jun;128(6):1092-1098.

Table 3 – BIS values

	Sevoflurane	Desflurane	p
	Mean±SD	Mean±SD	
BIS (T0)	92,67±7,88	91,03±9,48	0,183
BIS (T1)	55,02±14,95	46,21±12,72	<b>0,001</b>
BIS (Tmac)	41,89±6,49	40,41±9,15	<b>0,033</b>
BIS (T2)	41,79±10,31	41,34±38,18	<b>0,005</b>
BIS (T3)	41,31±8,39	37,63±8,34	<b>0,008</b>
BIS (T4)	43±8,71	37,14±5,75	<b>&lt;0,001</b>
BIS (T5)	44,67±8,95	36,81±6,67	<b>&lt;0,001</b>
BIS (T6)	42,89±9,53	38,26±7,22	<b>0,005</b>
BIS (T7)	45,54±8,95	39,69±7,73	<b>&lt;0,001</b>
BIS (T8)	46,79±7,88	42,91±8,69	<b>0,007</b>
BIS (T9)	53,74±12,76	45,84±10,92	<b>&lt;0,001</b>
BIS (Tm)	56,66±13,51	54,83±13,66	0,444
BIS (T10)	77,31±9,13	76,8±10,89	0,965

Table 4: Time variables

	Sevoflurane	Desflurane	p
	Median±SD	Median±SD	
T <sub>mac</sub>	7,56±4,18	5,97±2,63	<b>0,006</b>
T <sub>ext</sub>	11,39±4,94	9,81±7,66	<b>&lt;0,001</b>
T <sub>eye</sub>	17,26±3,55	13,23±7,59	<b>&lt;0,001</b>
T <sub>aldrete</sub>	30,1±3,64	25,31±7,66	<b>&lt;0,001</b>

T<sub>mac</sub>: Time to minimum alveolar concentration (MAC) 0.3, T<sub>ext</sub>: Time to extubation, T<sub>eye</sub>: Time to spontaneous eye opening, T<sub>aldrete</sub>: Time to Aldrete score >9

**O055****CAN WE SAY “ONLY THE ANESTHESIA TYPE IS IMPORTANT FOR RECOVERY TIME”?**Nevzat Mehmet MUTLU

Department of Anesthesiology and Reanimation - Critical Care, Ankara City Hospital, Ankara

**Background and Goal of Study / Background:** Total intravenous anesthesia(TIVA) has become widespread in recent years due to the toxic effects of inhalation anesthetics. Since the hormonal response due to surgical stress can be minimized with TIVA, a better cardiovascular stability can be achieved compared to inhalation anesthesia. We aimed to compare the postoperative recovery time and the factors that may affect the recovery time in patients who underwent TURP under balanced inhalation anesthesia(BIA) (etomidate-remifentanil-sevoflurane combination) or TIVA(remifentanil-propofol and remifentanil-propofol infusion combinations).

**Materials and Methods:** After ethics committee approval, 50 ASAII-III patients aged-50-87 scheduled for TURP were randomly assigned to two groups; Group-BIA (balanced inhalation anesthesia) or Group-TIVA. All patients were premedicated with 0,03mg/kg i.v. midazolam. Anesthesia was induced with 0,5-1µg/kg i.v. remifentanil, 1.5-2.5mg/kg i.v. etomidate in Group-BIA(n=25) and with 0.5-1µg/kg i.v. remifentanil, 1-2mg/kg i.v. propofol in Group-TIVA(n=25). Patients were intubated following muscle relaxation with 0.1mg/kg vecuronium. Anesthesia was maintained with sevoflurane(%1-3), %66/%33(N<sub>2</sub>O/O<sub>2</sub>) in Group-BIA and remifentanil(0.1-0.5µg/kg/min), propofol(3-6mg/kg/hr), %66/%33(N<sub>2</sub>O/O<sub>2</sub>) in Group-TIVA. Laboratory values were recorded preoperatively and following surgery. In both groups, the time from the discontinuation of anesthetic agents until the Aldrete score reached 8-10 was recorded as the recovery time. Statistical analysis was performed by SPSS for Windows 23.0.

**Results and Discussion / Discussion:** Comparison of demographic and characteristic features, recovery times, comorbidities and postoperative complications, laboratory values, are shown in tables-1,2. Aldrete(8-10) recovery time was significantly shorter in the TIVA group(p<0.001). No relationship was found between resection and anesthesia durations, the number of comorbidities, sodium exchange and heart rate change and the recovery time of Aldrete (8-10). It was observed that there was a linear relationship between the time taken for Aldrete to reach the 8-10 level and the change in age(p=0.046,r=0.283), BMI(p=0.045,r=0.284), Hb(p=0.002,r=0.433) and MAP(p=0.004,r=0.400). The fact that recovery is faster and easier than inhalation anesthesia in patients treated with TIVA can be explained by the short distribution phase, high clearance and short elimination half-life of the agents used.

**Conclusion(s):** We can say that not only TIVA has a shorter recovery time compared to balanced sevoflurane anesthesia in patients undergoing TURP, but also changes in age, BMI, hemoglobin and MAP may affect recovery time. Key-words:Inhalation anesthesia, TIVA, Recovery

**Table 1.** Comparison of demographic characteristics and recovery times of the groups

	BIA (n=25)	TIVA (n=25)	p
Age (years)	67.36 ± 9.5	69.56 ± 5.5	0.320
Weight (kg)	65.84 ± 9.4	69.88 ± 14.9	0.257
Height (m)	1.64 ± 0.1	1.61 ± 0.1	0.177
BMI (kg/m <sup>2</sup> )	24.49 ± 2.9	26.74 ± 4.5	<b>0.042</b>
ASA II / III	19 (76) / 6 (24)	17 (68) / 8 (32)	0.529
Duration of resection (min)	50.52 ± 21.4	49.44 ± 16.6	0.843
Duration of anesthesia (min)	59.72 ± 22.6	59.44 ± 17.8	0.961
Aldrete (8-10) time (sec)	858.52 ± 261.4	519.12 ± 136.7	<b>&lt;0.001</b>
Aldrete (8-10) time (min)	14.31 ± 4.4	8.65 ± 2.3	<b>&lt;0.001</b>

BMI; body mass index, ASA; American Society of Anesthesiologist score, Values were specified as mean ± SD, n (%)

**Table 2.** Comparison of comorbidity, postoperative complications and hemodynamic parameters belonging to the groups

	BIA (n=25)	TIVA (n=25)	p
<b>Comorbidities</b>			
<i>Comorbidity number</i>	2 (2)	2 (2)	0.088
<i>Hypertension</i>	10 (40)	6 (24)	0.225
<i>Diabetes mellitus</i>	3 (12)	2 (8)	0.500
<i>COPD</i>	13 (52)	14 (56)	0.777
<i>Atrial fibrillation</i>	1 (4)	2 (8)	0.500
<i>Heart failure</i>	4 (16)	6 (24)	0.480
<i>Coronary artery disease</i>	1 (4)	0 (0)	0.500
<i>Obesity</i>	2 (8)	6 (24)	0.123
<b>Complications</b>			
<i>TUR Syndrome</i>	0 (0)	1 (4)	0.500
<i>Hyponatremia</i>			
<i>Mild</i>	6 (24)	4 (16)	0.480
<i>Moderate</i>	3 (12)	9 (36)	<b>0.047</b>
<i>Severe</i>	4 (16)	3 (12)	0.684
<i>Sodium exchange</i>	5.72 ± 5.3	9.36 ± 7.7	0.088
<i>Hb exchange</i>	1.46 ± 0.9	2.43 ± 1	<b>0.002</b>
<i>Anemia (Hb ≤ 9gr/dl)</i>	6 (24)	6 (24)	1
<b>Hemodynamic parameters</b>			
<i>Maximum heart rate % change</i>	34.75 ± 9.7	39.9 ± 8.2	<b>0.021</b>
<i>Maksimum SAP % change</i>	39.31 ± 11.9	48.84 ± 9.9	<b>0.009</b>
<i>Maksimum MAP % change</i>	38.16 ± 13.9	46.37 ± 11.1	<b>0.008</b>

COPD; chronic obstructive pulmonary disease, TUR; transurethral resection of prostate, SAP; systolic artery pressure, MAP; mean artery pressure, Values were specified as median (interquartile range), mean ± SD, n (%)

**O056****EVALUATION OF THE EFFECTIVENESS OF UNILATERAL TRANSVERSUS ABDOMINIS PLANE BLOCK ON POSTOPERATIVE ANALGESIA IN OPEN APPENDECTOMY**Çağdaş BAYTAR<sup>1</sup>, Eralp ÇEVİKKALP<sup>2</sup>

1) Zonguldak Bülent Ecevit University Medicine Faculty, Department of Anaesthesiology and Reanimation, Zonguldak, Turkey

2) Bursa Medicabil Private Hospital, Department of Anaesthesiology and Reanimation, Bursa, Turkey

**Background and Goal of Study / Background:** This study aims to evaluate the postoperative analgesic efficacy of ultrasound (USG) guided unilateral transversus abdominis plane (TAP) block in emergency open appendectomy under general anesthesia.

**Materials and Methods:** This retrospective study was conducted at the Erciş State Hospital in Turkey. Data were collected from the records of patients who underwent emergency open appendectomy between January 2017 and May 2018. A total of 69 patients were eligible for inclusion in our study, however, 13 were excluded due to incomplete records. 56 patients were included in the study. TAP block was applied to 27 of these patients. 20 ml %0.25 bupivacaine was administered for TAP block. The demographic data of the patients, duration of anesthesia and surgery, postoperative rest and dynamic Visual Analog Scale (VAS) scores, and the amount of opioids consumed during the postoperative 24 hours were recorded.

**Results and Discussion / Discussion:** There was no significant difference between the groups in terms of demographic data and clinical parameters. The rest and dynamic VAS scores were significantly higher in the control group at 4 and 6 h after surgery. Eight of 27 patients in the TAP block group and 18 of 29 patients in the control group needed rescue analgesic, and there was a significant difference between the groups ( $p = 0.015$ ). While the TAP block group consumed  $112.50 \pm 58.24$  mg, the control group consumed an average of  $152.78 \pm 62.94$  mg tramadol. No complications were reported during TAP block application. Shahmoradi et al. reported that USG-guided TAP block reduces postoperative analgesic consumption in patients who underwent open appendectomy (1). In our study, we determined that TAP block decreased postoperative VAS scores and analgesic consumption.

**Conclusion(s):** Ultrasound-guided unilateral TAP block provides efficient postoperative analgesia for open emergency appendectomy. Keywords: transversus abdominis plane block, open appendectomy, ultrasonography, truncal blocks

**References:**

1. Shahmoradi, M. K., Besharatifar, G., & Taheri, H. R. (2020). Analgesic effects of TAP block among open appendectomy patients and the need of postoperative pethidine for Pain Management: A randomised controlled trial. *International Journal of Surgery Open*, 27, 166-171.

**O057****DIAPHRAGM SPARING EFFECTIVE ANALGESIA IN  
ARTHROSCOPIC SHOULDER SURGERY: ICB-SSB VS ISB**

M. Tuğba ARSLAN<sup>1</sup>, Derya ÖZKAN<sup>1</sup>, Savaş ALTINSOY<sup>1</sup>, Fatma KAVAK AKELMA<sup>1</sup>, Faruk ÇATMA<sup>2</sup>

1 University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital,  
Department of Anaesthesiology,

2 University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital,  
Department of Orthopedics

**Background and Goal of Study / Background:** This randomized trial aimed to compare (evaluate) combined suprascapular- infraclavicular nerve blocks (SSB-ICB) is noninferior to interscalene nerve block (ISB) would provide postoperative analgesia 48 hours after arthroscopic shoulder surgery. The secondary objective was to evaluate the prevalence of ipsilateral hemidiaphragmatic paresis between the SSB+ICB and the ISB with ultrasound guidance.

**Materials and Methods:** Seventy-six patients undergoing arthroscopic shoulder surgery were randomized to receive ultrasound-guided ISB (n=38, 20 ml 0.25 % bupivacaine) or combined SSB (10 ml 0.25 % bupivacaine) and ICB (n=38, 10 ml 0.25 % bupivacaine) before general anaesthesia. The patients' postoperative pain scores (at PACU, 4, 8, 12, 24, 48 hours after the surgery) and tramadol consumption were also recorded. To assess respiratory function (hemidiaphragmatic paralysis) with ultrasound-guided pre and 30 minutes after blocks. Groups were compared with regard to demographic and clinical characteristics using two-sided Student's t-test, Mann-Whitney U test, Chi-square test and Fisher's Exact test, accordingly.

**Results and Discussion / Discussion:** Pain scores at rest between SSB-ICB and ISB were similar (equivalent) during the 48 hours after surgery (p=0.360). Tramadol consumption was similar in both groups (p=0.809). After blocks, all patients of ISB and no patients of SSB-ICB presented diaphragmatic paralysis (p<0.001) and no patients were observed with dyspnea.

**Conclusion(s):** SSB-ICB is noninferior to ISB in terms of postoperative analgesia and tramadol consumption all of the times after arthroscopic shoulder surgery. While SSB-ICB administered in appropriate doses provides effective analgesia, diaphragm-sparing modality may also be effective.



**O058****A CASE OF POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME ASSOCIATED WITH LATE PREGNANCY**

Darko ANGJUSHEV<sup>1</sup>, Andrijan KARTALOV<sup>1</sup>, Teodora STOJANOVSKA<sup>1</sup>, Marija KOTEVSKA-ANGJUSHEV<sup>2</sup>

1. UC TOARILUC Clinical centre "Mother Teresa" Skopje, Macedonia,
2. UC Cardiac surgery Clinical centre "Mother Teresa" Skopje

**Background and Goal of Study / Background:** Posterior reversible encephalopathy syndrome (PRES) is a rare and very dramatic neurological disorder characterized by parieto-occipital vasogenic edema seen on MRI. Preeclampsia and eclampsia are the common causes of this potentially life-threatening neurological complication which is presented with rapid onset of seizures, altered mental status and loss of consciousness. Early detection and prompt treatment can lessen the mortality rate as this syndrome is completely reversible.

**Materials and Methods:** We present a case of 16-year-old female in late pregnancy (37 gestational week) who was admitted to the obstetrics & gynecology department with symptoms of eclampsia (acute onset of seizures, high blood pressure (230/120 mmHg), generalized edema and loss of consciousness). The patient was intubated, sedated and emergent cesarean section (CS) in general anesthesia (GA) was undertaken. The course of the CS was uneventful. As the patient was unconscious after GA, neurologist consultation was done and brain MRI imaging was recommended. MRI confirmed the presence of vasogenic edema in the affected regions (bilateral supratentorial, occipital and parietooccipital, cortical and subcortical zones), accompanied by fewer, smaller zones of toxic edema. These lesions are highly characteristic for PRES. An immediate therapy was ordained, which included high doses of corticosteroids, mannitol, methyldopa, heavy sedation and mechanical ventilation. The patient was transferred to central intensive care unit (ICU) for further treatment. Patient gradually improved after management with: anti hypertensive, anti convulsants, gastro-protective therapy, utero tonics, antibiotics, anticoagulant therapy, as well as fluids and electrolyte supplementation therapy. On the fourth day in the ICU, the control brain MRI imaging showed complete resolution of the lesions in the affected regions. On the fifth day weaning from mechanical ventilation was successfully done and patient was extubated with Glasgow coma score of 15.

**Results and Discussion / Discussion:** Recently dramatic cases of PRES, usually associated with eclampsia, has been increasingly reported as MRI becomes more available. If recognized and treated early, this potentially lethal clinical syndrome is completely reversible and commonly resolves within a week, both clinically and radiologically.

**Conclusion(s):** We emphasize the importance of early recognition and immediate therapy in order to prevent irreversible brain tissue changes and lethal outcome.

**O059****THE EFFECT OF INTRAOPERATIVE KETAMINE AND LIDOCAINE INFUSION ON POSTOPERATIVE OPIOID CONSUMPTION IN POSTERIOR SPINAL FUSION SURGERY – PROSPECTIVE DOUBLE-BLIND RANDOMIZED CONTROLLED STUDY**

Vedat OZTURK<sup>1</sup>, Canan ATALAY<sup>1</sup>, Kamber KASALI<sup>2</sup>, Ayşenur DOSTBİL<sup>1</sup>, Ilker INCE<sup>1</sup>, Ozgur OZMEN<sup>1</sup>

1. Department of Anesthesiology and Reanimation, School of Medicine, Ataturk University

2. Department of Biostatistics, School of Medicine, Ataturk University of

**Background and Goal of Study / Background:** The primary aim of this study is; To investigate the effect of intraoperative ketamine and lidocaine use on postoperative opioid consumption in posterior spinal fusion surgery.

**Materials and Methods:** Seventy-five ASA I-III patients between the ages of 18-65 who will undergo lumbar posterior spinal fusion surgery in the Neurosurgery clinic under elective conditions were included in the study after the approval of the ethics committee of our faculty and informed consent form. The patients were randomly divided into 3 groups using the closed envelope method. Group was determined as Ketamine (n =25), Group Lidocaine (n =25) and Group Control (n =25). Midazolam, propofol, rocuronium and fentanyl i.v. Done. In induction to Group Ketamine, ketamine i.v. 0.5mg/kg bolus and 0.25mg/kg/hour infusion were administered. Lidocaine i.v. for induction to Group Lidocaine. 1.5mg/kg bolus and 1.5mg/kg /hour infusion were administered. Group Control received i.v. saline was applied. Anesthesia was maintained with propofol and remifentanil infusion. Propofol and remifentanil doses were adjusted according to BIS monitoring and the increase and decrease in basal blood pressure and heart rate values of 20% and above. The BIS value was kept between 40-60. Infusions were closed at the end of surgery. Patients were administered PCA prepared with fentanyl for postoperative analgesia. The PCA device was attached for 24 hours postoperatively. Postoperative fentanyl consumption and pain scores of the patients were evaluated. Intraoperative propofol and remifentanil consumption was recorded.

**Results and Discussion / Discussion:** No statistically significant difference was found between the groups in postoperative fentanyl consumption. Postoperative resting and moving VAS values were similar and no significant difference was found. Intraoperative propofol consumption was lower in the Lidocaine group compared to the other two groups. There was a statistically significant difference with the control group( $p = 0.023$ ). Although intraoperative remifentanil consumption was lower in the Lidocaine group compared to the other two groups, there was no statistically significant difference.

**Conclusion(s):** We concluded that intraoperative bolus and infusion doses of ketamine and lidocaine at these doses are insufficient to provide effective analgesia for posterior spinal fusion surgery. We think that it may be effective by increasing the doses and applying it in the postoperative period.

**O060****DIFFICULT AIRWAY MANAGEMENT AFTER TRAUMA:A CASE REPORT**İrem ATEŞ<sup>1</sup>, Ela Nur MEDETOĞLU<sup>1</sup>

Atatürk University Faculty of Medicine, Anesthesiology and Reanimation, Erzurum, TURKEY

**Background and Goal of Study / Background:** The main responsibility of the anesthesiologist is to ensure airway openness and to maintain it safely. But sometimes predictive, sometimes unexpectedly difficult ventilation/intubation can be encountered. Anesthesia-related cardiac arrest is 4.7/100,000, death is 1/100,000 and 50% of these are caused by airway problems. Therefore, good training, careful evaluation, planning and equipment preparation are essential for difficult airway management (1).

**Materials and Methods:** A 43-year-old male patient was brought to the emergency due to maxillofacial trauma after suffering a firearm injury in order to commit suicide. There was depulsion in the mandible bone, upper hard palate, maxiller sinus anterior wall and left nasal bone along with common tissue defects in maxilla and mandibula. Orthognatic surgery was planned for the patient, but due to severe tissue defects in the face area, there was a high probability of difficult ventilation/intubation (Figure-1). After all the necessary equipment was provided, the patient was taken to the operating room. His hemodynamics were stable, GKS was 15. The patient's hunger could not be questioned. The patient was having breathing problem when the pillow under his head was removed. The patient was preoxygenized with 100% O<sub>2</sub> for 5 minutes and the pillow was removed after 1 mg of midazolam and 50 mg of ketamine intravenous(IV) applied. Glottis was seen with video laryngoscope. When it became clear that intubation would be done easily, IV 2 mg/kg propofol followed by 1 mg/kg of recurrenium were applied. Rapid serial intubation was performed successfully

**Results and Discussion / Discussion:** Endotracheal intubation is often required in general anesthesia applications in order to provide effective and safe airways. The continuity of vital functions depends on ensuring airway openness and maintaining it safely. Alternative methods should be tried in case of potentially difficult airway

**Conclusion(s):** Videolaryngoscopes that have been used frequently in recent years are promising and the results of this application are gracious. These devices reduced the need for fiberoptic intubation and also offered the advantage of being as efficient and easy as direct laryngoscopy. Figure-<sup>1</sup>

**References:**

1. Frerk C, Mitchell VS, McNarry AF. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. Br J Anaesth. 2015 Dec;115(6):827-48. doi: 10.1093/bja/aev371. Epub 2015 Nov 10.



**O061****THE EFFECT OF TOPICAL LOCAL ANESTHESIA ON PROPOFOL CONSUMPTION IN SEDATION FOR UPPER GASTROINTESTINAL ENDOSCOPY IN PEDIATRIC PATIENTS**Feyza SEVER<sup>1</sup>, Sengül ÖZMERT<sup>1</sup>, Arzu Meltem DEMİR<sup>2</sup>

1 Ankara City Hospital, Children Hospital, Department of Anesthesiology, Ankara Turkey

2 Ankara City Hospital, Children Hospital, Department of Pediatric Gastroenterology, Ankara Turkey

**Background and Goal of Study / Background:** Background: Children undergoing gastrointestinal endoscopies (GIE) are need anesthesia or procedural sedation (PS) to provide optimum comfort and cooperation during the procedure [1]. Topical pharyngeal anesthesia is effective in suppressing the threshold of the gag reflex and thus facilitates the procedure of upper gastrointestinal endoscopies [2]. Propofol based sedation is safely and effectively for pediatric GIE procedures [3]. We aimed to evaluate the effect of propofol combination with pharyngeal lidocaine spray and intravenous opioid on propofol consumption in pediatric patients.

**Materials and Methods:** Material and Method: At the Children's Hospital of Ankara City Hospital, hospital records of pediatric patients who underwent upper GI endoscopy were analyzed retrospectively. Patients who used propofol-fentanyl (Group F) or propofol-lidocaine spray (Group S) were included in the study. In order to reduce the need for anesthesia to be applied, Xylocain spray 1 mg / kg (max 5 puff) is sprayed into the pharynx of patients who allow it. The total propofol consumption, duration of anesthesia, recovery time and satisfaction of the patients were recorded.

**Results and Discussion / Discussion:** Results: Of the total 58 patients, 27 patients were in group F (mean age 12,6±4,3 years) while 31 patients were in group S (mean age 13,6±4,1 years). The mean recovery times in Group F and Group S were respectively 3.30±3.52 and 1.94±1.26 minutes. The mean consumption of propofol was 105.92±37.57 and 117.09±49,67 mg in Group F and Group S respectively. And the duration of anesthesia in Group F and Group S was 10,5±2,67 and 10,7±2,70 min respectively. There was no statistically significant difference between the groups in terms of propofol consumption, duration of anesthesia, recovery time and patient satisfaction.

**Conclusion(s):** Conclusion: Propofol is commonly use for sedation during elective upper gastrointestinal endoscopy because of its rapid onset of action, rapid recovery time, and improved satisfaction among endoscopists, patients and parents. In this retrospective study we concluded that topical pharyngeal lidocaine is as effective as fentanyl. Propofol combination with topical pharyngeal lidocaine did not improve the propofol consumption, duration of anesthesia and recovery time in this study but it is an alternative agent for opioid free anesthesia for children undergoing gastrointestinal endoscopy.

**References:**

1. Basturk A, Artan R, Yilmaz A Investigation of Efficacy of Lidocaine Spray for Sedated Esophagogastroduodenoscopy in Children. *Pediatr Gastroenterol Hepatol Nutr* 2017 June 20(2):87-93.
2. Rajasekaran S, Hackbarth RM, Davis AT, Kopec JS, Cloney DL, Fitzgerald RK, Hassan NE, Ndika AN, Cornelius K, McCullough A, Sanfilippo D. The Safety of Propofol Sedation for Elective Nonintubated Esophagogastroduodenoscopy in Pediatric Patients. *Pediatric Critical Care Medicine*. 2014; 15:6. 261-69.
3. Heuss LT, Hanhart A, Dell-Kuster S, Zdrnja K, Ortmann M, Beglinger C, Bucher HC, Degen L. Propofol sedation alone or in combination with pharyngeal lidocaine anesthesia for routine upper GI endoscopy: a

randomized, doubleblind, placebo-controlled, non inferiority trial. *Gastrointestinal Endoscopy*. 2011; 74: 6. 1207-1214.

**O062****COMPARISON OF THREE DIFFERENT INTRATHECAL MORPHINE DOSES USED FOR POSTOPERATIVE ANALGESIA IN THORACOTOMY AND VATS SURGERIES.**

Esra TURUNÇ, İsmail Serhat KOCAMANOĞLU

Ondokuz Mayıs Üniversitesi

**Background and Goal of Study / Background:** In this study, we compared the analgesic efficacy, need for additional analgesia and morphine-related side effects of three different intrathecal morphine doses applied for postoperative analgesia for video-assisted thoracoscopic surgery (VATS) or thoracotomy in our clinic. We aimed to determine the morphine dose that provides the most effective analgesia with least side effects in postoperative period .

**Materials and Methods:** The required ethics committee permissions were taken for the study. Files of 60 patients with ASA-II, who underwent thoracotomy or VATS between 01.01.2019-01.07.2020 in the Ondokuz Mayıs University Medical Faculty Hospital and took ITM and iv patient controlled analgesia (PCA) for postoperative analgesia were reviewed retrospectively. Demographic data, intraoperative and postoperative hemodynamic data of the patients were recorded from these files. The applied analgesia method, postoperative resting, walking and coughing VAS values at 0., 30.minutes, 1.,8.,24., 30. and 48 hours, postoperative IV PCA fentanyl and pethidine consumption, side effects, first oral intake time, first flatulence time, initial mobilization time, and discharge lengths were recorded. Patients were divided into 4 groups (iv-PCA only (Group1,n=15), 3mcg/kg ITM(Group2,n=15), 5mcg/kg ITM (Group3,n=15), 8mcg/kg ITM(Group4,n= 5). Postoperative PCA prepared with fentanyl was applied to all patients. Pethidine was administered 25 mg im (daily dose max. 200mg) to patients whose pain VAS score was >4

**Results and Discussion / Discussion:** In the postoperative period, similar results were found in Group1 and Group2 in terms of pain based on VAS scores while resting, walking and coughing, and similar results were found between Group3 and Group4. At all times, the lowest pain VAS scores were observed in Group4. The first request time from postoperative PCA was similar in Groups 1 and 2, and was significantly shorter than Groups3 and4. Postoperative PCA consumption of fentanyl and use of pethidine was found as lower with increasing doses of ITM. Side effects such as nausea-vomiting, itching, delay in the first oral intake and burping were more in Group4.

**Conclusion(s):** We concluded that among the doses we compared, the optimal ITM dose that can be used in thoracotomy and VATS is 5mcg/kg due to its adequate analgesic effect within 48 hours after surgery and low side effect profile.

**References:**

1. Low-Dose Spinal Morphine for Post-Thoracotomy Pain: A Prospective Randomized Study  
Sirilak Suksompong, MD,\* Ploynaree Pongpayuha, MD,† Warunya Lertpaitoonpan, MD,\* Benno von Bormann, MD,\* Teeravit Phanchaietch, MD,z and Vimolluck Sanansilp, MD\*  
Journal of Cardiothoracic and Vascular Anesthesia, Vol 27, No 3 (June), 2013: pp 417–422
2. The Efficacy of Intrathecal Morphine in Post-thoracotomy Pain Management  
F Azkar, S Kocabas, S Yucel, O Samancılar, HY Cetin ve M Uyar  
The Journal of International Medical Research 2007; 35: 314 – 322
3. Intrathecal Morphine: The Forgotten Child  
Edmond Cohen, MD

Department of Anesthesiology Icahn School of Medicine at Mount Sinai New York, NY Journal of  
Cardiothoracic and Vascular Anesthesia, Vol 27, No 3 (June), 2013: pp 413–416



**O063****SPIELBERGER STATUS AND CONSTANT ANXIETY LEVELS IN OPERATING ROOM EMPLOYEES IN THE COVID-19 PANDEMIC: AN EXAMPLE OF A TERTIARY HOSPITAL**

Gamze KÜÇÜKOSMAN<sup>1</sup>, Bengü Gülhan AYDIN<sup>1</sup>

<sup>1</sup>Zonguldak Bülent Ecevit University Faculty of Medicine, Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** During the COVID-19 epidemic, the surgical team in the operating rooms continued to serve COVID-19 patients with possible / definite diagnosis requiring surgery. This study aims to examine the level of anxiety and related variables in healthcare workers working in operating rooms during the COVID-19 outbreak.

**Materials and Methods:** After the Ethics approval was obtained, this survey study for operating room staff (surgeons, nurses, anesthesiologists, and other helping health personnel) was conducted in the tertiary hospital between the dates of 1-8 March 2021. The data of this study were obtained by distributing and filling the a-survey forms by using the Spielberger State-Trait Anxiety Scale (STAI 1-2) and socio-demographic characteristics questionnaire after informing the participants and taking their verbal permissions. We used SPSS 23.0 and Pearson's chi-square, Student's t and ANOVA tests.

**Results and Discussion / Discussion:** One hundred people who answered all questions were evaluated. The descriptive characteristics of the participants for the STAI-1 and 2 were shown in Table 1. The mean values of STAI-1 and 2 do not differ depending on the age, gender, task, working time, educational-marital status, income change, having children and COVID-19 infected individuals at home, presence of elderly at home, having a first degree patient at intensive care, contact at work, and the person himself having COVID-19 ( $p>0.05$ ). It was found that the STAI-1 differed only depending on the status of receiving psychological support; the average value was 52.8 in people who received psychological support, while it was 39.5 in those who did not ( $p=0.049$ ).

**Conclusion(s):** Köksal et al.<sup>1</sup> showed that the anxiety and depression symptoms were high in the operating rooms during the COVID-19 pandemic (April 2020). In the present study, it was found that the pandemic caused moderate anxiety in the operating room workers. We believe that the different in our anxiety assessment scale and the time of applying the questionnaire (March 2021) may have affected the results. We believe that improving the working conditions of operating room employees from the early period during the pandemic is effective in reducing anxiety levels and providing psychological support for the concerns of employees will be important in combating the pandemic.

**References:**

1. Koksal E, Dost B, Terzi Ö, Ustun YB, Ozdin S, Bilgin S. Evaluation of Depression and Anxiety Levels and Related Factors Among Operating Theater Workers During the Novel Coronavirus (COVID-19) Pandemic. *Journal of PeriAnesthesia Nursing* 35 (2020) 472-477.

**Table 1.** Descriptive Statistics of Participants and Comparison According to STAI 1 and STAI 2

	n	%	STAI 1	p	STAI 2	p
Age (year)						
18-29	31	31	40,9 ± 12,3		40,8 ± 9,7	
30-39	33	33	39,1 ± 9,2	0.994	40,7 ± 5,5	0.512
40-49	31	31	40,9 ± 9,8		42,8 ± 7,6	
50-59	5	5	38,6 ± 7,8		39,8 ± 6,1	
Sex						
Male	54	54	38,4 ± 9,6	0.220	40,0 ± 6,8	0.167
Female	46	46	42,2 ± 10,7		42,9 ± 8,3	
Profession						
Doctor	32	32	42,0 ± 10,8		41,6 ± 8,6	
Operating theater nurse	21	21	40,6 ± 12,7	0.741	40,1 ± 7,4	0.775
Anesthetic technician	24	24	40,4 ± 10,2		42,5 ± 8,1	
Cleaning staff	19	19	37,5 ± 6,2		41,2 ± 5,1	
Patient Transfer Staff	4	4	35,3 ± 7,3		39,5 ± 10,4	
Professional experience (year)						
0-5	34	34	40,7 ± 11,2		41,5 ± 8,6	
6-10	14	14	37,9 ± 9,0	0.921	39,9 ± 7,9	0.504
11-15	23	23	39,5 ± 10,1		39,9 ± 5,2	
16-20	19	19	41,5 ± 7,7		44,2 ± 7,2	
≥ 21	10	10	40,8 ± 14		41,1 ± 9,0	
Educational level						
Primary school	9	9	40,6 ± 3,5		40,4 ± 4,0	
Middle School	3	3	36,3 ± 14,4	0.650	40,3 ± 9,7	0.909
High school	12	12	39,3 ± 11,0		42,0 ± 6,0	
University	76	76	40,4 ± 10,6		41,4 ± 8,2	
Marital status						
Married	58	58	40,6 ± 9,0		41,6 ± 6,5	
Single	42	42	39,6 ± 11,9	0.181	41,0 ± 9,0	0.481
Income change						
Decreased	22	22	43,2 ± 13,2		41,0 ± 8,0	
Increased	8	8	39,5 ± 7,6	0.259	40,4 ± 6,3	0.969
Not changed	70	70	39,3 ± 9,4		41,6 ± 7,7	
Children						
Yes	49	49	40,5 ± 9,8		41,1 ± 6,6	
No	51	51	39,9 ± 10,8	0.594	41,6 ± 8,5	0.396
Having COVID-19 at home						
Yes	15	15	40,7 ± 8,3		40,0 ± 5,8	
No	85	85	40,1 ± 10,6	0.478	41,6 ± 7,9	0.821
Living with someone aged 65 y or older						
Yes	16	16	37,5 ± 8,7		41,6 ± 5,9	
No	84	84	40,7 ± 10,5	0.169	41,3 ± 7,9	0.764
Do you have a patient in ICU?						
Yes	2	2	43,0 ± 1,4		33,0 ± 4,2	
No	98	98	40,1 ± 10,4	0.937	41,5 ± 7,6	0.090
Contact with COVID-19 patient						
Yes	83	83	40,5 ± 10,8		41,3 ± 7,7	
No	17	17	38,6 ± 7,2	0.931	41,6 ± 7,3	0.838
Have you had COVID-19?						
Yes	17	17	38,1 ± 7,6		40,9 ± 7,0	
No	74	74	40,8 ± 10,9	0.206	41,3 ± 7,6	0.964
Unknow	9	9	39,2 ± 9,0		42,6 ± 9,3	
Did you get psychological support?						
Yes	5	5	52,8 ± 10,7	<b>0.049</b>	48,4 ± 8,0	0.029
No	95	95	39,5 ± 9,8		41,0 ± 7,4	

**O064****THE USE OF PROPOFOL IN SPINA BIFIDA REPAIR SURGERY**Esma Meltem Şimşek

Ankara Şehir Hastanesi

**Background and Goal of Study / Background:** Spina bifida is the most common neural tube defect, it may lead to neurological, neuromuscular, and urological system pathologies. In the intraoperative follow-up, it is recommended neuromuscular monitoring and maintenance of anesthesia with TIVA. In this study, we aimed to present a patient in who propofol infusion was administered due to neuromuscular monitoring in children under 3 years of age, although there are drawbacks to the use of propofol.

**Materials and Methods:** A 16-month-old 8.5 kg male child was operated on for spina bifida repair under ASA 2 risk. In addition to routine anesthesia monitoring, BIS and SSEP monitorization were performed. Propofol, fentanyl and rocuronium was used for anesthesia induction and remifentanyl-propofol infusion TIVA was used for anesthesia maintenance. Propofol administration was continued at a rate of 12 mg/kg/h for the first 30 minutes, and then reduced to 9 mg/kg/h and 6 mg/kg/h at 30-minute intervals, with a BIS value of 50-55. At the end of the operation, he was extubated and transferred to PACU. The patient, who did not experience any problems during the service follow-up was discharged on the 4th postoperative day.

**Results and Discussion / Discussion:** It is emphasized that propofol should not be administered as an infusion under 3 years of age in routine practice, but there are studies showing that it is used as an infusion under 3 years of age. Some researchers conducted studies evaluating the use of propofol in pediatric patients and showed that the use of propofol infusion together with sevoflurane reduces the risk of agitation after general anesthesia.(1,2) In surgeries where intraoperative monitoring of neuromuscular functions is performed, some intravenous infusion agents are used to respond to stimuli. In our case, propofol infusion was continued at the lowest rate according to the BIS follow-up and the patient was discharged without any problem.

**Conclusion(s):** Although there are different applications regarding the use of propofol under the age of <sup>3</sup>, no side effects were encountered in our case with iv infusion. Therefore, it is considered important to review the age ranges related to the use of propofol.

**References:**

1. Engelhardt T, McCheyne AJ, Morton N, Karsli C, Luginbuehl I, Adeli K, Walsh W, Bissonnette B. Clinical adaptation of a pharmacokinetic model of Propofol plasma concentrations in children. *Paediatr Anaesth*. 2008 Mar;18(3):235-9. doi: 10.1111/j.1460-9592.2007.02407.x. Epub 2008 Jan 7. PMID: 18179618.
2. Key KL, Rich C, DeCristofaro C, Collins S. Use of propofol and emergence agitation in children: a literature review. *AANA J*. 2010 Dec;78(6):468-73. PMID: 21309294.

**O065****DUTIES OF ANESTHETISTS AND ASSESSMENT OF AWARENESS, CONCERNS AND EXPECTATIONS ON ANESTHESIA PRACTICES**

Melahat YALÇIN SOLAK<sup>1</sup>, Murat İZGİ<sup>1</sup>, Murat TÜMER<sup>1</sup>, Şennur UZUN<sup>1</sup>

<sup>1</sup>Hacettepe University, Faculty of Medicine, Department of Anaesthesiology, Ankara, Turkey

**Background and Goal of Study / Background:** Although anesthesiologists have many duties in and out of the operating room, many studies have shown that society has a limited level of knowledge on anesthesia application and the duties and responsibilities of anesthesiologists. (1-3). This study aimed to evaluate the knowledge level of society about anesthesia applications and anesthesiologists, determine their concerns, if any, examine the changes in their knowledge and concern levels based on sex, educational status, and experiences about anesthesia, detect false or missing information, and predict what should be done about this matter as anesthesiologists.

**Materials and Methods:** The population of the study included 400 patients/patient relatives aged between 18 and 85, who were planned to undergo an elective surgical operation in Hacettepe University Hospital between March and October 2017, for preoperative anesthesia assessment. The questionnaire used in this study had 23 questions and two sections. The first section questioned demographic information. The questions in the second section related to anesthesia. The statistical analysis was made using the SPSS 20 program. The conformity to the normal distribution of data was tested with the Shapiro Wilk test. The distribution of the numerical variables between two groups was evaluated with the T-test in independent samples. Chi-square test, Yates corrected chi-square test, and Fisher's exact chi-square test were used to compare categorical data.

**Results and Discussion / Discussion:** The participants of 69% answered the question "Who is an anesthesiologist?" as "Specialist who was graduated from the faculty of medicine and trained about anesthesia" while 24.5% answered as "I do not know". Of the participants, 53.3% stated that they were afraid of anesthesia and this rate was higher among women than men (58.7% and 57.1%;  $p=0.020$ ). Considering the educational level of participants, the level of knowledge on anesthesia applications and the duties of anesthesiologists was significantly higher in the college/university education group than others ( $p<0.001$ ). The participants were compared in terms of previous anesthesia experience and the size of the operation undertaken. There were no significant differences in terms of knowledge level about anesthesia and anesthesiologists, and concerns about anesthesia ( $p<0.05$ ).

**Conclusion(s):** This study found that the level of knowledge on anesthesia applications and the duties of anesthesiologists is lacking in society.

**References:**

1. Gottschalk A, Seelen S, Tivey S, Gottschalk A, Rich G. What do patients know about anesthesiologists? Results of a comparative survey in an US, Australian, and German university hospital. *Journal of clinical anesthesia*. 2013;25(2):85-91.
2. Cohen B, Ogorek D, Oifa S, Cattan A, Matot I. Smart marketing may improve public understanding of the anesthesia profession. *Israel journal of health policy research*. 2015;4(1):16.
3. Nagrampa D, Bazargan-Hejazi S, Neelakanta G, Mojtahedzadeh M, Law A, Miller M. A survey of anesthesiologists' role, trust in anesthesiologists, and knowledge and fears about anesthesia among predominantly Hispanic patients from an inner-city county preoperative anesthesia clinic. *Journal of clinical anesthesia*. 2015;27(2):97-104.

**O067****ENIGMA OF BRAIN DEATH IN A PATIENT WITH COVID-19 FOLLOWED IN PRONE POSITION**Behiye Deniz KOSOVALI<sup>1</sup>

1. Ankara City Hospital, Department of Critical Care

**Background and Goal of Study / Background:** Although COVID-19 essentially damages the respiratory system, it may affect other systems such as the vascular and neurological system. In this case report, we present a patient who developed fatal acute ischemic stroke under COVID-19 treatment.

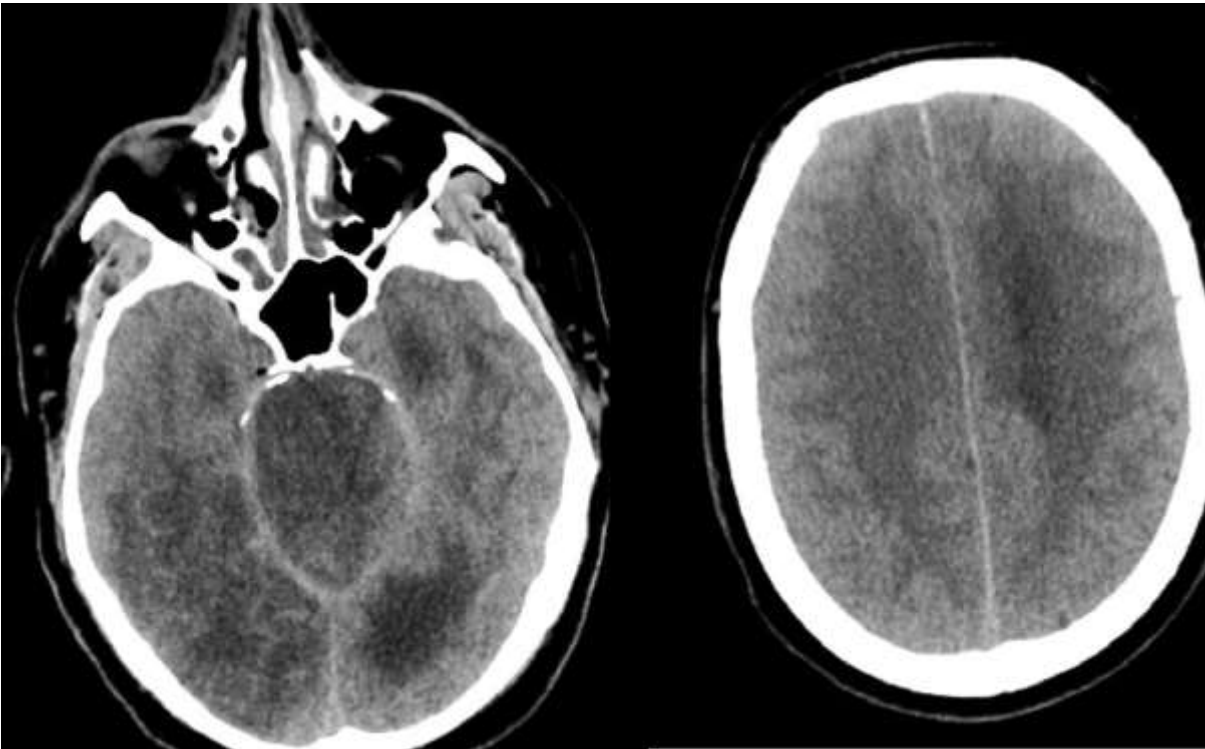
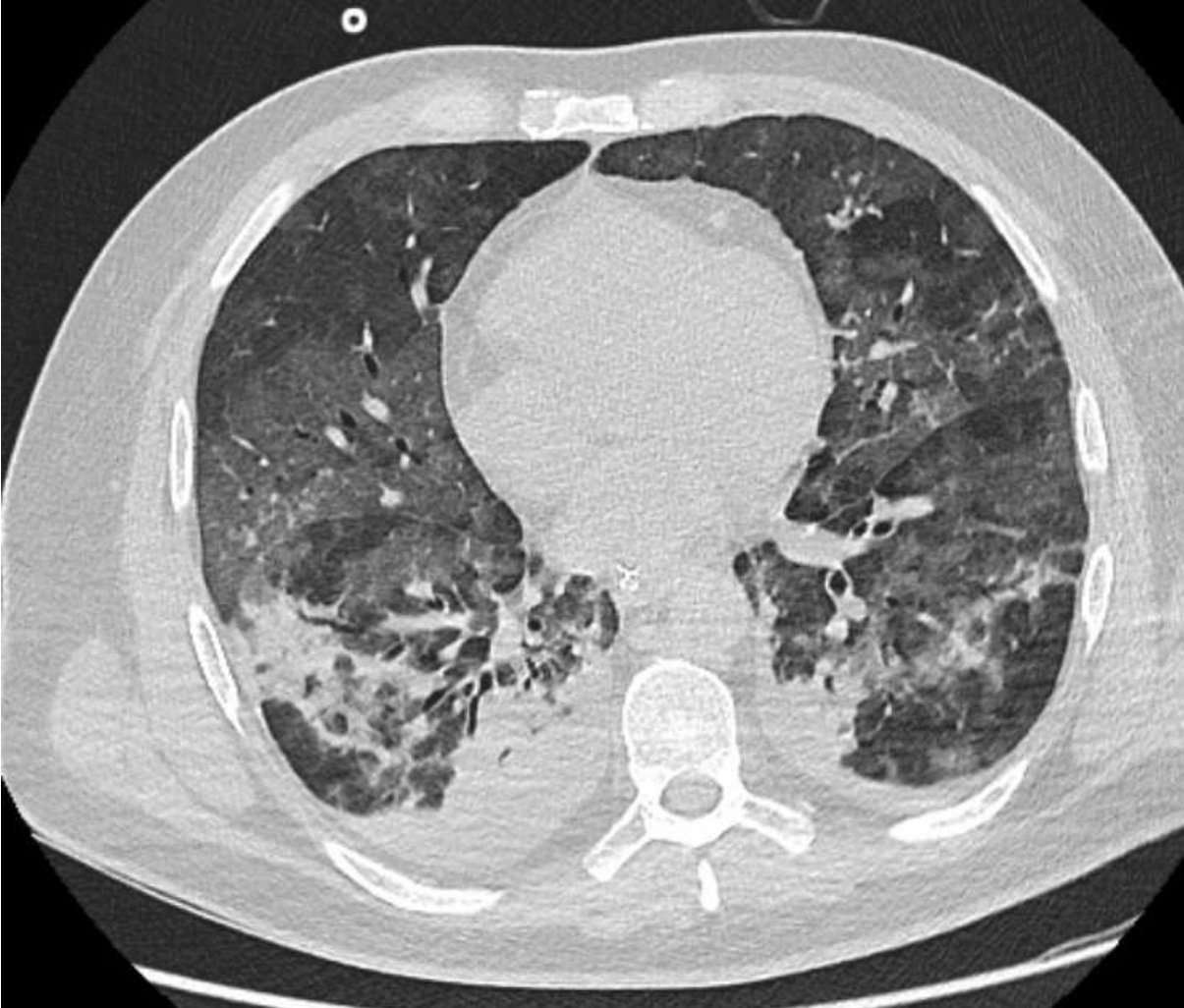
**Materials and Methods:** A forty-six year old non-smoker male had nonspecific symptoms at admission but developed COVID-19 associated ARDS which required intubation and mechanical ventilation (Figure 1). In MV period, prone positioning was used under sedative and muscle relaxant. Subsequently sedation was discontinued but the patient didn't gain consciousness and brain CT showed ischemic lesions in the brainstem and cerebral hemisphere and brain death was suspected (Figure 2). Apnea test and cerebral CT angiography were planned with suspicion of brain death, but due to the development of hypotension, tachycardia and cardiac arrest neither apnea test nor CT angiography could be performed.

**Results and Discussion / Discussion:** Although there are still many mechanisms that have not yet revealed, susceptibility to thrombosis occurs with hypoxia, sepsis, sepsis-related complement activation, endothelial injury, and activation of the inflammatory and micro thrombotic pathways. Another possible reason for the IS that developed in our patient may be the prone position applied for quite a long time to correct oxygenation. Both in the pre-intubation and on prone positioning periods we didn't detect any abnormal neurologic signs until the sedation was stopped.

**Conclusion(s):** As a result, we recommend closer follow up of neurological signs and symptoms both clinically and radiologically, in patients undergoing prone positioning to increase oxygenation, especially considering the challenges related to the pandemic process.

**References:**

1. L. Mao, M. Wang, S. Chen, et al. Neurological Manifestations of Hospitalized Patients with COVID-19 in Wuhan, China: a Retrospective Case Series Study. <https://www.medrxiv.org/content/10.1101/2020.02.22.20026500v1.article-info>
2. Tunç A, Ünlübaş Y, Alemdar M, Akyüz E. Coexistence of COVID-19 and acute ischemic stroke report of four cases. *Journal of Clinical Neuroscience*. 2020;77:227-229.
3. Kwee MM, Ho YH, Rozen WM. The Prone Position During Surgery and its Complications: A Systematic Review and Evidence-Based Guidelines. *Int Surg* 2015;100:292–303.



**O068****SURGICAL AND ANESTHETIC MANAGEMENT OF POSTPARTUM HEMORRHAGE 45 DAYS AFTER CESAREAN SECTION**

Funda CEVHER AKDULUM<sup>1</sup>, Nuray CAMGOZ ERYILMAZ<sup>2</sup>,  
Berrin GUNAYDIN<sup>2</sup>, Ayse BORKLUCE<sup>2</sup>, Esra BOSTANCI<sup>1</sup>, Ahmet ERDEM<sup>1</sup>

1 Gazi University School of Medicine Departments of OBGYN

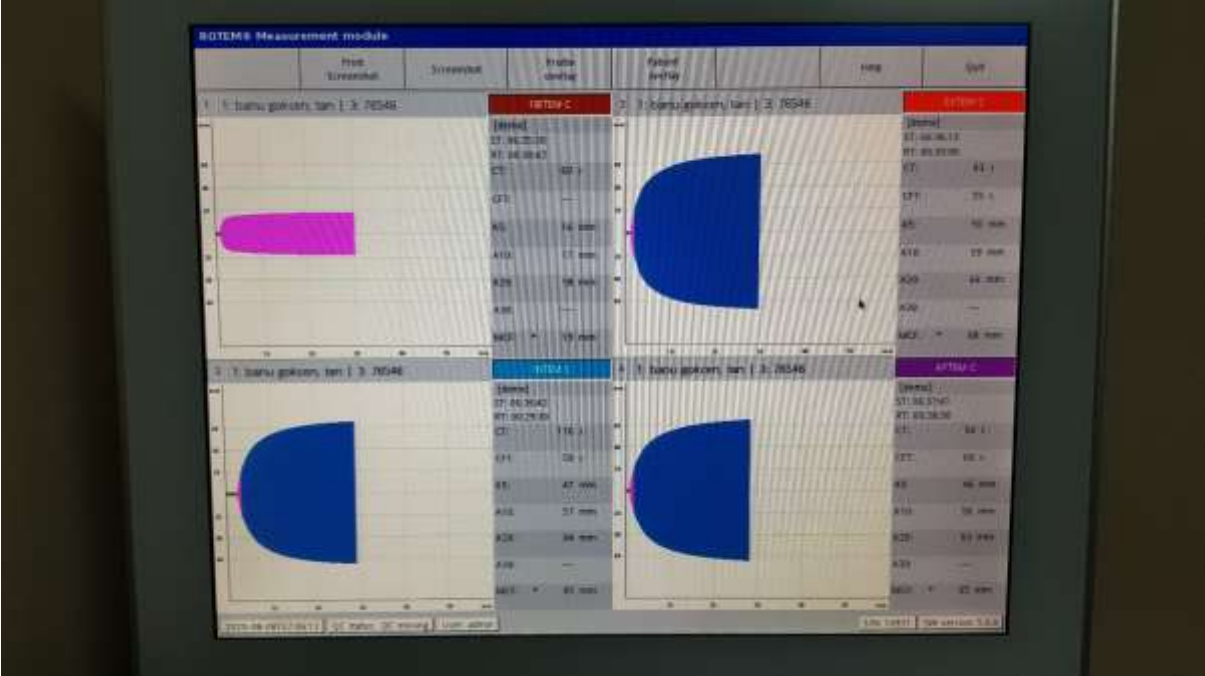
2 Gazi University School of Medicine Departments of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** To present management of delayed PPH in a severely bleeding parturient 45 days after cesarean section (CS).

**Materials and Methods:** A 29-year-old patient was admitted with vaginal bleeding. She underwent CS at the 39 weeks of gestation due to cephalopelvic disproportion 45 days ago. On admission coagulation profile was normal, ultrasound did not reveal any retained placental products/subinvolution. Hemoglobin level (10.3 g/dL) suddenly decreased to 6.9 g/dL due to abundant vaginal bleeding. After IV infusion of 20 IU oxytocin/1000 mL Ringer's lactate, 0.2 mg im methylergonovine, 600 µg transrectal misoprostol, 100 µg/10 ml carbetocin, 1 g IV tranexamic acid (TXA) and 2 g of fibrinogen concentrate, emergency explorational surgery including lateral hemostatic suturation and bilateral uterine and hypogastric artery ligations were performed under general anesthesia using propofol/rocuronium followed by 1 MAC sevoflurane in 50% O<sub>2</sub>/air mixture and remifentanyl infusion under monitorization. A foley catheter was placed into the uterus. Hemoglobin:7.7 g/dL and Platelet: 237,000/µL. Total of 6U of RBC, 6U of FFP, 1 ampule of calcium 10% and 3 g of fibrinogen concentrate were given. After extubation, case was transferred to the ward. When fibrinogen was checked by ROTEM, FIBTEM A5 was found to be 16 mm (fibrinogen level 303 mg/dL)(Fig.1).

**Results and Discussion / Discussion:** We stopped bleeding by pharmacological (using available uterotonics consecutively) and surgical (vaginal suturing and bilateral uterine+hypogastric artery ligations). After early use of TXA, we corrected coagulopathy using fibrinogen (to target >2 g/L and FIBTEM A5 16 mm) along with RBC and FFP in a 1:1 ratio driven protocol (to target Hb>9 g/dL). We guided our therapy with viscoelastic hemostatic assay (VHA) and standard laboratory tests. In order to avoid unnecessary blood/blood product use that can increase mortality and/or morbidity, focus on central role of fibrinogen in the coagulation is utmost important.

**Conclusion(s):** Adapted/modified massive transfusion protocol (MTP) that includes algorithms with trigger and target values used under the guidance of VHA and/or standard coagulation tests should be activated early. Based on MTP of Maternity and Obstetric Guidelines launched recently by the Turkish Ministry of Health, delayed PPH was successfully managed in this particular case.





0069

**ANESTHESIA MANAGEMENT DURING FAILED  
INTRAUTERINE BALLOON PULMONARY VALVULOPLASTY**Özge ÖZEN<sup>1</sup>, Banu KILIÇASLAN<sup>1</sup>, Murat ÇAĞAN<sup>2</sup>, Meral KANBAK<sup>1</sup>1 Hacettepe University Department of Anesthesiology and Reanimation 2 Hacettepe University  
Department of Gynecology and Obstetrics

**Background and Goal of Study / Background:** Critical congenital heart defects(cCHD), if left untreated prenatally, causes irreversible changes in the anatomy and the function of the cardiovascular system. Purpose of their intrauterine treatment is to reduce the negative effect of excessive pressure load on left or right ventricular function and development(1,2). In intrauterine fetal interventions, increasing the comfort of the procedure without disturbing the hemodynamics of the mother and fetus, while keeping the fetus in the appropriate position for the procedure, is very important in terms of the success of the procedure and possible complications that may occur. In this case report, we shared our own an experience in this subject.

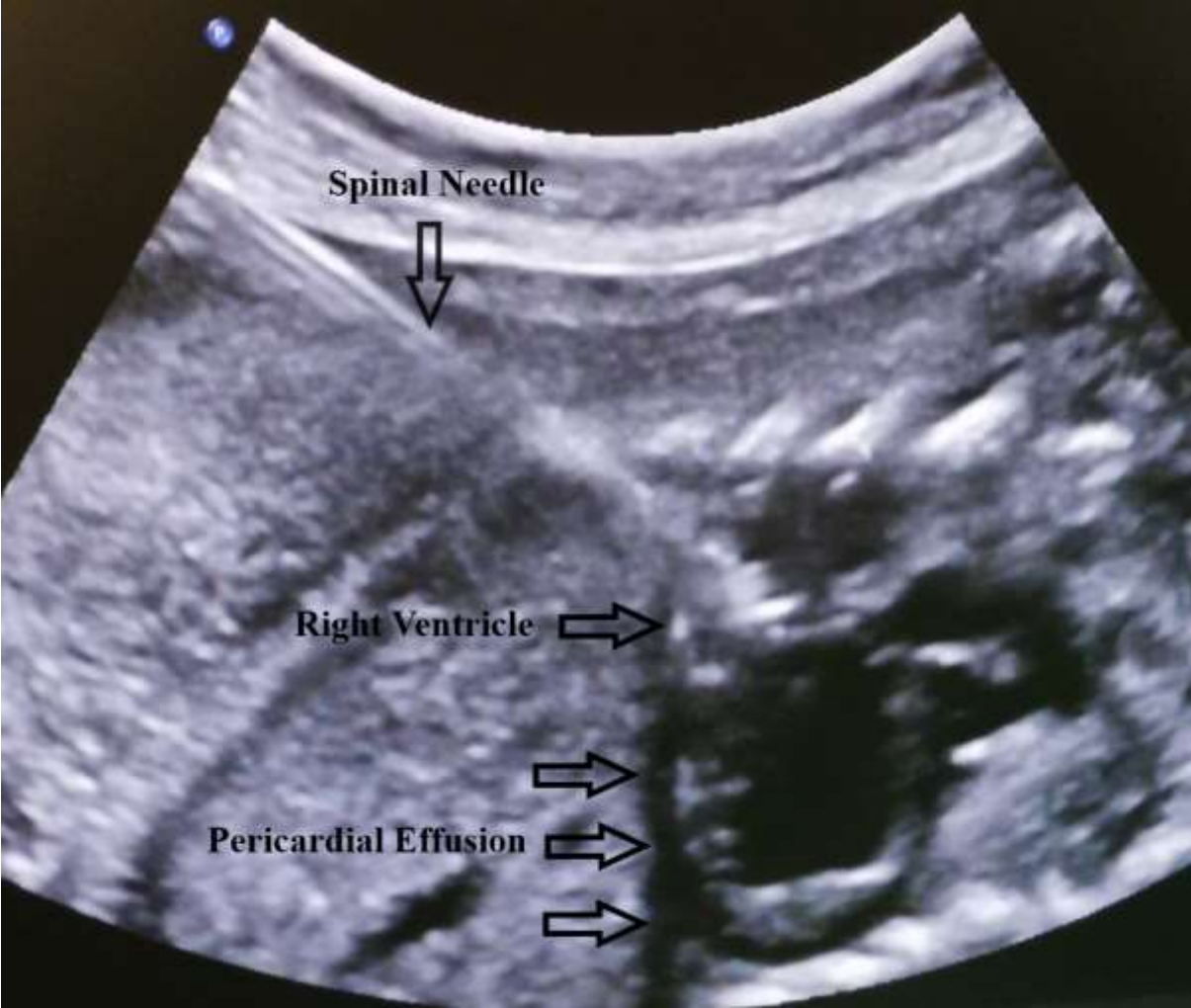
**Materials and Methods:** A 33 yearsold, 26 weeks of gestation pregnant patient admitted to our hospital with the diagnosis of pulmonary atresia with intact ventricular septum as a result of fetal ultrasonography(USG). After obtaining the appropriate fetal position in the operating room with USG; mother sedation was started with 200mcg/hour remifentanil infusion. In the right ventricular outflow tract image with USG, right ventricle was reached by passing through tissues with 18G spinal needle. Then, general anesthesia was applied to the mother to prevent movements of both mother and fetus using intravenous administration of propofol and rocuronium. Anesthesia was maintained with 60%O<sub>2</sub>+1%sevoflurane+ 40%air and 200mcg/hour remifentanil infusion. In the fetal right ventricle outlet view, the coronary balloon catheter was advanced from the spinal needle at the level of the right ventricle and pulmonary valve, respectively. Meanwhile, severe fetal bradycardia developed. Enlarged pericardial effusion was observed(Figure-1). The dilatation catheter wasn't advanced further into the pulmonary artery and pericardial effusion was aspirated. A regression in effusion was observed and the spinal needle was removed. At the end of the procedure, mother was extubated. Fetal bradycardia continued after the procedure. There was no any problem during follow-up. The transaction was deemed unsuccessful.

**Results and Discussion / Discussion:** During these procedures, separate anesthesia is given to the fetus through the umbilical vein. However, in this case, it was not considered necessary by obstetricians due to the small gestational week.

**Conclusion(s):** Peroperative management by an experienced anesthesia team is important for both maternal and fetal health such procedures.

**References:**

1. Arzt, W.; Wertaschnigg, D.; Veit, I et.al. Intrauterine aortic valvuloplasty in fetuses with critical aortic stenosis: Experience and results of 24 procedures. *Ultrasound Obstet. Gynecol.* 2011, 37, 689–95.
2. Tworetzky, W.; McElhinney, D.B.; Marx, G.R. et. al. In utero valvuloplasty for pulmonary atresia with hypoplastic right ventricle: Techniques and outcomes. *Pediatrics* 2009, 124, e510–e18.



**O070****ANESTHESIA MANAGEMENT OF RENAL TRANSPLANTATION IN A PATIENT WITH POST LIVER TRANSPLANTATION**

Sertaç ÇETİNKAYA<sup>1</sup>, Behiç GİRĞİN<sup>1</sup>, Yağmur Sitem AKBULUT<sup>1</sup>,  
Ayşe Sema TÜRKAY YILMAZ<sup>1</sup>, Nevriye SALMAN<sup>1</sup>, Ümit KARADENİZ<sup>1</sup>  
Ankara City Hospital Department of Anesthesiology and Reanimation <sup>1</sup>

**Background and Goal of Study / Background:** According to reports and literature, 5%-50% of liver transplantation patients suffer from renal failure [1] and end stage renal disease occurs 2%-10% of these patients.[2,3] Kidney transplantation after liver transplantation is a good choice to extend survival. Therefore, appropriate anesthetic management of these patients is important.

**Materials and Methods:** The patient was a 48-year-old male with liver failure due to alcohol and renal failure due to diabetic nephropathy with hepatorenal syndrome. His blood test results were; urea: 118 mg/dl; creatinine: 4.1<sup>4</sup>, potassium: 5.6 mEq/L and he was decided on hemodialysis. During his workup, transplantation of a kidney from a living and liver from a cadaver was decided. During this period, the patient received hemodialysis regularly, three times a week. Approximately six months after hospitalization, liver transplantation performed. After five days of liver transplantation and his hemodynamics and liver function tests returned to normal, kidney transplantation was performed from his sister. He was monitored with ASA standards and with CVP, BIS, NIRS and PICCO. Anesthesia was induced with 200 mg propofol, 100 mcg fentanyl, 100 mg lidocaine and 100 mg rocuronium, and was maintained with remifentanyl and desflurane. 2500 mg prednol was administered and electrolyte, blood sugar and acid-base balance were adjusted according to the intermittent ABG results. The patient, whose CVP value was tried to be kept at the level of 5, was given 30 grams of mannitol and 20 mg of furosemide before the completion of ureter anastomosis. Colloid fluid replacement was performed with 4 units of ES and 2 units of FFP. The patient who starts urinating after anastomosis was extubated with 200 mg sugammadex and analgesia was provided with 5 mg of morphine.

**Results and Discussion / Discussion:** Even if the liver functions of the patient return to normal, preservation of the transplanted liver in the kidney transplant procedure is important in terms of anesthesia.

**Conclusion(s):** For this complicated surgery, close monitoring of the surgical site in terms of bleeding and management of the CVP value without allowing liver congestion but also ensuring urine output are among the main parameters.

**References:**

1. Pawarode A, Fine DM, Thuluvath PJ. Independent risk factors and natural history of renal dysfunction in liver transplant recipients. *Liver Transpl* 2003;9:741-747.
2. Fraley DS, Burr R, Bernardini J, Angus D, Kramer DJ, Johnson JP. Impact of acute renal failure on mortality in end-stage liver disease with or without transplantation. *Kidney Int* 1998;54:518-524.
3. Gonwa TA, Mai ML, Melton LB, Hays SR, Goldstein RM, Levy MF, et al. End-stage renal disease (ESRD) after orthotopic liver transplantation (OLT) using calcineurin-based immunotherapy: risk of development and treatment. *Transplantation* 2001;72:1934-1939

**O071**

**PREGNANCY AND COVID19;  
PERFORMING SPINAL ANESTHESIA UNDER UNEXPECTED CONDITIONS**

Aygün GÜLER

Ankara City Hospital

**Background and Goal of Study / Background:** Special precautions should be considered when providing care for COVID 19 positive pregnant women undergoing CS.

**Materials and Methods:** 31-year-old 28-week pregnant woman who was confirmed as SARS-CoV-2 5 days ago was admitted to operation room for emergency cesarian section with cough, fever, worsening shortness of breath symptoms. Her oxygen saturation (SpO<sub>2</sub>) was 85 % on room air and 92 % with 2 L oxygen with nasal cannula, heart rate was 120 / minute, pCO<sub>2</sub> 30,6 mmHg, pO<sub>2</sub> 69,4 mmHg, lymphocyte:0,35 x10<sup>9</sup>/L, increased CRP:0,113 g/L, IL-6:21<sup>3</sup>, ALP:104 U/L, LDH:281U/L, procalcitonin:0,39 µg/L, fibrinogen:4,29 g/L and D-Dimer:0,9 mg/L. Intubation difficulty was the most problem because there was no fasting time and patients' BMI was 35,8 kg/m<sup>2</sup>. Also, patient had a cervical and thoracic-lumbar vertebral stabilization operation performed 7 month ago which was unknown before, cause of emergency entrance to the operation room and learned during positioning for spinal anesthesia. But of course, most important factor for all the medical persons in the operation room was possible virus spreading. Despite of these conditions especially thoracolumbar stabilization spinal anesthesia and operation successfully performed. Supplemental oxygen at 2 L/min was delivered via a nasal cannula under the patient's surgical mask and any need of vasopressors during surgery.

**Results and Discussion / Discussion:** The importance of this procedure is "what can we do if spinal anesthesia was unsuccessful?" difficult intubation, even failed intubation, aspiration during procedure, hypoxia could be happen.

**Conclusion(s):** So first, patients' medical history must be learnt carefully before the anesthesia. Second COVID19 operation rooms always must be ready for every emergency like difficult intubation. Third the anesthesiologist and technician must be the most experienced personnel in the team and another experienced anesthesiologist must be ready outside the operation room for help.

**O072****MANAGEMENT OF ACUTE EUDEMATOUS PANCREATITIS IN PATIENTS WITH SEVERE COVID-19 PNEUMONIA**

Mustafa HACIÖMEROĞLU<sup>1</sup>, Salih Birkan ARI<sup>1</sup>, Zehra KOÇ<sup>1</sup>,  
Çetin KAYMAK<sup>1</sup>, Bülent BALTAÇI<sup>1</sup>, Hülya BAŞAR<sup>1</sup>

<sup>1</sup>University of Health Science Ankara Training and Research Hospital

**Background and Goal of Study / Background:** COVID -19 primarily effects the respiratory system but sometimes it can be presented with other system dysfunctions. It is known that covid-19 can be presented with simple digestive system symptoms besides pancreatic symptoms. In this case, we present a case of acute pancreatitis with atypical gastrointestinal symptoms in a patient whis fallowed with covid-19 pneumonia.

**Materials and Methods:** 50 year old male patient with hypertension applies to the hospital with cough and fatigue . PCR test for COVID-19 is positive and the thorax CT is diagnostic for covid-19. Antiviral treatment was started . The patient applies to the hospital again with dyspnoea after receiving treatment at home for five days. Paitent who has desaturation, torax CT progression has been admitted to the service. Two days later, the patient who has unconsciousness and deep metabolic acidosis was intubated and taken to the intensive care unit. Abdomen CT has been documented with the preliminary diagnosis of acute pancreatitis on the notice of amilas increase, hypocalseミア, deep metabolic acidosis in the same day examinations. The patient diagnosed with acute eudematous pancreatitis. Hydration has been planned, meropenem has started as antibiotherapy. Spontaneous breathing trials with T-tube was started two days after the intubation. The following day, the patien was extubated electively. The patient, whose oxygen need decreased and blood sugar regulation was provided, was transferred to the service on the 5th day. It was observed that the laboratory parameters returned to normal when transferred to the service. (Table-1)

**Results and Discussion / Discussion:** COVID-19 can effectth digestive system from oropharingeal mucosa to rectum, additionally liver and pancreas . Increased ACE-2 expression may be the mechanism of liver damage. This expression is secondary to proliferation of bile duct epithelium. Therefore the prominent gastrointestinal symptoms in our patient, may cause direct gastrointestinal invasion in addition to inflammation. Similarly, immune response triggered by increased ACE-2 receptor expression in pancreas cells may cause pancreatic damage.

**Conclusion(s):** As a conclusion, COVID-19 associated acute pancreatitis is rare. Other reasons of acute pancreatitis should be excluded. If not recognized and treated properly, it may cause deadly results.

Table-1: Patient Laboratory Parameters

PARAMETERS	BASE VALUES	ADMISSION OF ICU	SECOND DAY OF ICU	FIFTH DAY OF ICU	NORMAL VALUES
AMILASE (IU/L)	26	592	174	67	
LIPASE (IU/L)	-	474	-	-	
ALANIN AMINOTRANSFERASE(ALT) (IU/L)	17	12	13	17	0-55
ASPARTATE AMINOTRANSFERASE(AST) (IU/L)	21	18	20	28	0-48
PROTHROMBINE TIME(PT) (sec)	-	14.5	14.4	-	12-24
ACTIVE PARTIAL THROMBOPLASTINE TIME(APTT) (sec)	-	35.6	31.9	-	24-36
TOTAL BILURUBIN (mg/dL)	0.24	0.17	0.32	0.5	<1.2
C- REACTIVE PROTEIN(CRP) (mg/L)	258.4	84	56	20	<5
SODIUM(Na) (mmol/L)	133	131	145	142	136-145
POTASSIUM(K)(mmol/L)	4.6	4.5	3.4	4.3	3.5-5.0
CHLORIDE(Cl) (mmol/L)	98	99	105	103	98-107
BLOOD UREA NITROGEN(BUN) (mg/dL)	36	142	86	40	18-55
CREATININ (mg/dL)	1.16	1.49	0.96	0.69	0.7-1.2
BLOOD GLUCOSE (mg/dL)	385 (PBS*)	459	238	191	75-99
CALCIUM(Ca) (mg/dL)	9.4	7.6	9.1	9	8.8-10.6
WHITE BLOOD CELLS COUNT/ml	15.75	19.2	18.6	13.9	4-10.5

\* Postprandial Blood Glucose

**0073****THE SIGNIFICANCE OF USING USG FOR  
CENTRAL VENOUS CATHETERIZATION IN ATRIAL SEPTAL DEFECT SURGERY**Hülya YİĞİT ÖZAY

Ankara Şehir Hastanesi, Anesteziyoloji ve Reanimasyon Kliniği

**Background and Goal of Study / Background:** Atrial septal defect (ASD) is the third most common lesion in congenital heart disease. Progressive right atrial and ventricular dilatation, atrial arrhythmias, right heart failure, and pulmonary hypertension may develop over time due to a left-to-right shunt. Spontaneous internal jugular vein thrombosis (IJVT) is an extremely rare disease that can be fatal due to possible complications such as sepsis and pulmonary embolism. IJVT can occur due to reasons such as prolonged central catheterization, ovarian hyperstimulation syndrome (OHSS), malignancy, and hypercoagulability. Here, we present the case of a patient who was scheduled for an ASD operation and incidentally diagnosed with IJVT by using USG during central venous catheterization.

**Materials and Methods:** A 40-year-old female patient was taken to the operating room for ASD closure using the minimally invasive method. There was no previously-known comorbidity in her medical history. Endotracheal intubation was performed after routine cardiac surgery monitoring and standard anesthesia induction. An 8F catheter was placed in the right IJV to be used by surgeons for cannulation. Another central venous catheter was planned to be placed in the left IJV for anesthetic use. Using the Seldinger method the catheter was inserted into the left internal jugular vein. Once the guidewire couldn't advance after a point, the case was evaluated by USG. A thrombus was detected in the IJV distal to the intervention site, and the procedure was terminated. A central venous catheter was placed distal to the cannula in the right IJV. The operation and postoperative period went uneventfully.

**Results and Discussion / Discussion:** It is considered that the incidence of vascular thrombosis with a clinically-asymptomatic course is higher than those with an asymptomatic course. The clinical significance of asymptomatic thrombosis is not quite well-known, but all thrombosis might have an embolism potential.

**Conclusion(s):** As a consequence, a systemic embolism could have occurred and catastrophic consequences could have been experienced. Although central venous catheterization is a standard procedure that can be easily performed with standard anesthesia applications and traditional methods, it should be taken into consideration that the prevalent use of USG in anesthesia practice can make a vital contribution in unique cases such as this case.

**O074****A CASE OF GUILLAIN-BARRÉ SYNDROME ASSOCIATED WITH COVID-19 INFECTION**

Trajkovska Elena<sup>1</sup>, Angjushev Darko<sup>1</sup>, Kartalov Andrijan<sup>1</sup>,  
Dimitrova Martina<sup>1</sup>, Trposka-Poposka Angela<sup>1</sup>

1. University Clinic of Anesthesiology, Reanimation and Intensive care Medicine ( KARIL ) –  
Skopje, Republic of North Macedonia

**Background and Goal of Study / Background:** Background: It is widely accepted that SARS Cov-19 infection most commonly affects the respiratory system, causing respiratory failure (RF), as well as myocarditis and hypercoagulability states.(1) The effects of COVID-19 on the neurological system, although potentially life threatening are considered to be most rare complication and perhaps least understood.(2) We report a case of Guillain-Barré syndrome (GBS) associated with COVID-19.

**Materials and Methods:** Case presentation: A 38-year-old man with no previous medical history was presented with tachypnea, hypoxemia, cyanosis, and was tested positive for SARS Cov-19. He was admitted to intensive care unit (ICU) for treatment of RF. He was treated with high flow oxygen mask. During the acute phase he developed acute renal failure (ARF) and 18 hemodialysis were performed. The patient eventually overcame the RF and the ARF phase. However 5 weeks after the admission to ICU, the patient state deteriorated again and over the course of 24 hours he developed a generalized muscular weakness, areflexia and progressive proximal para-paresis. At this point he was already tested negative for Covid-19. Patient was transferred to general ICU for further treatment of the neurological symptoms and newly developed RF. The post Covid-19 GBS was confirmed by neurologist. On Lumbar puncture his cerebro-spinal fluid (CSF) showed typical changes for GBS, while infectious etiology was excluded. A CT scan of the brain was unspecific. The specific treatment protocol included intravenous immunoglobulin therapy instead of plasmapheresis. The general treatment involved: symptomatic therapy, control of the general homeostasis, thrombosis prophylaxis and corticosteroids. His neurological status gradually improved, and the patient gained back some of the muscular force, and reflexes. However he still needed respiratory support over the period of 2 months.

**Results and Discussion / Discussion:** Discussion: Increasing reports of neurologic manifestations of COVID-19 are emerging, but only rare cases of GBS have been associated with the virus.(1,2) When complete clinical manifestation of GBS is developed it is difficult to treat and represents a life threatening condition.(3)

**Conclusion(s):** Conclusion: We are emphasizing the significance of early diagnostics and including an experienced neurologist into the team as the key to achieve improvement.

**References:**

1. Whittaker A, M, Harky A - Neurological Manifestations of COVID-19: A systematic review and current update Acta Neurol Scand. 2020 Jul; 142(1):14-22;
2. Berlit P, Bösel J, Gahn G, Isenmann S, Meuth SG, Nolte CH, Pawlitzki M, Rosenow F, Schoser B, Thomalla G, Hummel T. "Neurological manifestations of COVID-19" - guideline of the German society of neurology. Neurol Res Pract. 2020 Dec 2;2:51;
3. Gaurav Nepal, Jessica Holly Rehrig, Gentle Sunder Shrestha, Yow Ka Shing, Jayant Kumar Yadav, Rajeev Ojha, Gaurab Pokhrel, Zhi Lan Tu & Dong Ya Huang - Neurological manifestations of COVID-19: a systematic review- Crit Care. 2020 Jul 13;24(1):421.



**O075****RETROSPECTIVE EVALUATION OF CYTOKINE STORM PARAMETERS IN SEVERE COVID-19 PNEUMONIA**

Ayşe ÖZCAN, Çetin KAYMAK, Hülya BAŞAR, Yusuf Harun İREN, Mustafa HACIÖMEROĞLU, İlayda PEKTAŞ, Merve Tuğçe GÖÇ

University of Health Sciences, Ankara Training and Research Hospital Department of Anesthesiology and Reanimation, Intensive Care Unit

**Background and Goal of Study / Background:** Coronavirus disease 2019 (COVID-19) is primarily a respiratory system infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Studies have revealed that the hyperinflammatory response induced by the infection is the major cause of disease severity and death. The purpose of the present study was to evaluate the levels of interleukin-6 (IL-6) and other inflammatory parameters in patients with severe COVID-19 pneumonia and ARDS.

**Materials and Methods:** After the approval of ethics committee (with date and number: 11.02.2021/536), this retrospective study was conducted in COVID-19 patients admitted to intensive care unit with severe pneumonia and acute respiratory distress syndrome (ARDS) during a 10-month period. Demographic characteristics, APACHE II score at admission and laboratory data including IL-6, CRP, ferritin, LDH, lymphocyte count, neutrophil/lymphocyte ratio, D-Dimer and fibrinogen on days 0, 7, 14 and 28 of admission to ICU were recorded.

**Results and Discussion / Discussion:** A total of 399 patients with severe COVID-19 pneumonia and ARDS were included in the study. The 59,4% of the patients was male and 40,6% was female. The mean age of the patients was 68,8±14,8. The mean APACHE II score at admission was 13,8±8,7. IL-6, ferritin and D-Dimer were remarkably high in the screened patients and started to decrease on the fourth week of ICU stay in the survivors (Table 1). Elevation of circulating cytokines was significantly associated with presence of pneumonia in COVID-19 and the severity of lung injury. IL-6 together with other inflammatory biomarkers are associated with severe disease and poor outcome.

**Conclusion(s):** Anticytokine therapies may help in inhibiting inflammatory response and could be considered in patients with high serum IL-6 levels.

**Table 1:** Inflammatory biomarkers of patients

	Day 0	Day 7	Day 14	Day 28
IL-6	105,9±212,4	112,4±200	111,9±161,5	67,5±124
CRP (mg/L)	116,7±92,5	90,8±98,7	105,5±92	104,5±94,5
Ferritin (µg/L)	1293±4619,3	1743,8±7677,2	1046,4±2727,4	630,3±545,2
Fibrinogen (mg/dl)	545,7±191	476,2±200,6	574,3±245	533,3±148,8
D-Dimer (µg/L)	4070,4±10675,8	5624,9±7715,1	5976,8±18110,4	3033,5±2510,3
Lymphocyte (/mm <sup>3</sup> )	936±1232,7	1072,4±1172,6	1018,5±668,9	1373,8±866,3
NLR	17,8±18,1	19,5±25,2	15,2±15,9	11,4±16,2
LDH (U/L)	516,9±402,1	587,3±541	380,1±172,2	435,9±336

\*Data are presented as mean±SD, IL-6:Interleukin-6, CRP:C-Reactive Protein, NLR:Neutrophil lymphocyte ratio, LDH: Lactate dehydrogenase

**O076****EFFICACY OF PLASMA EXCHANGE IN CRITICALLY ILL COVID-19 PATIENTS**

Ayşe ÖZCAN, Çiğdem KIZILAY, Çetin KAYMAK, Birkan ARI, Ayşe EKEN, Meltem BEKTAŞ, Hülya BAŞAR

University of Health Sciences, Ankara Training and Research Hospital  
Department of Anesthesiology and Reanimation, Intensive Care Unit

**Background and Goal of Study / Background:** The “cytokine storm” induces endotheliopathy and microthrombotic disease in patients with COVID-19. Severe cases can present rapid deterioration and develop acute respiratory distress syndrome, septic shock, metabolic acidosis and coagulopathy, including disseminated intravascular coagulation (DIC). The effective treatment for COVID-19 has not been defined yet. We investigated the effect of therapeutic plasma exchange on inflammatory markers and outcome in critically ill COVID-19 patients.

**Materials and Methods:** A case series of critically ill patients, with laboratory-confirmed COVID-19, was studied during two-month period. Therapeutic plasma exchange (TPE) was performed in patients admitted to the intensive care unit (ICU) with acute respiratory distress syndrome (ARDS), severe pneumonia, disseminated intravascular coagulation. Demographic characteristics, laboratory data including D-dimer, ferritin, IL-6, CRP and arterial PCO<sub>2</sub> and PO<sub>2</sub> were recorded. Wilcoxin paired samples test was used to compare pre- and post-plasma exchange laboratory values.

**Results and Discussion / Discussion:** Case files of 10 patients with confirmed COVID-19 were assessed. All patients were male with a mean age of 61,8±11 years (range; 39-78). There were no significant difference between pre- and post-plasma exchange levels of D-dimer and inflammatory parameters including IL-6, CRP, ferritin. No improvement was observed in PCO<sub>2</sub> and PO<sub>2</sub> levels of the patients. Two of the patients were discharged from intensive care unit. Mortality rate was 80 %. Plasma exchange may help to decrease the levels of inflammatory biomarkers and attenuate endotheliopathy and microthrombosis associated with COVID-19. In our case cohort we did not observe any significant effect of plasma exchange on levels of inflammatory biomarkers. This may be due to the small sample size.

**Conclusion(s):** Further studies are needed to identify the efficacy of the potential role of therapeutic plasma exchange in critically ill COVID-19 patients.

**O077****A CHALLENGING PREGNANT: ECLAMPSIA OR COVID-19?**

Ayşe ÖZCAN, Yusuf Harun İREN, Çiğdem KIZILAY, Yusuf ÜSTÜN,  
Çetin KAYMAK, Hülya BAŞAR, Mert NAKİP

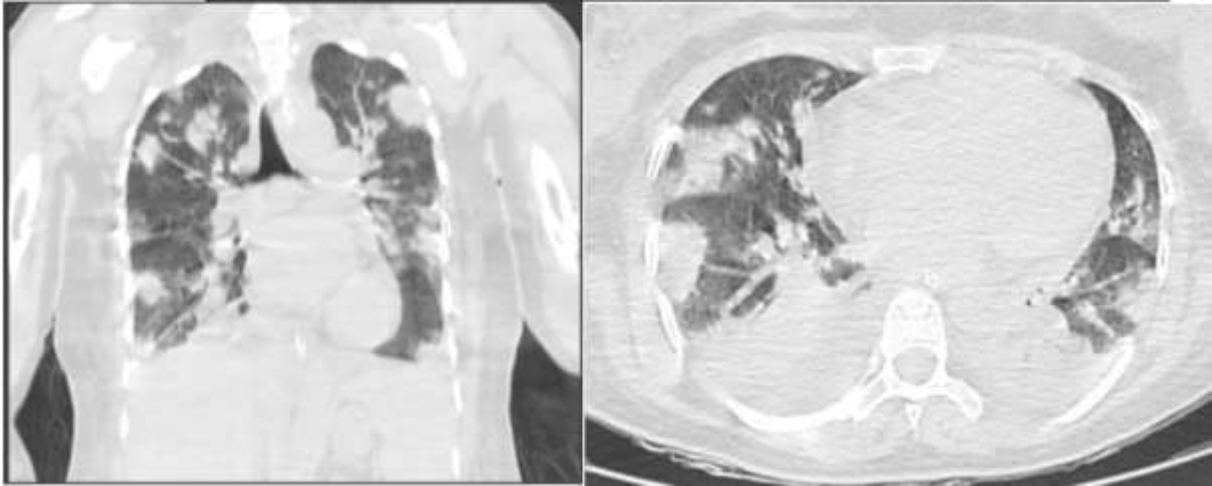
University of Health Sciences, Ankara Training and Research Hospital  
Department of Anesthesiology and Reanimation, Intensive Care Unit

**Background and Goal of Study / Background:** Covid-19 is affecting pregnant women and they have increased risk of serious complications of viral diseases. We report a confirmed Covid-19 pregnant case presented with eclampsia to the emergency service and later complicated with cardiomyopathy related with pregnancy or Covid-19.

**Materials and Methods:** A 30-year-old, woman at 38 weeks of gestation presented with hypertension and convulsions to the emergency service and was immediately undergone cesarean section. Her heart rate was 120/min and SpO<sub>2</sub> was 84% before general anesthesia. At the end of the surgery, because of persisting hypoxemia and hypertension, she was transferred to the intensive care unit. At admission to ICU she was sedated, had blood pressure of 137/88 mmHg, tachycardia, SpO<sub>2</sub> 88% and temperature of 36.8°C. Arterial blood gas showed both respiratory and metabolic acidosis. Laboratory findings revealed lymphopenia, high CRP and NT-pro-BNP. After observing lymphopenia and high CRP level with hypoxemia, computerized tomography was performed and revealed typical findings for viral pneumonia and pleural effusion on both sides (Figure 1). A nasopharyngeal swab was taken for Covid-19 rt-PCR and was resulted positive 6 hours after admission. On the follow-up, she became hypotensive, noradrenalin infusion was started. Cardiomyopathy (ejection fraction of 35-40%), 1st-2nd degree mitral, 1st degree tricuspid insufficiency and basal hypokinesia was established by echocardiography. After successful weaning from mechanical ventilation, the trachea was extubated 30 hours later after admission. She became dyspneic and tachypneic after extubation and was ventilated non-invasively for 6 days. After respiratory and hemodynamic stabilization, she was transferred to ward.

**Results and Discussion / Discussion:** Covid-19 should be considered in complicated pregnancies. Chest CT scan on admission to hospital will help to detect the infection rapidly and will prevent the nosocomial spread of the virus.

**Conclusion(s):** To recognize the infection earlier will help to anticipate the complications that might contribute to deterioration of the patients.



**Figure 1.** Chest computerized tomography of the patient showing ground-glass opacities and pleural effusion on both sides of the lungs.

**O078****CEREBRAL INFARCT: DUE TO MUCORMYCOSIS OR COVID-19?**Çiğdem KIZILAY, Ceren KAÇAN, Ayşe ÖZCAN, Hülya BAŞAR, Çetin KAYMAK

University of Health Sciences, Ankara Training and Research Hospital Department of Anesthesiology and Reanimation, Intensive Care Unit

**Background and Goal of Study / Background:** Although the main target of the SARS-Cov-2 is the respiratory system, it also affects other systems and patients are at increased risk of acute cardiac injury, arrhythmias, thromboembolic complications, and secondary infection. Here we present a patient who developed widespread cerebral infarction thought to be due to Rhino-Orbital-Cerebral Mucormycosis during the follow-up for COVID-19.

**Materials and Methods:** A 45- year-old male patient, insulin-dependent diabetic with a positive PCR for SARS-CoV-2 presented emergency department with nausea, loss of appetite. He was diagnosed with diabetic ketoacidosis in addition to COVID-19. The patient was consulted with neurology and ophthalmology due to changes in consciousness, ptosis and lateral gaze restriction in the ward. Cranial CT and diffusion MRI was performed. The CT revealed bilateral maxillary sinus mucosal thickening. MRI was normal. Because of acutely altered mental status, he was admitted to Intensive Care Unit. On admission, all vital parameters were normal, he was lethargic and GKS:11. It was learned that the patient's tooth was extracted 5 days ago. With the pre-diagnosis of encephalitis, cerebrospinal fluid(CSF) sampling, imaging tests were performed. Acyclovir, ceftriaxone, dexamethasone, enoxaparin, acetylsalicylic acid and favipiravir were administered. Contrast-Enhanced MR venography was normal but, Control Diffusion MRI reported as diffuse acute-subacute ischemia. There was no recommendation after neurology consultation. Due to mental deterioration, the trachea was intubated. Because of increased procalcitonin, C-reactive protein antibiotherapy was revised as meropenem and vancomycin. Urine, blood and CSF cultures were negative. On the seventh day of his admission, a necrotic lesion appeared at the medial edge of the eye. The lesion was assessed as mucormycosis by ophthalmology. Amphotericin B was added. Due to persistent hypotension, we were unable to repeat imaging or any surgical debridement. He unfortunately expired tenth day of this admission.

**Results and Discussion / Discussion:** In addition to immune dysregulation in COVID-19, glucocorticoids and immunomodulators used in the treatment of COVID-19 may increase the risk for invasive fungal infections.<sup>1</sup> We think that ischemic infarct, which initially appears to be a complication of COVID-19, is actually a complication of mucormycosis.

**Conclusion(s):** Physicians should be aware of the possibility of invasive secondary fungal infections in COVID-19 infection especially with preexisting risk factors.

**References:**

1. Kumar G, Adams A, Herrera M, et al. Predictors and outcomes of healthcare-associated infections in COVID-19 patients. *Int J Infect Dis.* 2021;104:287-292. doi:10.1016/j.ijid.2020.11.135

**O079****ANESTHESIA MANAGEMENT OF LIVER TRANSPLANTATION IN A PATIENT WITH RENAL FAILURE**

Yağmur Sitem AKBULUT<sup>1</sup>, Behiç GİRĞİN<sup>1</sup>, Ayşe Sema TÜRKEY YILMAZ<sup>1</sup>,  
Sertaç ÇETİNKAYA<sup>1</sup>, Nevriye SALMAN<sup>1</sup>, Ümit KARADENİZ<sup>1</sup>

1 Ankara City Hospital Departman Of Anesthesioloji And Reanimasyon

**Background and Goal of Study / Background:** Despite improvements, renal dysfunction before and after liver transplantation (LT) remains a major complicating factor associated with increased morbidity and mortality. Renal dysfunction occurs in 25% to 50% of patients with cirrhosis and may be due to underlying chronic kidney disease, acute worsening or both (1).

**Materials and Methods:** The patient was a 48-year-old male with liver failure due to alcohol and renal failure due to diabetic nephropathy with hepatorenal syndrome. During his workup, both liver and kidney transplantation was decided. As time goes by, the MELD score of the patient increased and encephalopathy occurred intermittently; so he was listed for an emergency LT. During this period, because of his renal failure, the patient received hemodialysis three times a week. Approximately six months after hospitalization, liver from a cadaver was found. He was monitored with ASA standards and with CVP, BIS, NIRS and PICCO. Anesthesia was induced with 100 mg propofol, 100 mcg fentanyl, 100 mg lidocaine and 100 mg rocuronium, and was maintained with remifentanyl and desflurane. 20000 cc of acid was drained and treated with albumin. Electrolyte, blood sugar and acid-base balance were adjusted according to ABG results. Mannitol and furosemide were administered as diuretic and CVP value was tried to be kept below the level of 5. Hyperkalemia during the procedure was intervened with glucose-insulin infusion. Since we stopped the rise of potassium levels, intraoperative renal replasman treatment (RRT) was not needed. The patient urinating 600 ml of urine for 12 hours whose haemodynamics are stable and who do not need a vasopressor was extubated with 200 mg sugammadex and analgesia was provided with 7 mg morphine.

**Results and Discussion / Discussion:** Renal dysfunction in LT has an adverse impact on a multitude of outcomes, including short and long term graft and patient survival. Resolving these critical issues that surround renal dysfunction in LT recipients is essential to reducing patient morbidity and mortality.

**Conclusion(s):** The treatment of hyperkalemia and acidosis is important in patients undergoing LT with renal failure; this can be intervened with glucose insulin infusion and diuretics; but if there is no response, intraoperative RRT options should be evaluated.

**References:**

1. Angeli P, Gines P, Wong F, et al. Diagnosis and management of acute kidney injury in patients with cirrhosis: revised consensus recommendations of the International Club of Ascites. *J Hepatol.* 2015;62:968–974.

**O080****SYSTEMIC INFLAMMATORY RESPONSE SYNDROME IN CYANOTIC AND ACYANOTIC CHILDREN UNDERGOING AFTER CONGENITAL HEART SURGERY**Feride KARACAER<sup>1</sup>, Ebru BİRİCİK<sup>1</sup>, Murat ILGINEL<sup>1</sup>, Demet TUNAY<sup>1</sup>, Numan BERK<sup>2</sup>, Yasin GÜZEL<sup>3</sup>

1Çukurova University Medical Faculty, Anesthesiology and Reanimation Department,

2Adıyaman Kahta State Hospital, Anesthesiology and Reanimation Department,

3Çukurova University Medical Faculty, Cardiovascular Surgery Department

**Background and Goal of Study / Background:** Cardiac surgery with cardiopulmonary bypass (CPB) is a primary activator of the systemic inflammatory response syndrome (SIRS) that is considered a major contributor to postoperative complications<sup>1</sup>. In this study, we aimed to compare the incidence of postoperative SIRS after cardiac surgery between cyanotic and acyanotic children and to assess the association of postoperative SIRS with intraoperative variables and early postoperative outcomes.

**Materials and Methods:** The children aged 2 months-16 years, undergoing cardiac surgery with CPB for cyanotic or acyanotic congenital heart disease, were included in this prospective, observational, cohort study. Perioperative clinical data were recorded. The presence of SIRS for each patient was evaluated based on the International Pediatric Sepsis Consensus Conference. The SIRS occurrence was evaluated at the end of the operation and at 6, 24 and 48 hours postoperatively.

**Results and Discussion / Discussion:** Of 197 children (median age: 26 months [2 months-16 years]) included in the study, 83 were cyanotic and 114 were acyanotic and SIRS occurred in 117 (59,4%) patients. The patients in the SIRS group were older than no-SIRS group ( $p < 0,001$ ). The SIRS incidence was not statistically different between cyanotic and acyanotic children ( $p = 0,427$ ). Aortic cross clamp time was longer and the quantity of administered crystalloid fluid and fresh frozen plasma (FFP) intraoperatively was higher in children with SIRS ( $p = 0,04^2$ ,  $p < 0,00^1$ ,  $p = 0,005$ ). The lactate levels at the 6th and 48th hours postoperatively was higher in the SIRS group ( $p = 0,01^2$ ,  $p = 0,032$ ). The mortality rate was higher in the cyanotic children ( $p = 0,03$ ). In this study, the incidence of SIRS was 59,4% following congenital heart surgery. While in previous studies, lower weight, younger age and longer CPB time have been identified as risk factors for SIRS occurrence<sup>2,3</sup>, in our study we identified older age, aortic cross clamp time and quantity of administered FFP and crystalloid fluid as risk factors. Cyanosis was not a risk factor in this study. As the coagulation and inflammatory system are closely linked in multiple ways, FFP might contribute to the SIRS<sup>3</sup>.

**Conclusion(s):** The incidence of SIRS after congenital cardiac surgery was higher in our study than previous studies and perioperative FFP exposure may increase the inflammatory response.

**References:**

1. Oxidative Stress after Surgery on the Immature Heart. Fudulu D, Angelini G. *Oxid Med Cell Longev*. 2016;2016:1971452. doi: 10.1155/2016/1971452.
2. Risk factors for systemic inflammatory response after congenital cardiac surgery. Güvener M, Korun O, Demirtürk OS. *J Card Surg*. 2015 Jan;30(1):92-6. doi: 10.1111/jocs.12465.
3. Systemic inflammatory response syndrome after pediatric congenital heart surgery: Incidence, risk factors, and clinical outcome. Boehne M, Sasse M, Karch A. *J Card Surg*. 2017 Feb;32(2):116-125. doi: 10.1111/jocs.12879.

**O081****THE IMPORTANCE OF DIFFERENTIAL DIAGNOSIS IN SUSPECTED COVID19 PREGNANTS**Nihan AYDIN GÜZEY

Ankara Şehir Hastanesi Anesteziyoloji ve Reanimasyon Kliniği

**Background and Goal of Study / Background:** With the onset of the Covid19 pandemic, pregnant women were also affected by this uncertain process. Although most elective surgeries have been postponed, it is inevitable for patients to receive anesthesia for cesarean section. That's why in our hospital, the pregnant women constituted the largest group of patients who were operated on with Covid19 positive results. Too much pandemic patient admission, makes Covid 19 the first diagnosis that comes to mind in patients with covid19 like symptoms normally, but this situation brings some setbacks and inaccuracies with it.

**Materials and Methods:** During 2020, a total of 240 Covid19 or suspicious Covid19 pregnant women were delivered by cesarean section in our clinic. In their follow up, 19 of them were negative. After detailed examinations, 2 patients, who presented with fever were diagnosed with chorioamnionitis and pyelonephritis respectively and 1 patient with dyspnea was diagnosed with dilated cardiomyopathy. Also cavernous sinus thrombosis was diagnosed in a patient presenting with severe headache.

**Results and Discussion / Discussion:** Medical conditions and accompanying diseases of the patients are important in anaesthesia practice. Anesthesia methods, drugs, doses, monitoring should be specially selected and applied according to the patient. However, pandemic causes situations in symptomatic patients that make it difficult to make decisions. Although the pandemic conditions has increased the possibility that each patient may be Covid19, it should be kept in mind that other diagnoses that can be seen frequently in pregnant women and require urgent treatment should also be considered. Therefore, all symptoms should be carefully reviewed and in any situation that does not require urgency, PCR results should be awaited. This will prevent the likelihood of non-covid patients being infected in Covid 19 wards, reduce the unnecessary use of Covid 19 operating rooms and personal protective equipment, and most importantly, will allow anesthesia management appropriate to the patient's current situation.

**Conclusion(s):** In emergency cases where the PCR result cannot be expected, the anesthesiologist should evaluate the patient's anamnesis, findings and examination very well, consider different diagnoses that can give Covid19 like symptoms and choose anesthesia accordingly.



**O082****IS THERE A RESIDUAL NEUROMUSCULAR BLOCKER EFFECT IN THE TRANSITION FROM PRONE TO SUPINE?**

Alparslan KOC<sup>1</sup>, Ufuk KUYRUKLUYILDIZ<sup>2</sup>, Didem ONK<sup>2</sup>, Mustafa GAZI<sup>1</sup>, Hakan Gökalp TAŞ<sup>3</sup>

1.Erzincan Mengucek Gazi Training and Research Hospital

2.Faculty of Medicine, Erzincan Binali Yildirim University.

3. Siran Government Hospital, Gumushane

**Background and Goal of Study / Background:** The residual effect of the neuromuscular blockers at the end of surgery can cause many complications which may result morbidity and mortality. Therefore, it is important monitoring neuromuscular blocking drugs during the operation. Also the patient position may cause some complications due to the redistribution of neuromuscular blockers. We presented three cases whose TOF values were changed from prone to supine position.

**Materials and Methods:** The ages of cases were respectively 47 , 53 and 51 years old. Both of ASA were two.The surgery duration were 47 minutes,94 minutes and 51 minutes respectively. The TOF values of case 1 were respectively %45 end of surgery at prone,%21 from prone to supine position , %17 in one minute after supine and %13 in two minutes after supine.The TOF values of case 2 were respectively %6<sup>3</sup>, %19, %14 and %8.The TOF values of case 3 were respectively %71,%3<sup>2</sup>, %21 and %13.For both patients Propofol 3mg / kg, Fentanyl 1mcg / kg, Rocuronium 0.6mg / kg were used, and intubation were applied after the Train of Four (TOF) value was 0.

**Results and Discussion / Discussion:** The monitoring of drugs, which are used for surgical intervention has gained importance in recent years. ATrain-of-four ratio (TOFR)  $\geq 0.9$  may indicate complete return of neuromuscular block.Postoperative residual effect increases the risk of aspiration due to pulmonary complications. There is a decrease in the cardiac index due to decreased venous return and reduced left ventricular compliance as a result of increased intra-thoracic pressure at prone position.These changes may effect the redistribution of NMB. Therefore, we noticed that TOF values decreased when the patient was placed in the supine position after the prone position. Similarly, both cases, we determined that the TOF values decreased much more from prone to supine position.

**Conclusion(s):** We think that this decreases in TOF values may also cause post-operative residual effect, leading to anesthesia-related morbidity and mortality, especially pulmonary complications, and more careful attention should be paid to this residual effect, especially in patients who are converted to supine position.

0083

**COMPARISON OF HEMODYNAMIC EFFECTS OF ETOMIDATE IN GENERAL ANESTHESIA INDUCTION IN DIABETIC AND NON-DIABETIC PATIENTS**

Alparslan KOÇ<sup>1</sup>, Sinan UZMAN<sup>2</sup>, Didem ONK<sup>3</sup>, Ufuk KUYRUKLUYİLDİZ<sup>3</sup>, Hakan Gökalp TAŞ<sup>4</sup>

1 Department of Anesthesiology and Reanimation,  
Erzincan Mengucek Gazi Training and Research Hospital, Erzincan – Turkey

2 Department of Anesthesiology and Reanimation,  
Sultangazi Haseki Training and Research Hospital, University of Health Sciences, Istanbul – Turkey.

3 Department of Anesthesiology and Reanimation,  
Faculty of Medicine, Erzincan Binali Yildirim University, Erzincan – Turkey.

4 Department of Anesthesiology and Reanimation,  
Siran Government Hospital, Gumushane – Turkey

**Background and Goal of Study / Background:** Cardiovascular diseases are the most common cause of perioperative morbidity for diabetic patients. Etomidate has minimal effects on the cardiovascular system. Cardiovascular autonomic neuropathy is one of the common and serious complications of diabetes. The importance of measuring heart rate variability in the early diagnosis of cardiac autonomic dysfunction has increased in recent years. We try to compare the hemodynamic effects of Etomidate in diabetic and non-diabetics.

**Materials and Methods:** ASA 1-3 patients scheduled for surgery under general anesthesia . Patients with liver failure, advanced renal failure, Type I diabetes and difficult intubation criteria were excluded from the study. The patients were divided as Group D (diabetic, n = 21) and Group ND (Non-Diabetic, n = 21). Patients were intubated after 1mcg / kg fentanyl, 0.3 mg / kg Etomidate, 0.6 mg / kg rocuronium were administered in induction. Hemodynamic parameters were measured before induction (T1), after induction (T2), 2 min (T3), 5 min (T4) and 10 min (T5) after endotracheal intubation. Hemodynamic changes and heart rate variability were compared between the two groups.

**Results and Discussion / Discussion:** Although there was a statistically significant decrease in systolic arterial pressure values measured at T<sup>2</sup>, T4 and T5 time points in Group D compared to basal values (p <0.001), no significant difference was observed in Group ND compared to baseline values in any period. While there were significant decreases in diastolic blood pressure in the pre-intubation period in Group D compared to basal values (p <0.001), it was observed that there was no significant change in Group ND. No significant difference was found between the two groups in terms of heart rate during any measurement period, and there was no correlation between heart rate variability and hemodynamic changes. Etomidate is known to preserve sympathetic outflow and autonomic reflexes in induction.

**Conclusion(s):** Although etomidate provides hemodynamic stability in Diabetic and Non-Diabetic Patients, we believe that heart rate variability measured at rest will not be sufficient to predict autonomic neuropathy, especially in diabetic patients.

**O084****EXTRACORPOREAL BLOOD PURIFICATION WITH OXIRIS® HEMOFILTER IN SEVERE COVID-19 PATIENTS: A SINGLE CENTER CASE SERIES**

Fatma İrem YEŞİLER<sup>1</sup>, Emre KANDEMİR<sup>1</sup>, Meshur ÇAPRAS<sup>1</sup>, Helin ŞAHİNTÜRK<sup>1</sup>, Pınar ZEYNELOĞLU<sup>1</sup>

<sup>1</sup>Department of Anesthesiology and Critical Care,  
Başkent University Faculty Of Medicine, Ankara, Turkey

**Background and Goal of Study / Background:** COVID-19 is a hyperinflammatory state associated with a cytokine storm that triggers acute respiratory distress syndrome (ARDS), acute kidney injury (AKI), and hypercoagulability. Patients with COVID-19 who have cytokine storm may require extracorporeal blood purification (EBP)<sup>1,2,3,4,5</sup>. We present 5 severe COVID-19 patients treated with continuous renal replacement therapy (CRRT) using an oXiris® hemofilter.

**Materials and Methods:** The clinical characteristics and outcomes of septic shock patients with COVID-19 who received CRRT with oXiris® hemofilter between March 9, and December 1<sup>3</sup>, 2020 were retrospectively analyzed.

**Results and Discussion / Discussion:** A total of 5 COVID-19 patients who received CRRT with oXiris® hemofilter in intensive care unit (ICU) were analyzed. The mean age was 63.8±17.3 years and all of them were male. Two patients were renal transplant recipients. The mean APACHE II, GCS, SOFA scores at ICU admission were 24.4±6.5, 8.6± 6.1 and 7.8±3.9, respectively. All patients had ARDS due to pneumonia and AKI. All of them received favipiravir therapy, 1 patient tocilizumab and 1 patient convalescent immune plasma therapy. Vasopressor therapy, corticosteroid therapy, C vitamin and low molecular weight heparin were given to all patients. The mean duration of CRRT initiation was 5.6 ± 4.8 days after ICU admission. The length of stay on CRRT was 70.0 ± 47.8 hours. The oXiris® CRRT modality was CVVHDF for all patients. The mean flow rates were maintained as follow; effluent dose 28.8 ± 2.6 mL/kg/h, dialysate 1010± 194.9 mL/h, blood 120±27.4 mL/min, replacement 1283.4 ± 126.3 mL/h (Table 1). No adverse events occurred during the treatment. Laboratory values before and after CRRT were presented in Table <sup>2</sup>, no statistically significant difference was found. The mean LOS at ICU and hospital stay were 13.2 ± 8.3 and 15.4 ± 9.5 days. The mortality rate of ICU and hospital were 80.0%.

**Conclusion(s):** EBP is considered as the main advocated technology of organ support therapy for COVID-19 patients with cytokine storm. These patients may benefit from early usage of oXiris® hemofilter with CRRT to improve survival and clinical outcomes. However, we did not observe improvement of inflammation and organ function among severe COVID-19 patients treated with oXiris® filter.

**References:**

1. Zhang H, Zhu G, Yan L, et al. The absorbing filter Oxiris in severe coronavirus disease 2019 patients: A case series. *Artificial Organs*. 2020 Dec;44(12):1296-1302.
2. 2Padala SA, Vakiti A, White JJ, Mulloy L, Mohammed A. First Reported Use of Highly Adsorptive Hemofilter in Critically Ill COVID-19 Patients in the USA. *J Clin Med Res*. 2020;12(7):454-457.
3. Ronco C, Bagshaw SM, Bellomo R, Clark WR, Husain-Syed F, Kellum JA et al. Extracorporeal blood purification and organ support in the critically ill patient during covid-19 pandemic: expert review and recommendation. *Blood Purification*. 2021 Jan;50(1):17-27.

4. Asgharpour M, Mehdinezhad H, Bayani M, Zavareh MSH, Hamidi SH, Akbari R, Ghadimi R, Bijani A, Mouodi S. Effectiveness of extracorporeal blood purification (hemoadsorption) in patients with severe coronavirus disease 2019 (COVID-19). *BMC Nephrol.* 2020 Aug 20;21(1):356.
5. Villa, G., Romagnoli, S., De Rosa, S. et al. Blood purification therapy with a hemodiafilter featuring enhanced adsorptive properties for cytokine removal in patients presenting COVID-19: a pilot study. *Crit Care* 24, 605 (2020).

Table-1: Setting changes of CRRT with oXiris® hemofilter

Patient	1 <sup>st</sup> patient	2 <sup>nd</sup> patient	3 <sup>rd</sup> patient	4 <sup>th</sup> patient	5 <sup>th</sup> patient
Q <sub>b</sub> , mL/min	100	150	100	150	100
Q <sub>d</sub> mL/h	1000	1300	1000	1000	750
Predilution, mL/h	1000	500	1000	750	667
Postdilution, mL/h	250	1000	250	500	500
Q <sub>r</sub> mL/h	1250	1500	1250	1250	1167
UF, mL/h	150	0	50	100	0
Effluent dose mL/kg/h	32	27	28	31	26
Anticoagulation	Citrate	UFH	Citrate	UFH	Citrate
AKI stage	Stage 3	Stage 1	Stage 2	Stage 2	Stage 1
Outcome	Transfer	Death	Death	Death	Death

CRRT: Continuous Renal Replacement Therapy, Q<sub>b</sub>: Blood flow rate, Q<sub>d</sub>: Dialysate flow rate, Q<sub>r</sub>: Replacement fluid rate, UF: Ultrafiltration rate, UFH: unfractionated heparin, AKI: Acute kidney injury,

Table -2: Laboratory parameters of inflammation and organ dysfunction throughout the treatment period

Patient	1 <sup>st</sup> patient		2 <sup>nd</sup> patient		3 <sup>rd</sup> patient		4 <sup>th</sup> patient		5 <sup>th</sup> patient	
	S	F	S	F	S	F	S	F	S	F
IL-6 (pg/mL)	481	-	279	-	5.7	-	114	1000	-	-
CRP (mg/L)	358.8	103	173.6	48.3	46.3	38.5	164.7	6.8	147.5	259.3
Ferritin (µg/L)	>1676	>1676	>1676	1542	4096	1764	1258	845	590	1197
Fibrinogen (mg/dL)	437	360	646	550	357	358	475	108	-	-
D-dimer (mg/L)	33.5	2.9	1.4	1.5	1.4	0.6	1.1	2.6	5.6	6.3
LDH (U/L)	1182	604	529	687	632	368	320	799	472	
Lenfosit (10 <sup>3</sup> /µL)	0.6	0.9	0.4	0.3	0.5	0.4	1.2	1.3	0.2	0.4
ESR (mm/h)	114	70	69	103	35	18	37	35	29	
Creatinine (mg/dL)	6.6	2.3	1.4	1.2	2.0	1.2	2.3	2.2	2.7	3.2
Lactate (mmol/L)	1.0	2.8	1.6	1.3	2.5	3.4	3.4	8.8	0.9	1.1
SOFA score	14	9	9	7	14	13	12	16	14	14

S: Start, F: finish, IL-6: Interleukin 6, CRP: C- reactive protein, LDH: lactate dehydrogenaz, ESR: Erythrocyte sedimentation rate, SOFA: Sequential Organ Failure Assessment

**O085****THE EFFECTS OF PREOPERATIVE FRAILITY ON POSTOPERATIVE DELIRIUM IN GERIATRIC ONCOLOGIC PATIENTS**Nursedda EREZ<sup>1</sup>, Gonca OĞUZ<sup>1</sup>, Serpil ŞAVLI METE<sup>1</sup>, Süheyla ÜNVER<sup>1</sup>University of Health Sciences, Dr AY Ankara Oncology Training and Research Hospital  
Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Along with the aging population, the number of elderly patients requiring surgery is also increasing around the world. Postoperative delirium is one of the most encountered complications in elderly after major surgery and is related to an increase in adverse events, length of hospital stay, and mortality(1). Frailty is a common geriatric syndrome whose risks and consequences overlap with delirium(2). Due to common risks and outcomes of these two geriatric syndromes, it is unclear whether preoperative evaluation of frailty possesses prognostic value over postoperative delirium as well as its previously identified risk factors. In this study, we aimed to investigate the relationship between preoperative frailty index and postoperative delirium development in patients undergoing geriatric oncological surgery.

**Materials and Methods:** After ethics committee approval, 168 ASA I-IV patients over 65 years of age, scheduled for elective oncological surgery and gave informed consent were included in the study. Frailty index scores of all patients were calculated preoperatively using Edmonton Frail Scale. Methods of anesthesia, duration of operation, intraoperative invasive procedures, blood loss, transfusion, postoperative pain management, perioperative hemoglobin levels, liver and kidney function tests were recorded. Postoperative delirium was assessed by Confusion Assessment Method within postoperative 48 hours in patients whose Ramsay Sedation Scale was  $\leq 4$ .

**Results and Discussion / Discussion:** Postoperative delirium was detected in 22.6% of the patients. Edmonton Frail Scale scores were significantly high in patients who developed delirium ( $p < 0.001$ ). The difference was statistically significant between groups with or without delirium regarding cognition, hospitalization, general health status, functional independence, forgetting prescribed drugs, nutrition, continence and functional performance subscale scores ( $p < 0.05$ ). The risk of developing postoperative delirium increased 13.1 times in frail patients. Significant difference was detected between groups with respect to the duration of operation, bleeding, blood transfusion, opioid use, urinary bladder catheterization, arterial catheterization and use of nasogastric tube.

**Conclusion(s):** In this study, it was shown that the preoperative frailty index is a useful tool to predict postoperative delirium development in patients undergoing geriatric oncological surgery. It was thought that evaluating the frailty index together with other perioperative risk factors for postoperative delirium in elderly patients would be necessary in the implementation of preventive treatments and patient specific care plan.

**References:**

1. Gleason LJ, Schmitt EM, Kosar CM, et al. Effect of delirium and other major complications on outcomes after elective surgery in older adults. *JAMA Surg* 2015;150:1134–40.
2. Leung JM, Tsai TL, Sands LP. Preoperative frailty in older surgical patients is associated with early postoperative delirium. *Anesth Analg*. 2011;112(5):1199–201.

**O086****TRACHEOSTOMY EXPERIENCE IN PEDIATRIC INTENSIVE CARE UNIT; LAST EIGHT YEARS**

Sinan YAVUZ<sup>1</sup>, Mehmet ÇELEĞEN<sup>2</sup>, Selman KESİCİ<sup>1</sup>

1) Hacettepe University Faculty of Medicine, Division of Pediatric Intensive Care, Ankara

2) Afyonkarahisar Health Sciences University Faculty of Medicine, Pediatric Intensive Care Unit, Afyonkarahisar

**Background and Goal of Study / Background:** Tracheostomy is a surgical procedure that consists of making an incision on the anterior aspect of the neck and opening a direct airway through an incision in the trachea (1). The aim of this study is to review the indications, complications, mortality rate, and the effect of pediatric tracheostomy on length of intensive care unit or hospital stay

**Materials and Methods:** Demographic characteristics, indications, complications, mortality rate, duration of mechanical ventilation before tracheostomy, length of pediatric intensive care unit stay (PICU) and length of hospital stay were analyzed retrospectively

**Results and Discussion / Discussion:** A total of 174 patients were included in the study. The median age of patients was 25.5 (1 month- 18 years). The most common tracheostomy indication was prolonged intubation (n=10<sup>3</sup>, 59%), other indications were upper airway obstruction (n=25, 14.3%). The median duration of mechanical ventilation before tracheostomy was 15 (0-130) days. Eighty-nine tracheostomy procedures were performed at bedside. Cannula dislocation (4.5%) and bleeding (4.5%) are most common early complications. There was no difference between procedures performed in surgical room and PICU in terms of early complications. Most common late complication was granulation (10.9%). 33 patients (19%) was died before discharge but mortality rate related with tracheostomy procedure and its complications was 1.1% (2 patients). The mean length of hospital stay was 51 days and mean length of PICU stay was 27 days. The procedure enabled 77.6 % of the patients to be discharged from hospital

**Conclusion(s):** Tracheostomy facilitates discharge from PICU and weaning of mechanical ventilation (<sup>2</sup>, 3). Although the timing of tracheostomy has to be determined for each individual patient, two weeks of ventilation seems to be a suitable period for tracheostomy. Tracheostomy can be performed at bedside safely but patient selection should be made carefully

**References:**

1. Wood D, McShane P, Davis P. Tracheostomy in children admitted to paediatric intensive care. Archives of disease in childhood. 2012;97(10):866-9.
2. Ertugrul I, Kesici S, Bayrakci B, Unal OF. Tracheostomy in pediatric intensive care unit: when and where? Iranian journal of pediatrics. 2016;26(1).
3. Berry JG, Graham RJ, Roberson DW, Rhein L, Graham DA, Zhou J, et al. Patient characteristics associated with in-hospital mortality in children following tracheotomy. Archives of disease in childhood. 2010;95(9):703-10.

O087

## OUR TREATMENT EXPERIENCE IN A PATIENT WITH COEXISTENCE END STAGE RENAL FAILURE AND SEVERE HYPONATREMIA

Ayşe AYYILDIZ<sup>1</sup>, Meryem ONAY<sup>1</sup>, Birgül YELKEN<sup>1</sup>

<sup>1</sup> Eskisehir Osmangazi University, Faculty of Medicine,  
Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Coexistence of severe hyponatremia and end-stage renal disease (ESRD) is always difficult to manage in intensive care units (ICU). (1) We aimed to present our case showing that continuous renal replacement therapies (CRRT) are a successful method for raising sodium in a controlled manner.

**Materials and Methods:** A 64-year-old male patient, who developed end-stage renal failure secondary to amyloidosis and underwent routine intermittent hemodialysis, developed bleeding due to traumatization during the insertion of a urinary catheter. It was observed that the patient underwent cystoscopy had perforation in the bladder and approximately 3 liters of resection fluid (5% mannitol) spread to the abdomen until the repair was performed. The patient, who underwent transurethral resection and bladder perforation repair, was admitted to our intensive care unit due to fluid overload, sodium 114 mEq/L and hemodynamically unstable, and continuous venovenous hemodialysis (CVVHD) was started. We started CVVHD at low blood flow rate and dialysate flow rate levels and added distilled water to the dialysate fluids with no difference of more than 20 mEq/L between plasma sodium and dialysate sodium. At the end of the 48th hour, serum Na level was increased to 20 mEq/L in a controlled manner, and excess fluid was ultrafiltered. The need for inotropes was reduced and no uremic symptoms or neurological defects developed during follow-up. The patient, whose general condition was good, was discharged to the nephrology service on the 5th day of follow-up.

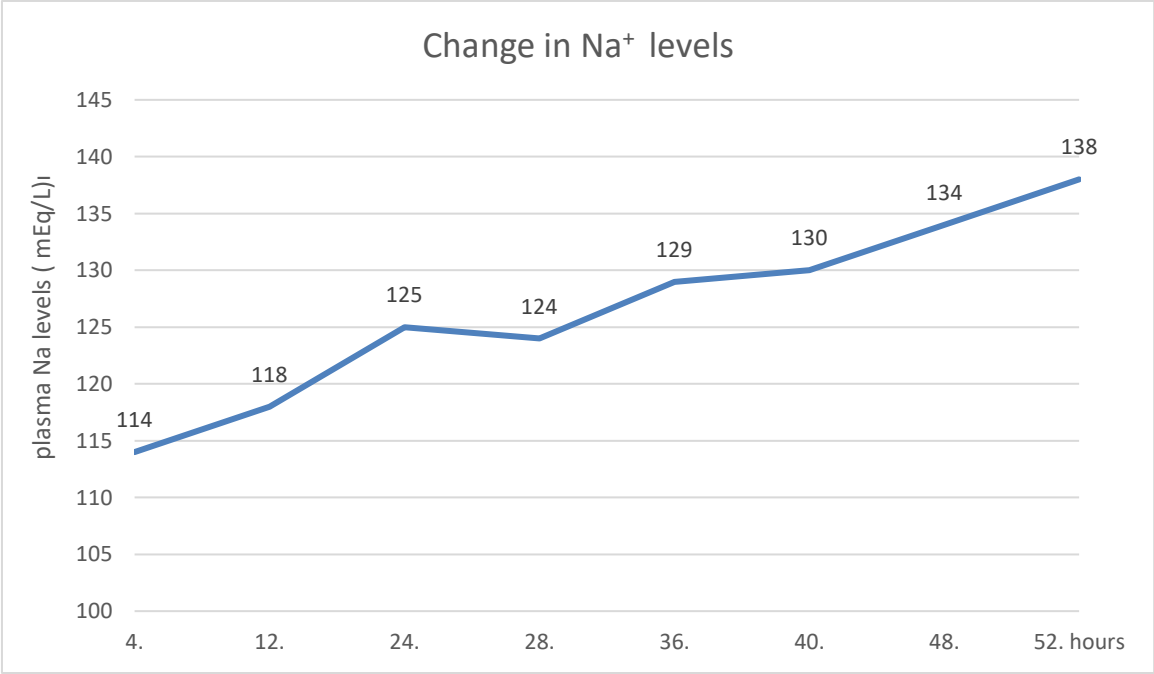
**Results and Discussion / Discussion:** In our patient, the reason for the hyponatremia was the absorption of resection fluid containing mannitol from the peritoneum in the abdomen, and the tendency to hyponatremia continued as absorption continued. Our rate of correcting hyponatremia with CVVHD should have been higher than the rate of hypertonic hyponatremia that mannitol would create as it is absorbed from the peritoneum so that we could correct the plasma sodium level. Therefore, we tried to keep this value at the upper limit of 20 mEq/L, based on studies suggesting that the difference between the plasma sodium level of the patient and the sodium level of the dialysate solution should be 15-20 mEq/L (1-3).

**Conclusion(s):** In conclusion, the use of low blood flow rates in CRRT, adjustment of Na levels of the solutions, frequent biochemical controls provide the opportunity to dialysis safely without neurological complications in uremic patients with severe hyponatremia.

### References:

1. Pattanashetti, N., Bharati, J., Kohli, H. S., Gupta, K. L., & Ramachandran, R. (2019). Successful management of severe hyponatremia in CKD-VD: In a cost limited setting. *Hemodialysis International*, 23(2), E69-E71.
2. Tandukar, S., Kim, C., Kalra, K., Verma, S., Palevsky, P. M., & Puttarajappa, C. (2020). Severe Hyponatremia and Continuous Renal Replacement Therapy: Safety and Effectiveness of Low-Sodium Dialysate. *Kidney medicine*, 2(4), 437-449.
3. Han, S. S., Bae, E., Kim, D. K., Kim, Y. S., Han, J. S., & Joo, K. W. (2016). Dysnatremia, its correction, and mortality in patients undergoing continuous renal replacement therapy: a prospective observational study. *BMC nephrology*, 17(1), 1-8.

TABLE 1: Change in plasma Na levels





**O088****A CESE OF SEVERE REBOUND INTRACRANIAL HYPERTENSION FOLLOWED BY INTRACRANIAL HYPOTENSION SUBSEQUENT TO EPIDURAL PATCH PROCEDURE**

Sehend DEBBAG<sup>1</sup>, Fatma SARICAOGLU<sup>1</sup>

1- Hacettepe Univesity Medical faculty , Anesthesiology and Reanimation Department

**Background and Goal of Study / Background:** An epidural blood patch is an option for post-dural puncture headache treatment that is not responsive to conservative therapy. Rebound intracranial hypertension is a possible complication that can occur after an epidural blood patch.

**Materials and Methods:** We report a 15-year-old patient with Burkitt lymphoma who had complaints of headache after the last dose of the intrathecal chemotherapy. The severity of the headache was increased when standing up and alleviated by lying down. These symptoms were accompanied by nausea and photophobia. MRI studies showed bilateral subdural effusions and findings that support intracranial hypotension due to dural puncture. The epidural blood patch was applied to the patient who did not respond to the medical conservative treatment. After the procedure, there was a marked reduction in the severity of the headache. Control brain CT was performed on the fourth day due to an increase in the severity of the headache accompanied by vomiting. Radiological findings showed a decrease in the subdural effusion accompanied by midline shift and elongated cerebellar tonsils through the foramen magnum. Hypertonic fluid and acetazolamide were started in order to relieve the severity of the intracranial pressure. On the fourth day of the medical treatment, the complaints continued and a new brain MRI was acquired, the new brain MRI showed a decrease in the midline shift and increasing subdural effusion with the herniation of the cerebellar tonsils. Despite the absence of a neurologic deficit, the recommendation of the neurosurgery department was to surgical intervention due to the enlargement of the subdural effusion and herniation. The patient's complaints decreased after the surgery and also there were no complaints of headache in the 1st, 6th, and 12th months after the surgery.

**Results and Discussion / Discussion:** Although rebound intracranial hypertension is reported, the problems that may be caused by treatments were not emphasized. In this case, we underline the problems that may face the medical staff in the postprocedural period

**Conclusion(s):** Rebound intracranial hypertension is a complication that can occur after epidural patch procedures and management should be cautious and the patient should be monitored very closely to avoid the possibility of more serious complications.

**O089****ANTIBACTERIAL EFFECT OF TRAMADOL AGAINST PATHOGENS ASSOCIATED WITH NOSOCOMIAL INFECTIONS: AN IN VITRO STUDY**Ozlem KOCATURK<sup>1</sup>, Esin POYRAZOGLU<sup>2</sup>, Halil BIYIK<sup>3</sup>

1 Department of Oral and Maxillofacial Surgery, Division of Anaesthesiology, Adnan Menderes University Faculty of Dentistry, Aydın, Turkey

2 Department of Biology, Adnan Menderes University Faculty of Art and Science, Aydın, Turkey

**Background and Goal of Study / Background:** Tramadol is a synthetic, centrally acting analgesic agent which possesses opioid agonist properties. Recently, tramadol has been used as a local anesthetic. We aimed to investigate the antibacterial activity of tramadol in vitro against infectious complications caused by pathogenic microorganisms after local or regional anesthesia.

**Materials and Methods:** The four bacterial strains included in this study were E.coli (ATCC 25922), S.aureus (ATCC 25923), S.epidermis (ATCC 12228), and P.aeruginosa (ATCC 27853). The bacterial suspensions tested for sensitivity were prepared in broth cultures for 24 hours, diluted in sterile physiological saline, and incubated at 37°C with 25 or 50 mg/mL tramadol. The mixtures were then plated onto blood agar and colony counts were recorded after 6h and 24h incubation at 37°C.

**Results and Discussion / Discussion:** Tramadol 50 mg was found to have a 100% bactericidal effect with a reduction of 6 log 10 for S. aureus, E. coli and P. aeruginosa in 24 hours, and an antibacterial effect of approximately 4 log 10 for S. epidermidis. The bactericidal activity of tramadol 25 mg on all bacteria at 24 hours was approximately 4 log 10. The antibacterial activity of tramadol 50 mg at 6 hours was greater for E. coli and P. aeruginosa (3 log 10 reduction) than for S. aureus and S. epidermidis (1-2 log 10 reduction). The bactericidal activity of tramadol 25 mg at 6 hours was low for all bacteria. (1-2 log 10 reduction) The difference between the mean colonie forming unit counts of all bacterias measured at 6 and 24 hours of Tramadol was found to be statistically significant (p <0.001). In addition, it was observed that there was an interaction between drug dose and time change in the measurement of colony count. It was determined that the mean colony counts were significantly different between drug doses (p <0.001). It has been observed that the inhibition effect of tramadol in its pure form of 50 mg is stronger than its dose of 25 mg.

**Conclusion(s):** The in vitro antibacterial effect of tramadol, which is dose and time dependent, may be useful in reducing the risk of bacterial contamination after local or regional anesthesia.

**Table 1.** Growth of all micro-organisms after incubation with various concentrations of tramadol

Microorganism	Tramadol (mg/mL)	CFU/mL		
		0 h	6 h	24 h
<b>S. aureus</b>	50	2.3x10 <sup>6</sup>	1.4x10 <sup>4</sup>	0
	25*		2.0x10 <sup>5</sup>	3.0x10 <sup>2</sup>
	0 (control)		1.3x10 <sup>7</sup>	1.5x10 <sup>7</sup>
<b>S. epidermidis</b>	50	2.3x10 <sup>6</sup>	1.9x10 <sup>5</sup>	2.0x10 <sup>2</sup>
	25*		2.7x10 <sup>5</sup>	4.1x10 <sup>3</sup>
	0 (control)		2.0x10 <sup>6</sup>	2.4x10 <sup>6</sup>
<b>E. coli</b>	50	1.6x10 <sup>6</sup>	3.6x10 <sup>3</sup>	0
	25*		4.5x10 <sup>4</sup>	2.6x10 <sup>2</sup>
	0 (control)		1.4x10 <sup>6</sup>	1.7x10 <sup>6</sup>
<b>P. aeruginosa</b>	50	1.6x10 <sup>6</sup>	1.5x10 <sup>3</sup>	0
	25*		3.5x10 <sup>4</sup>	3.0x10 <sup>1</sup>
	0 (control)		1.5x10 <sup>6</sup>	1.9x10 <sup>6</sup>

\*0.9% saline was used for dilution

**0090****SPEC.ANESTEZIOLOGY**

Elisaveta Tomova<sup>1</sup>, Milica Zlatkova<sup>2</sup>, Jasmina Krstevska<sup>3</sup>,  
Gynekology Obstetric Clinic University Mother Teresa Skopje

**Background and Goal of Study / Background:** The aim of the study was to compare isobaric and heavy bupivacaine in SAB(subarahnoidal blok) in SC( caesarean section) .

**Materials and Methods:** This research presents a comparative prospective clinical study. It involved 30 SC, class 1-2ASA patients, divided into two groups: isobaric or heavy bupivacaine . During the SAB for SC at L3-L4 level the we applied a dose of 10-12 mg of local anesthetics, with adjuvant fentanyl of 0.02 mcg and mo o.1 mg. The moment of disconnection of the syringe from the needle was taken as zero time. Reaserch: Following parameters were determined: time of sensory blockade, time of motor blockade, time of drop of mean TA over 30%, subjective estimation of the blockade on a scale from 1 to 10). The statistical data processing was done by using the Statistica for Windows program.

**Results and Discussion / Discussion:** Statistic analysis before procedure  $p = 0.13$ ;  $df = 23$   $t = 1.54$   $p > 0.05$  i  $df = 23$  there is no big statistic difference between two group On second measurement  $p = 0.66$ ;  $df = 23$   $t = 0.43$  For  $p > 0.05$  i  $df = 23$  there is no big statistic difference between two group In the isobaric group the average value of the sensory blockade was 93 seconds, and of the motor blockade 156.33 sec. The drop of tension occurred in 296 seconds, r36% of the starting mean pressure, The average estimation of the blockade was 9.6. With heavy bupivacaine group, average sensory blockade occurred in 135 seconds, and the motor blockade in 230 seconds. The drop of the mean arterial pressure occurred in 390 seconds, with 33% decreasing, with average estimation of a satisfactory blockade of 9.2.

**Conclusion(s):** The analysis indicates that when using isobaric the sensory blockade occurs 42 seconds faster, whereas the motor blockade 74 seconds faster, though there is a greater variance in the drop of the mean arterial pressure for 3%. SAB with heavy bupivacaine on a L3-L4 level has a delayed occurrence of the blockade, but it provides a greater hemodynamic stability.

**O091****CASE REPORT: SPINAL ANESTHESIA IN A PATIENT WITH RECEIVING HEPARIN INFUSION**M. Tuğba ARSLAN<sup>1</sup>University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital,  
Department of Anaesthesiology<sup>1</sup>

**Background and Goal of Study / Background:** Spinal hematoma is a rare but serious complication of spinal or epidural anesthesia. Platelet count and APTT value should be checked before central block is performed in patients receiving heparin infusion lasting longer than four days. In our case, a patient who has been receiving heparin infusion for 6 days, was operated under spinal anesthesia due to severe lung problems and no neurological complications were observed in the follow-up.

**Materials and Methods:** A 74-year-old male patient had bilateral femoral-popliteal bypass surgery 2 weeks ago and presented to the emergency room with left foot pain. In the lower extremity Doppler imaging, an occlusion was detected in the left popliteal artery. 1000-1500 U / h heparin infusion was started the patient in the intensive care unit. Emergency revision femoral-popliteal bypass surgery was planned for the patient who developed circulatory disorders in the left foot on the sixth day. Preoperative evaluation, the patient had hypertension, COPD, active pneumonia and SpO<sub>2</sub> 70 without oxygen. Heparin infusion was stopped. Spinal anesthesia was planned after intermittent follow-up of the activated clotting time (ACT). Spinal anesthesia was applied in a single attempt with a 25 Gauge atraumatic spinal needle to the patient whose ACT value was measured 122 seconds in the 150th minute and thrombocyte 292000  $\mu$ L. After the operation, the patient was transferred to the intensive care unit.

**Results and Discussion / Discussion:** The actual incidence of neurologic dysfunction resulting from hemorrhagic complications associated with central neural blockade is unknown. Three factors associated with increased risk were identified: less than 60-minute time interval between the administration of heparin and lumbar puncture, traumatic needle placement, and concomitant use of other anticoagulants (aspirin). The patient, who was evaluated at postoperative 8 h, 24 h, 2nd and 7th days and had no neurological deficit, was discharged.

**Conclusion(s):** Critical consideration of the risk/benefit ratio and a strict clinical regimen is essential in these situations.

**O092****EVALUATION OF BLOOD TRANSFUSION NEED IN HOSPITALIZED COVID-19 PATIENTS**

D.Berrin GÜNAYDIN<sup>1</sup>, Azer İlbengü KAPTAN<sup>1</sup>, Şeniz GÖRAL<sup>1</sup>,  
Zühre KAYA<sup>1</sup>, Asiye UĞRAŞ DİKMEN<sup>1</sup>, Murat DİZBAY<sup>1</sup>, Özlem GÜZEL TUNÇCAN<sup>1</sup>

1: Gazi University Medical Faculty Hospital

**Background and Goal of Study / Background:** During the COVID-19 pandemic, the blood donation rate decreased due to restrictions, while rate of asymptomatic infection has raised concerns about blood safety. Since there are limited studies about need for blood transfusion in COVID-19 patients, we aimed to compare rate of blood transfusion before and after COVID-19 pandemic period in our center to get ready for a plan in situ for a possible outbreak in future

**Materials and Methods:** After the approval of the ethics committee, data of Gazi University Medical Faculty Hospital Blood Center were retrospectively reviewed. The numbers of blood donors and supplied whole blood, red blood cell (RBC), fresh frozen plasma (FFP), cryoprecipitate, platelet (pooled or apheresis) and apheresis granulocyte concentrates were documented before (01.07.2019-31.03.2020) and during (01.04.2020-31.12.2021) pandemic. Patient data was searched with COVID-19 ICD code via operating system of our hospital. Number of patients needed blood/blood products were retrieved from the collected data. Number of blood donors and used blood products before and during pandemic were presented in table 1.

**Results and Discussion / Discussion:** Before pandemic, the rate of patients admitted to intensive care unit (ICU) in total inpatients was 8% (4692/57,008), while during the pandemic period, it was 10% (3608/34,931). Decrease in the number of donors and the produced blood product was not directly proportional to the decrease in the number of hospitalized patients. We think that the reason for the significant decrease in the number of inpatients (43.5%) may be the postponement of elective surgery Organ system failure and coagulopathy problems reported in COVID-19 patients were thought to affect need for blood transfusion. However, Barriteau et al. (1) reported that hospitalized COVID-19 patients had lower need for RBC, platelet and FFP transfusion than that of patients without Covid-19. Similarly, Wang et al. (2) reported that although RBC supply decreased by 65% during the COVID-19 pandemic, the need for blood products did not increase, but the number of COVID-19 infected patients was not reported in this study.

**Conclusion(s):** Although there is no increase in transfusion rates during the pandemic, we should be prepared due to the decreased number of donors.

**References:**

1. Transfusion 2020 2. Vox Sanguinis 2020

	BEFORE PANDEMIC (01.07.2019 -31.03.2020)	DURING PANDEMIC (01.04.2020 - 01.01.2021)
Donor of blood (n)	5414	3879
Blood component obtained from the Turkish Red Crescent (n)	14374	11547
Blood component produced in Gazi University Hospital (n)	13247	8158
Whole blood transfusion (n)	10	4
RBC: Red blood cell concentrate transfusion (n)	11755	8993
FFP: Fresh frozen plasma transfusion (n)	6329	4497
Total platelet concentrate transfusion (n)	3753	2672
<i>Apheresis –Pooled (n)</i>	<i>2215-1538</i>	<i>1715-957</i>
Apheresis granulocyte concentrate transfusion (n)	5	1
Cryoprecipitate concentrate transfusion (n)	748	591

0093

**EVALUATION OF SECONDARY INFECTIONS IN SARS-COV-2 PATIENTS IN HACETTEPE UNIVERSITY ANESTHESIA INTENSIVE CARE UNIT**

Nihal Deniz BULUT YÜKSEL<sup>1</sup>, Adnan Menderes VURAL<sup>1</sup>,  
Mehmet Yasir PEKTEZEL<sup>2</sup>, Seda Banu AKINCI<sup>1</sup>, Ömrüm UZUN<sup>3</sup>

<sup>1</sup>Hacettepe University, Department of Anesthesiology and Reanimation, Intensive Care, Ankara

<sup>2</sup>Hacettepe University, Department of Neurology, Intensive Care, Ankara

<sup>3</sup>Hacettepe University, Department of Clinical Microbiology and Infectious Diseases, Ankara

**Background and Goal of Study / Background:** Viral pathogens are known to weaken the host immunity and lay the groundwork for the development of secondary infections. The purpose of our study; is to evaluate the secondary infections in patients with definite or probable COVID-19 infection and the effects of these infections on patients outcomes.

**Materials and Methods:** After ethics committee approval, COVID-19 patients diagnosed with either a positive nasal swap PCR, or positive antibody or a thorax CT suitable with COVID-19 pneumonia in Hacettepe University Anesthesiology ICU were included into the study, retrospectively. Patients were separated into three groups according to infectious status other than COVID-19 as no additional infection (NAI), coinfection (Co)(Culture positivity within the first 48 hours after admission to the ICU), and super-infection (Su)(Culture positivity after 48 hours after admission to the ICU). Kruskal-Wallis, Fisher Freeman-Halton, multivariate logistic regression tests were used for statistical analysis.

**Results and Discussion / Discussion:** A total of 182 patients [NAI: 57(31%), Co: 66(36%), Su: 59(32%)] were included (Table 1). Enterococcus spp [n=18 (15%)] was the most common agent in the bloodstream, candida spp. [n=39 (32%)] in the urinary tract, acinetobacter [n=27 (32%)] in the respiratory tract, and E.coli [n=4 (11%)] in the catheter related bloodstream infections were the other common microbial agents. Aspergillosis [n=21 (35%)] was the most common opportunistic infection, followed by PCP [n=4 (11%)] and CMV [n=6 (9%)]. Both median length of stay and mortality rates were higher in Co and Su groups than in NAI. Only higher APACHE-II [OR (95% CI): 1.13 (1.1-1.2), p=0.047 (for each point increase)] score was found as an independent factor for predicting mortality while adjusted for HT, IMV, steroid use (low dose), having infectious source risk factor, and each infectious status in binary logistic regression analysis.

**Conclusion(s):** Respiratory infections with Covid-19 can present with high rate of coinfections and superinfections. These secondary infections negatively affects COVID-19 infected patients's outcomes. Studies are needed to investigate the mechanisms responsible for secondary infections, risk factors and prophylactic or empiric antimicrobial treatments in high risk groups of COVID-19 infected patients.



Total (n=182)	No Additional Infection n=57 (31%)	Co-Infection n=66 (36%)	Super-Infection n=59 (32%)	p
Age* (year)	65 [50-77]†	71 [65-81]	70 [59-78]	0.011
Gender (F), n (%)	20 (35)	33 (50)	22 (37)	0.190
COVID-19 PCR, n(%)	44 (77)	47 (71)	48 (81)	0.418
BMI*	25 [24-28]	27 [25-31]	26 [24-30]	0.136
APACHE-II*	11 [8-15]†	17 [13-22]	17 [12-19]	<0.001
HT, n(%)	30 (53)	47 (71)†	26 (44)	0.006
DM, n(%)	20 (35)	26 (40)	17 (29)	0.431
COPD, n(%)	11 (19)	22 (33)	18 (31)	0.194
CKD, n(%)	4 (7)	7 (11)	8 (14)	0.516
Malignancy, n(%)	8 (14)	16 (25)	14 (24)	0.292
Bloodstream Infection, n(%)	-	23 (35)	27 (46)	0.239
Urinary Tract Infection, n(%)	-	32 (56)	37 (63)	0.471
Respiratory Tract Infection, n(%)	-	47 (71)	37 (63)	0.312
Catheter Related Infection, n(%)	-	8 (42)	5(25)	0.257
Aspergillosis, n(%)	-	10 (39)	11 (32)	0.623
PCP, n(%)	-	2 (11)	2 (11)	0.954
CMV, n(%)	-	4 (12)	2 (6)	0.673
Infectious Source Risk Factor, n(%)	13 (57)†	21 (84)	17 (100)	0.002
IMV, n(%)	13 (23)†	35 (53)	28 (48)	0.001
IMV duration* (day)	8 [1-15]	8 [2-12]	12 [5-35]†	0.034
Urinary Catheter, n(%)	11 (52)	34 (92)	28 (97)	<0.001
Central Catheter, n(%)	7 (30)	28 (82)	19 83()	<0.001
Favipravir, n(%)	40 (70)	51 (79)	56 (95)	<0.001
Remdesivir, n(%)	4 (7)	4 (6)	2 (3)	0.560
Convalescent Plasma, n(%)	3 (5)	6 (9)	8 (14)	0.295
Low Dose Steroid, n(%)	32 (56)†	46 (71)	48 (81)	0.013
High Dose Steroid, n(%)	3 (5)	5 (8)	6 (10)	0.611
ICU LOS* (day) j	5 [2-8]	11 [7-17]	17 [8-33]	<0.001
Hospital LOS* (day) j	11 [7-14]	16 [10-28]	27 [13-45]	<0.001
ICU Mortality (28 day), n(%)	8 (14)†	28 (42)	24 (41)	<0.001
ICU mortality (90 day), n(%)	8 (14)†	33 (50)	31 (53)	<0.001

BMI: Body Mass Index CKD: Chronic Kidney Disease, CMV: Cytomegalovirus, COPD: Chronic Obstructive Pulmonary Disease,

DM: Diabetes Mellitus, F: Female, HT: Hypertension, ICU: Intensive Care Unit, IMV: Invasive Mechanical Ventilation,

LOS: Length of Stay, PCP: Pneumocystis Jiroveci Pneumonia, PCR: Polymerase Chain Reaction

\*median[IQR]

† signs the significantly differed factor from others.

j means all rates presented differed from each other significantly.

**O094****CLINICAL CHARACTERISTICS AND RISK FACTORS OF COVID-19 PNEUMONIA PATIENTS HOSPITALIZED IN INTENSIVE CARE UNIT: A RETROSPECTIVE STUDY**Hülya BAŞAR<sup>1</sup>, Çetin KAYMAK<sup>1</sup>, Ayşe ÖZCAN<sup>1</sup>, Mert NAKİP<sup>1</sup>,  
Ümit Murat PARPUCU<sup>1</sup>, Ceren KAÇAN<sup>1</sup>, Hikmet Furkan YALÇIN<sup>1</sup>, Murat KAYKAÇ<sup>1</sup>

1: University of Health Sciences Ankara Training And Research Hospital

**Background and Goal of Study / Background:** A new virus that causes pneumonia was first identified in December 2019 in Wuhan, named as Covid-19 by WHO in February 2020. The clinical spectrum of this infection is wide and ranges from asymptomatic patient to mild upper respiratory tract infection, severe pneumonia and respiratory failure. In this presentation, demographic data and clinical characteristics of Covid-19 patients with severe pneumonia who were treated in the 2nd and 3rd Stage intensive care unit in between March 2020 and December 2020 are presented.

**Materials and Methods:** Ages, gender, Body Mass Index (BMI), Apache II and SOFA scores, comorbid diseases of 400 patients with Covid-19 pneumonia, who were taken to Ankara EAH Reanimation and Zekai Tahir Burak intensive care units between March 2020 and December 2020 were recorded. Data were analysed by using SPSS 15 programme.

**Results and Discussion / Discussion:** Followed 400 patients were between the ages of 26 and 92. The demographic data of the patients and their Apache II and SOFA scores are given in Table 1. 258 patients were male and 142 patients were female, and statistically, the male gender was significantly different ( $p = 0.0002$ ). - Patients were admitted from the emergency service at most (% 72.5). - APACHE II scores are statistically different between patients of exitus and survivors. - Comorbidities of the patients are given in Table 2 (Table 2). -The rate of obese patients was 11.8% (BMI > 30) -There were 206 patients with hypertension (51.6%). -The rate of patients using ACE inhibitors was 18.9%. - The mortality rate was detected % 68,25.

**Conclusion(s):** In this retrospective study, the rate of obesity and ACE inhibitor use were found to be low in our patients (1). Since our patients were over 65 years of age, the rate of hypertension was relatively high(2). In conclusion Age and APACHE II score were found to be important factors in survival in patients with covid 19 pneumonia.

**References:**

1. Qingxian Cai, Fengjuan Chen, Tao Wang et al. Diabetes Care 2020 Jul; 43(7): 1392-1398.
2. Christopher E. Clark , Sinead T. J. McDonagh, Richard J. McManus, Una Martin. Journal of Human Hypertension 2020 Jan, 2897.

**Table 1. Demographic characteristics and APACHE-SOFA Score values**

<u>Parameters</u>	<u>Mean</u>	<u>± SD</u>
<u>Age (year)</u>	67,1	11,8
<u>Gender (F/M)</u>	258 patient F	142 patient M <b>p =0,0002</b>
<u>BMI (kg/m<sup>2</sup>)</u>	26,4	5,2
<u>MV duration (day)</u>	4,69	8,82
<u>SOFA</u>	4,62	3,1
<u>APACHE II from Ex Patients</u>	16,68	8,50
<u>APACHE II from Surviving Patients</u>	9,19	6,26 P= 0,0001
<u>ICU duration</u>	9,79 day	8,39

**Table 2. Comorbid Diseases of patients**

<u>Comorbid Diseases</u>	<u>Number of Patients (Without)</u>	<u>Number of Patients (With)</u>
<u>Asthma</u>	370	30
<u>COPD</u>	349	51
<u>Diabetes Mellitus</u>	268	132
<u>Hypertension</u>	194	206
<u>Cardiac Failure</u>	350	50
<u>Ischemic Cardiac Diseases</u>	293	107
<u>Hematological Diseases</u>	395	5
<u>Immunological Diseases</u>	393	7
<u>Chronical Renal Diseases</u>	377	23
<u>Chronical Liver Diseases</u>	391	9
<u>Malignancy</u>	372	28
<u>Neurological Diseases</u>	326	74

**0095**

**CEREBRAL NEAR-INFRARED SPECTROSCOPY (NIRS) MONITORING IN  
CRANIOSYNOSTOSIS SURGERY: SERIES OF 5 CASES**

Mine AKIN

ANKARA CITY HOSPITAL

**Background and Goal of Study / Background:** Craniosynostosis that occurs in 1 in 2500 births is congenital anomaly, caused by premature closure of sutures, disrupts skull growth. Cranial vault remodeling is surgical approach usually performed within the first year of life, that doctors have relied on for decades to treat craniosynostosis. The operation takes about 3-7 hours, excessive blood loss may occur, more than 1 transfusion is often required, these are listed as the most important risks of the surgery. In these case series, we aimed to present the place of the use of near infrared (NIRS), which is non-invasive, real time monitoring method, in the follow-up of bleeding in craniosynostosis surgeries.

**Materials and Methods:** A total of 5 cases included in study. After routine monitoring inhalational induction with sevoflurane was performed to the patient. Bolus of fentanyl (1-2 µg.kg<sup>-1</sup>), rocuronium (0.6µg.kg<sup>-1</sup>) are administered before endotracheal intubation. Central venous catheter, invasive arterial catheter were inserted. NIRS optodes (The INVOSTM) were placed on bilateral forehead or occipital part of the head. During the operation, we decided on blood transfusion according to hemodynamic changes such as arterial blood pressure and heart rate. We recorded the amount of blood loss, number of sponges and gauze pads as "Critical condition" for bleeding. We also recorded the amount of intraoperative bleeding, intra-postoperative blood transfusion.

**Results and Discussion / Discussion:** The mean age of cases patients was 8.90 months (range 4 - 15), there were 4 (80%) male and 1 (20%) female. The average duration of anesthesia and surgery were 267.00± 87.08 and 189.00±71.62 respectively. Characteristics of the cases were shown in Table 1. Intraoperative parameters, postoperative Hemoglobine values of patients were shown in table 2. In critical situations, a decrease in NIRS cerebral values was observed, a decrease between % 8 and 21 was observed.

**Conclusion(s):** In these young children who will undergo open craniosynostosis surgery with very limited blood reserves blood transfusion is usually required in the intraoperative period and decreases in NIRS values can be a guide to determining the transfusion threshold. NIRS monitoring can be useful for avoiding unnecessary blood transfusion in these surgeries. Further studies are needed in terms of clearer threshold values.

**Table 1.** Characteristics of the Patients

Patient Number	Age (months)	Gender	Weight (kg)	Height (cm)	Type of craniosynostosis	ASA Classification	Duration of anesthesia (minutes)	Duration of surgery (minutes)	Preoperative Hb (gr/dl)
1	5.5	Male	8	69	Sagittal	I	300	240	11.1
2	9	Male	9	75	Metopic	I	330	240	12.3
3	11	Famale	11	72	Bicoronal	II	225	135	12.6
4	4	Male	7.5	62.5	Metopic	II	345	240	11.2
5	15	Male	9	72	Sagittal	II	135	90	12.5

**Table 2.** Intraoperative Parameters and Postoperative Hemoglobine Values of patients

Patient Number	Baseline Hb (gr/dl)	Baseline MAP (mmHg)	Baseline HR (/min)	Baseline NIRS <sub>c</sub>	CS MAP (mmHg)	CS HR (/min)	CS NIRS <sub>c</sub>	% NIRS <sub>c</sub>	Intraoperative Bleeding (ml)	ES transfusion (ml)	Postoperative Hb (gr/dl)
1	9.9	54	115	81	37	109	71	-12	80	120	9.1
2	10.7	83	145	95	57	123	89	-15	100	186	11
3	11.2	67	146	95	34	102	75	-21	200	170	9.5
4	8.6	58	116	86	43	112	73	-15	200	125	10.1
5	10.1	71	113	68	58	116	63	-8	60	65	11.4

**O096****THE EFFECT OF PREOPERATIVE ORAL HYDRATION ON HEMODYNAMIA IN CARDIAC SURGERY**Feride KARAKUŞ<sup>1</sup>, Gamze SARKILAR<sup>2</sup>, Funda GÖK<sup>2</sup>, Yüksel DERELİ<sup>2</sup>, Sema TUNCER UZUN<sup>2</sup>

1: Başakşehir Çam ve Sakura Şehir Hastanesi, İstanbul,

2: Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi , Konya

**Background and Goal of Study / Background:** In this study, we aimed to evaluate hemodynamic changes (invasive blood pressure measurement) and intravascular volume status (static and dynamic parameters, and ultrasonography) during anesthesia induction in patients undergoing open heart surgery, between groups with and without oral hydration with preoperative water.

**Materials and Methods:** Three hundred patients aged 18-80 years undergoing open heart surgery under general anesthesia were included. They were divided into two equal groups as the control group without preoperative oral hydration and the hydration group with preoperative oral water. Patients in the hydration group were given 500 ml of drinking water 2 and 8 hours before the operation. In the control group, full hunger and thirst were achieved during the 8-hour period. Systolic, diastolic, and mean blood pressures, and heart rate were recorded at baseline, before intubation and after intubation (T<sub>0</sub>, T<sup>1</sup>, T<sub>2</sub>). A reduction of >30% in systolic blood pressure and mean blood pressure <60 mmHg was considered as hypotension. Systolic pressure variation, pulse pressure variation, central venous pressure, and internal jugular vein distensibility index were measured under mechanical ventilation. The analysis of the data was done using student t test, chi-square test, independent sample t-test.

**Results and Discussion / Discussion:** Age, gender, type of operation, systolic pressure variation, pulse pressure variation, central venous pressure and number of patients who developed hypotension were similar between the groups (p>0,05). In the hydration group, the internal jugular vein distensibility index value was lower (p<0,05). The patients who developed hypotension in total were elderly, high body mass index, diabetic, and patients who underwent coronary artery bypass graft surgery (p<0,05). Heart rate (T<sub>0</sub>, T<sup>1</sup>, T<sub>2</sub>), systolic, diastolic and mean blood pressure (T<sub>1</sub> and T<sub>2</sub>), and pulse pressure variation were statistically different between patients with and without hypotension (p<0,05).

**Conclusion(s):** Anesthesia induction in cardiac surgery has been associated with high rates of hypotension. Preoperative oral hydration did not prevent hemodynamic imbalance during anesthesia induction in patients undergoing cardiac surgery. There seems to be a prognostic relationship between age, bypass surgery, diabetes, body mass index, heart rate, pulse pressure variation and hypotension. Internal jugular vein distensibility index may indicate volume status.

0097

**SHOULD PREGNANT WOMAN BE TESTED FOR COVID-19?**Asude AYHAN<sup>1</sup>, Sertac ESIN<sup>2</sup>, Elvin KESIMCI<sup>1</sup>

1 Baskent University School of Medicine, Department of Anaesthesiology and Reanimation;

2 Baskent University School of Medicine, Department of Obstetrics and Gynecology

**Background and Goal of Study / Background:** Although the number of published papers on COVID-19 in pregnancy is increasing, the evidence is limited, and the results are diverse. Here, the authors introduce a pregnant woman, giving birth by cesarean section (C/S), who had been in close contact with a COVID-19 patient, and who denied testing before delivery.

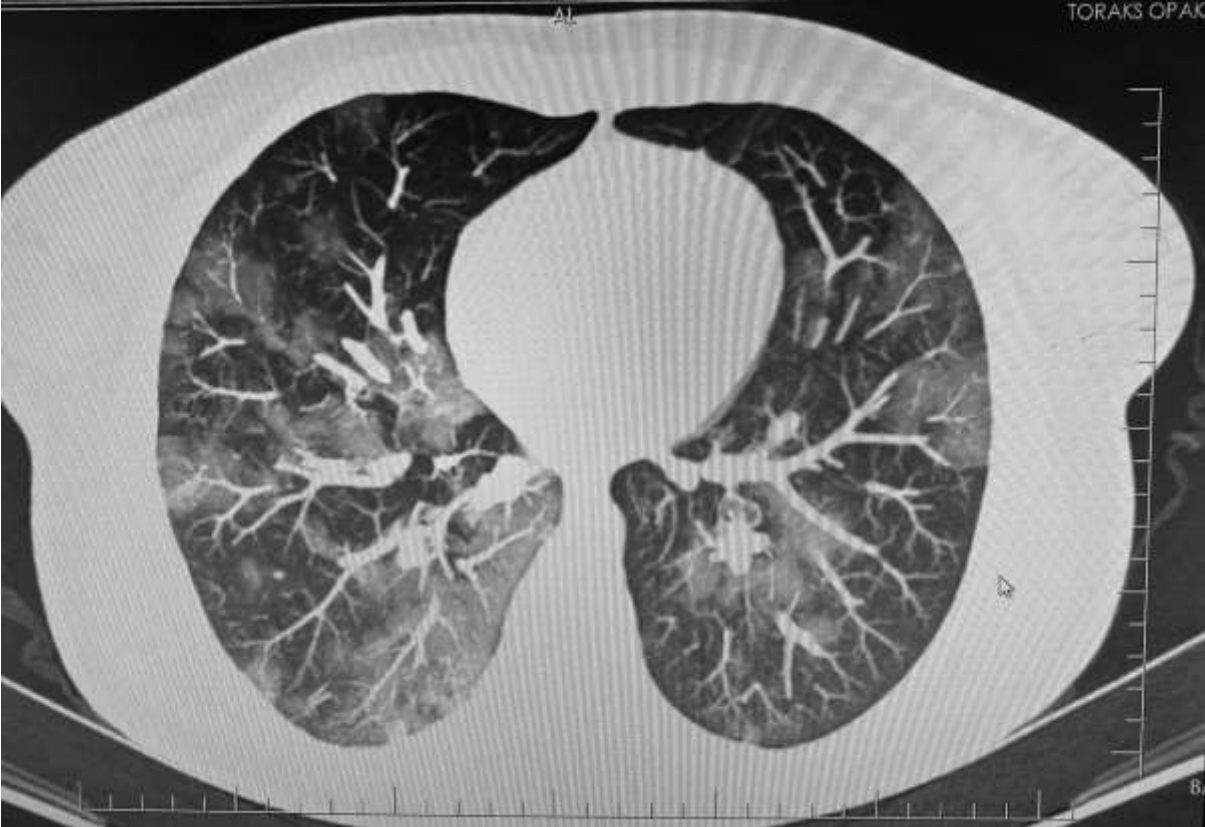
**Materials and Methods:** : A 34-year-old woman (G1P0) at 39 weeks of gestation was taken to C/S under emergency conditions. She had a close contact history of a patient with COVID-19 dating back to 15 days. No history of fever, chest pain, nausea, vomiting, and myalgia was noted. However, she described a recent mild intermittent dry cough at the time of admission. PCR test was taken before entering to the operating room, but without waiting for the test results.

**Results and Discussion / Discussion:** After routine monitoring, oxygen was administered through a nasal cannula under the protective mask. Spinal anesthesia was performed. The patient gave birth to a healthy male baby with APGAR scores of 9 and 10 at 1st and 5th minutes after delivery, respectively. He was then isolated and taken to the intensive care unit for evaluation of viral infection. Fortunately, there was no evidence of vertical transmission, and the nasopharyngeal swabs were negative at 24 and 96 hours, and he was discharged to home in a stable condition. Despite stable vital signs, the mother's cough increased towards the end of the surgery. As the nasopharyngeal swab returned positive, the mother was taken to the COVID-19 ward immediately after the operation. A CT-scan of the chest showed pulmonary involvement (Figure 1). The laboratory tests are summarized in Table 1. The routine treatment protocol was started, and the patient was discharged on the postoperative 5th day with prescriptions.

**Conclusion(s):** The health professionals are still learning about COVID-19 manifestations in pregnancy. Here, the symptoms of COVID-19 in the mother were mild. Careful preoperative evaluations should be performed, especially the history of contact should be examined, and all precautions must be taken into consideration during the pandemic.

**Table 1.** Maternal laboratory results during admission.

Variable	Reference Range	Test Result on Admission (Day 1)
Hemoglobin (Hb) g/L	12-16	11.6
Platelet count x10 <sup>9</sup> /L	150-140	115
White cell count x10 <sup>9</sup> /L	4.5-11	11.6
Neutrophil count x10 <sup>9</sup> /L	2-7.8	10
<b>Lymphocyte count x10<sup>9</sup>/L</b>	1-4	1
<b>C-reactive protein (CRP) mg/L</b>	0-5	35
Lactate Dehydrogenase (LDH)U/L	125-243	427
<b>Aspartate aminotransferase (ASAT) U/L</b>	5-34	130
Alanine aminotransferase (ALAT) U/L	0-55	70
Alkaline phosphatase (ALP) U/L	20-150	197
Gamma-glutamyl transferase (GGT) U/L	5-36	22





**O098****MEDIAN NERVE HYDRODISSECTION IN THE TREATMENT OF CARPAL TUNNEL SYNDROME:  
A CASE SERIES**

Habip Burak ÖZGÖDEK, Muhammed Enes AYDIN  
Ataturk University Faculty of Medicine

**Background and Goal of Study / Background:** Carpal tunnel syndrome (CTS) is the most common focal entrapment neuropathy that results from compression of the median nerve (MS) within the carpal tunnel. High pressure-related ischemia and impairment of neural conduction are generally accepted mechanisms.<sup>1</sup> Although the prevalence of CTS varies between 3.8% and 4.9%, it is three times more common in women.<sup>2</sup> It is characterized by pain and paresthesia in the median nerve trace; it also includes loss of sensitivity, dexterity and functionality. However, signs and symptoms vary and do not correlate with the level of severity.<sup>3</sup> In severe cases, muscle weakness and spread of symptoms to the forearm, upper arm, and sometimes shoulder may be identified. Tenar atrophy and weakness of thumb abduction seem to be the most important signs.<sup>4</sup> While mild and moderate cases are followed with conservative treatment, surgical treatment is recommended in severe cases. Here, we share our 6-month results after MS hydrodissection of 6 patients who were diagnosed with severe CTS but did not want to undergo surgery.

**Materials and Methods:** Six (5 female / 1 male) CTS patients aged 45-65 years were informed about MS hydrodissection and their written consent was obtained. Under sterile conditions, the MS was observed at the entrance of the carpal tunnel at the scaphoid – pisiform level with a linear USG probe. MS was released from the transverse carpal ligament and flexor tendons by injecting a mixture of bupivacaine and methylprednisolone around it using an in-plane technique and an ulnar approach.

**Results and Discussion / Discussion:** During the six-month follow-up, the patients did not need any additional treatment other than simple analgesics. A remarkable reduction in other symptoms of CTS was also observed.

**Conclusion(s):** The therapeutic effect of nerve hydrodissection is based on the theory that separating the compressed nerve from nearby soft tissue may reduce the risk of adhesion and chronic constriction injury.<sup>5</sup> There have been several studies in recent years showing that MS hydrodissection may be beneficial in CTS patients.<sup>6,8</sup> We think that MS hydrodissection will take its place in CTS treatment with larger series of studies.

**References:**

1. Bland JD, Rudolfer SM. Clinical surveillance of carpal tunnel syndrome in two areas of the United Kingdom, 1991-2001. *J Neurol Neurosurg Psychiatry* 2003;74:1674–1679.
2. Wiperman, J.; Goerl, K. Diagnosis and management of carpal tunnel syndrome. *J. Musculoskelet. Med.* 2016, 94, 47–60.
3. Erickson, M.; Lawrence, M.; Stegink Jansen, C.; Coker, D.; Amadio, P.; Cleary, C. Carpal Tunnel Syndrome: A Summary of Clinical Practice Guideline Recommendations-Using the Evidence to Guide Physical Therapist Practice. *J. Orthop. Sports Phys. Ther.* 2019, 49, 359–360.
4. Padua, L.; Coraci, D.; Erra, C.; Pazzaglia, C.; Paolasso, I.; Loreti, C.; Caliandro, P.; Hobson-Webb, L.D. Carpal tunnel syndrome: Clinical features, diagnosis, and management. *Lancet Neurol.* 2016, 15, 1273–1284.
5. Cass SP. Ultrasound-guided nerve hydrodissection: What is it? A review of the literature. *Curr Sports Med Rep* 2016;15:20–22.
6. Wu YT, Ho TY, Chou YC, Ke MJ, Li TY, Huang GS, et al. Six-month efficacy of platelet-rich plasma for carpal tunnel syndrome: a prospective randomized, single-blind controlled trial. *Sci Rep* 2017;7:94.

7. Wu YT, Ho TY, Chou YC, Ke MJ, Li TY, Tsai CK, et al. Six-month efficacy of perineural dextrose for carpal tunnel syndrome: a prospective, randomized, double-blind, controlled trial. *Mayo Clin Proc* 2017;92:1179–1189.
8. Lam SKH, Reeves KD, Cheng AL. Transition from deep regional blocks toward deep nerve hydrodissection in the upper body and torso: method description and results from a retrospective chart review of the analgesic effect of 5% dextrose water as the primary hydrodissection injectate to enhance safety. *Biomed Res Int* 2017;2017:7920438.

**O099****LUNG ULTRASOUND IN TOTAL LUNG LAVAGE: A CASE REPORT**Volkan SIVGIN, Aycan OZDEMIRKAN

Gazi University

**Background and Goal of Study / Background:** It has been proven that during the anesthesia applications with lung ultrasound, valuable information is provided in the evaluation of lung and pleural pathologies in critical patients both intraoperatively and postoperatively. Total lung lavage is a unique human model ultrasonographically in which conceptually, the state of the lungs at different stages of the procedure is very similar to various pathological conditions, the lung air content is changed in a very controlled manner: degasing the re-absorption atelectasis model, filling the alveoli with saline consolidation model, The recovery phase, in which re-ventilation of the lavaged lung is the pulmonary edema and progressive resolution model.

**Materials and Methods:** A 54-year-old male patient who was being followed up with a diagnosis of pulmonary alveolar proteinosis presented with increased shortness of breath and low oxygen saturation. Total lung lavage was planned. During the procedure, both lungs were evaluated with lung ultrasound. While an alveolar intestinal pattern was observed especially in the lower zones at the beginning, a near-normal lung image was observed in the upper zones. After intubation with a left-double lumen tube, the lung collapse was confirmed ultrasonographically by the absence of lung pulse and pleural motion. A tissue-like pattern was seen with the increase of B lines with the saline infusion given during the lavage. In the meantime, pleural movements and the number of B lines in the non-dependant lung were checked regularly. The washing process was completed in 210 minutes with a total of 54 liters of saline. During the procedure, there were no hypoxia, leakage of washing fluid into the ventilated lung or any hemodynamic complication. At the end, double lung ventilation was started and the resolution phase was followed ultrasonographically. After providing adequate oxygenation, the patient was safely extubated and transferred to the intensive care unit.

**Results and Discussion / Discussion:** With the lung ultrasound applied during total lung lavage, it is possible to observe the changes in the lungs that are washed and to perform the procedure steps safely and to diagnose the complications that may occur in the ventilated lung early.

**Conclusion(s):** Lung ultrasound, a noninvasive surface imaging technique, can quantitate lung water content.

**References:**

1. Yu X, Zhai Z, Zhao Y, Zhu Z, Tong J, Yan J, Ouyang W. Performance of Lung Ultrasound in Detecting Peri-Operative Atelectasis after General Anesthesia. *Ultrasound Med Biol.* 2016;42(12):2775-2784.
2. Via G, Lichtenstein D, Mojoli F, Rodi G, Neri L, Storti E, Klersy C, Iotti G, Braschi A. Whole lung lavage: a unique model for ultrasound assessment of lung aeration changes. *Intensive Care Med* 2010;36:999–1007

**O100****RETROSPECTIVE EVALUATION OF PATIENTS DEVELOPING CHRONIC PAIN FOLLOWING LOWER EXTREMITY AMPUTATION: A THREE YEARS' EXPERIENCE**

Süheyla KARADAG ERKOC, Dostali ALIYEV, Hatice GUNES, Sanem CAKAR TURHAN, Feyhan OKTEN  
Ankara University Medical Faculty Department of Anesthesiology and ICU

**Background and Goal of Study / Background:** Postoperative chronic persistent pain (PCPP) is an important condition which is difficult to treat, impairing health quality of individuals following surgery and creating a burden to health system. PCPP is multifactorial and for successful treatment of PCPP it is important to determine the predisposing factors and to plan an individualized preoperative management strategy according to the type of surgery. Postoperative chronic pain is most commonly observed following inguinal hernia, arthroplasty, amputation and abdominal surgeries(1). In the current study, we aimed to evaluate chronic pain in patients who had undergone lower extremity amputation.

**Materials and Methods:** After obtaining ethical approval, the hospital records of patients who had undergone lower extremity amputation between 2018-2020 were reached and the patients who had developed chronic pain were included to the current retrospective study.

**Results and Discussion / Discussion:** Among 100 patients undergoing lower extremity amputation, chronic pain was present in 40 patients. Among patients with chronic pain, 13 patients have undergone finger amputation, 8 patients have undergone forefoot and ankle amputation and 19 have undergone below knee amputation. F/M ratio was 7/33. The mean age was 59,875±15,85, the mean body weight was 76,35±15,85 and the mean height was 170,375±8,03. Diabetes mellitus was present in 5 patients undergoing finger amputation, in 3 patients undergoing forefoot and ankle amputation and 7 patients undergoing below knee amputation. Peripheral artery disease was present in 4 patients undergoing finger amputation, in 4 patients undergoing forefoot and ankle amputation and 8 patients undergoing below knee amputation. Both diabetes mellitus and peripheral artery disease was present in 4 patients undergoing finger amputation, in 1 patients undergoing forefoot and ankle amputation and 4 patients undergoing below knee amputation.

**Conclusion(s):** Diabetes mellitus, peripheral artery disease and male gender may be predisposing factors for developing chronic pain following lower extremity amputation.

**References:**

1. Kern U, Busch V, Muller R, et al. Phantom limb pain in daily practice – still a lot of work to do! Pain Med 2012; 13(12): 1611–1626.

**O101****UNEXPECTED DIAGNOSIS DURING PERCUTANEOUS ENDOSCOPIC GASTROSTOMY  
APPLICATION IN THE INTENSIVE CARE UNIT**

Onur OZLU, Merve BAYRAKTAROGLU, Cihan SAHİN

Department of Anaesthesiology and Reanimation,  
TOBB University of Economics and Technology, Ankara, Turkey.

**Background and Goal of Study / Background:** PEG is an effective way to provide enteral nutrition in patients with inadequate oral intake. Esophageal carcinoma and actinomycosis infection, which were unexpectedly detected during PEG administration, are presented in our two patients who were followed up in ICU.

**Materials and Methods:** CASE 1 86-year-old patient was followed up by mechanical ventilation due to respiratory failure that developed after aspiration pneumonia. Enteral nutrition was provided with a nasogastric tube. On the 6th day of the treatment, when spontaneous breathing was sufficient, the patient was planned to be extubated and switched to oral nutrition. After extubation, the patient, who was conscious and had a GCS: 15, was started to be followed up with face mask. The patient was consulted to the Otorhinolaryngology department because of hoarseness and stridor. In fiberoptic laryngoscopy, epiglottis, vocal cords and larynx were observed to be edematous. Symptoms resolved with administration of methylprednisolone and cold steam. PEG application was planned for the patient, when it was observed that swallowing functions were not sufficient with pharyngeal endoscopy. During the endoscopy, an ulcerovegetan mass that seemed to infiltrate up to the arytenoid cartilage level was detected in the proximal esophagus. PEG has been successfully applied. The patient whose pathological examination was compatible with squamous cell carcinoma was transferred to the oncology center for treatment planning. CASE 2 41-year-old patient; he was followed up for coronary artery disease, infectious pneumonia, and bilateral middle cerebral artery infarction. Due to loss of swallowing reflex, PEG application was planned for the patient who was followed up with GCS: 6, tetraplegic and tracheostomy. On gastroscopy, it was observed that the esophagus was densely filled with a white fibrin plug from its proximal to distal. Because of this plug, the distal esophagus could not be passed and the procedure was delayed. Penicillin treatment was planned for the patient who was diagnosed with actinomyces infection with sulfur granules visible on direct microscopic examination. All examinations for rheumatological diseases and immunodeficiency were within normal limits. It was observed that the lesions disappeared after treatment. PEG application was performed successfully.

**Results and Discussion / Discussion:** Unexpected pathologies can be detected incidentally during PEG application.

**Conclusion(s):** In conclusion, a detailed endoscopic examination of the esophagus and stomach is required before PEG is planned.



**O102****RETROSPECTIVE EVALUATION OF EARLY POSTOPERATIVE PAIN AND LATE TERM MORTALITY IN COVID POSITIVE AND NEGATIVE PATIENTS UNDERGOING SURGERY FOR HIP FRACTURE**

Suheyla KARADAG ERKOC<sup>1</sup>, Mehmet Can GEZER<sup>2</sup>, Volkan BAYTAS<sup>1</sup>, Mahmut KALEM<sup>2</sup>

1 Ankara University Medical School Department of Anesthesiology and ICU

2Ankara University Medical School Department of Orthopedics and Traumatology

**Background and Goal of Study / Background:** Pelvic fractures are fractures caused by low energy trauma in elderly patients with high mortality ratio resulting in impairment of quality of life. Ineffectively treated fracture could cause immobilization, delirium, depression, sleep disorders, delayed ambulation and pulmonary complications. Patients with COVID-19 infection are especially prone to develop vasculopathy, due to increased proinflammatory cytokines and hypoxia. The aim of the current study is to determine how COVID-19 affects the quality and quantity of pain in geriatric patients with pelvic fractures.

**Materials and Methods:** Medical records of patients undergoing pelvic fracture surgery were evaluated and 26 geriatric pelvic fracture patients who had undergone surgery during the pandemic period between March 2020-March 2021 in a single university hospital were included to the current retrospective study. All patients were operated by the same orthopaedic surgeon with the same technique. Patients were divided into two groups as Covid-19 positive(n=10) and Covid-19 negative(n=16) depending on preoperative PCR results. Patients' short-term postoperative pain was evaluated with Short-McGill Melzack Pain Score Form. Mortality ratio and the correlation between pain and mortality were evaluated.

**Results and Discussion / Discussion:** The average sensory pain scores in Covid-19 positive and Covid-19 negative patients were  $26.3 \pm 4.59$  and  $20 \pm 8.16$  respectively ( $p=0.0151$ ). The average affective pain scores in Covid-19 positive and Covid-19 negative patients were  $9.3 \pm 0.65$  and  $6.1 \pm 0.7^1$ , respectively ( $p=0.0131$ ). The average pain severity score was  $7.5 \pm 0.70$  and  $5 \pm 0.61$  in Covid-19 positive and Covid-19 negative patients, respectively ( $p=0.0157$ ). 3 Covid-19 positive and 4 Covid-19 negative patients died. The mortality rate 26.9%. The patients with pain severity scores 7 and above died. Mortality was found to be 100% correlated with pain scores.

**Conclusion(s):** COVID-19+ patients suffer from more severe pain in terms of quality and quantity. There should be more caution on postoperative rehabilitation and complications related to pain after pelvic fractures. New treatment protocols should be appreciated aside from the standard pain management protocol so that pain and its complications can be decreased as much as possible.

## **POSTER PRESENTATIONS**



**P01****ANESTHESIA MANAGEMENT IN A PATIENT WITH AFF UNDERGOING PERTROCHANTERIC FRACTURE REPAIR . A CASE REPORT**

TRPOSKA POPOSKA Angela.<sup>1</sup>, TOLESKA DONESKA Marija.<sup>1</sup>, NAUMOVSKI Filip.<sup>1</sup>,  
STOJKOVSKA Ana.<sup>1</sup>, KUZMANOVSKA Biljana <sup>1</sup>, KARTALOV Adrijan <sup>1</sup>

1University Clinic of Anesthesiology,  
Reanimation and Intensive care Medicine (KARIL) -Skopje - Skopje (Republic of North Macedonia)

**Background and Goal of Study / Background:** Medical complications affect cognitive and neurological alterations,cardiopulmonary affections,venous thromboembolism,gastrointestinal tract bleeding,are the most important in the elderly patients. (1)

**Materials and Methods:** We report the anesthetic management of a 79 year-old female patient undergoing pertrochanteric fracture repair under general anesthesia.The patient has previous history of ventricular tachyarrhythmias,and her symptoms were well controlled with Bisoprolol 2.5 mg,Enalapril 5 mg,and Clopidogrel.Preoperative 12 lead ECG revealed-AFF, HR-160 min.Echocardiography showed good size of left ventricle,ejection fraction of 47 %.Patient was given enoxaparin sodium 2 x 40 S.C preoperative.The patient and her family accepted the surgery and anesthesia risk, with possible complications while the surgery is being done or after surgery.Patient was monitored with ECG,intermittent blood pressure measurement and pulse oximetry.The heart rate was 155 min.The blood pressures were 145/85 mmHg.Spinal anaesthesia was administered ,the patient recived 2.8 ml of Bupivacaine 0.5%. Dural puncture was done in an aseptic technicque at the L3-L4 level.The 25G spinal needle was used.When we flipped the patient around to inject the spinal anesthesia, she had a hear rate 195 min. We gave her Amiodarone 150 mg right away, it didn't react, then we gave her Esmolol 10mg,and after a while the heart rate went down.Due to her heart rate variations and constant high heart rate,from the very beginning of the surgery, we gave her continued Amiodarone on a pump throughout the srugery.The heart rate range was from 110 to 140.The surgery was done succesfully, the patient continued with therapy after the surgery.We called for a cardiologist that controlled the situation as well as the patient's therapy. The patient was released from the clinic after 15 days.

**Results and Discussion / Discussion:** AFF is one of the most common arrhythmias in non-cardiac surgeries, especially in the elderly patients.Elderly patients are at increased risk for thromboembolic events.(2) First onset of AFF should be treated aiming for the restoration of haemodynamic stability while focussing on optimising the precipitating factors, rate control and rhythm control.

**Conclusion(s):** Minimizing perioperative risk in geriatric patients requires thoughtful preoperative assessment of organ function and reserve, meticulous intraoperative management of coexisting disorders, and vigilant postoperative pain control.

**References:**

1. V. Minville, O. Fourcade, D. Grousset, et al.Spinal anesthesia using single injection small-dose bupivacaine versus continuous catheter injection techniques for surgical repair of hip fracture in elderly patients *Anesth Analg*, 102 (2006), pp. 1559-1563
2. C.D. Collard, S. Eappen, E.P. Lynch, et al.Continuous spinal anaesthesia with invasive hemodynamic monitoring for surgical repair of the hip in two patients with severe aortic stenosis *Anesth Analg*, 81 (1995), pp. 195-198

## P04

### DESCENDING NECROTIZING MEDIASTINITIS FOLLOWING DENTAL EXTRACTION : A CASE REPORT

Ana STOJKOVSKA<sup>1</sup>, Marija TOLESKA<sup>1</sup>, Angela TRPOSKA<sup>1</sup>, Filip NAUMOVSKI<sup>1</sup>, Biljana LOZANOVSKA<sup>2</sup>  
University Clinic of TOARILUC , Skopje - Department of Anesthesia, Reanimation and Intensive care<sup>1</sup>  
Clinical Hospital Triphun Panovski, Bitola<sup>2</sup>

**Background and Goal of Study / Background:** Acute mediastinitis is a serious infection involving the connective mediastinal tissue. Odontogenic and peritonsillar abscess are the most common causes. Descending necrotizing mediastinitis (DNM) is a polymicrobial infection originating in the oropharynx with mortality rate 25% -40%.

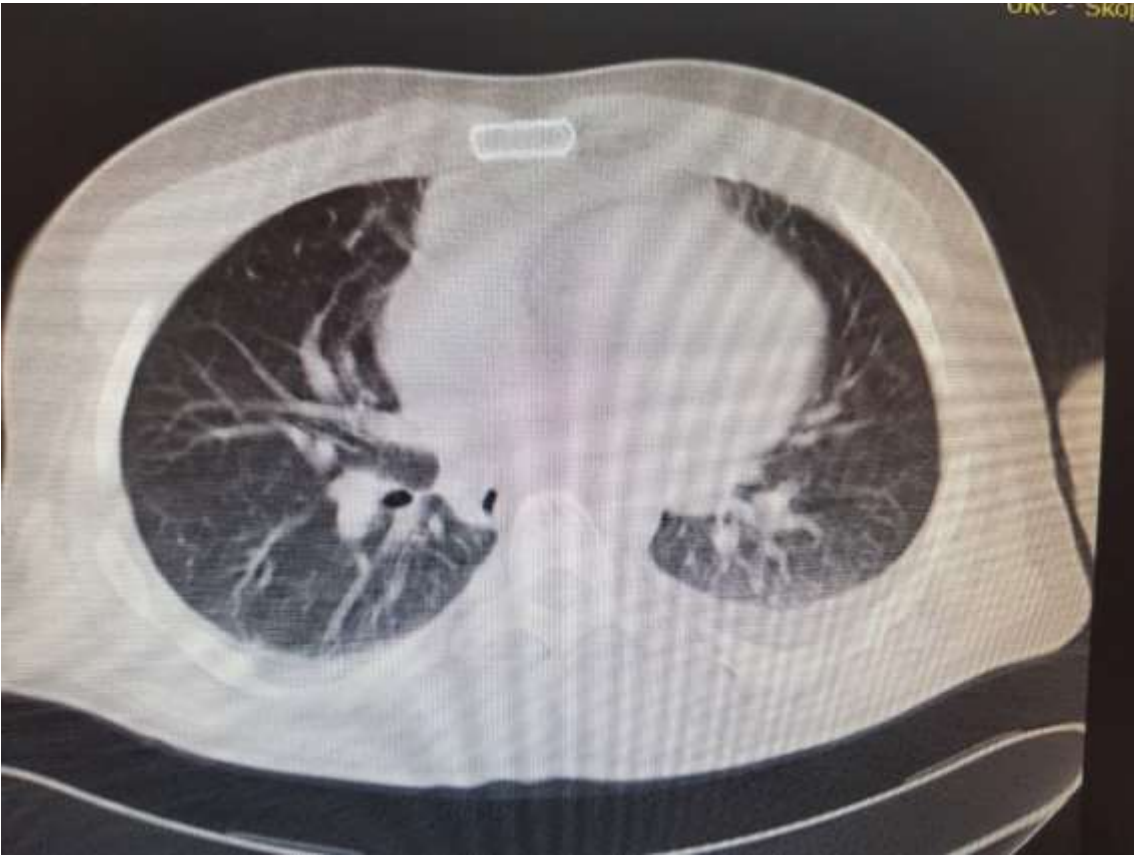
**Materials and Methods:** A 22 year old patient with a tooth pain went to his dentist where the lower left third molar was treated. 5 days later the patient was admitted to the Oral and Maxillofacial Surgery Clinic because of a severe pain and local swelling over the left cheek and neck. An extraoral incision was made, the tooth was extracted and antibiotic therapy was initiated Kindamycin и Ampicilin-sulbactam. After few days the patient medical state worsens and patient was transferred to the ICU. On examination he was febrile, tachycardic, hypotensive, tachypneic with a mandibular swelling extending towards the left side of the neck and face. The blood analyses showed high levels of WBC, CRP , Neut, hypoxemia and respiratory alkalosis. The CT scans showed inflammatory changes, edema and air tracked downward from the submandibular space to the pharynx, visceral and anterior mediastinum a presence of a dense liquid in the left mediastinum and pleural effusion 58mm on the right side. An emergent surgery was performed: thoracotomy, decortication, debridement and drainage of the mediastinum and the left side of the chest. During the stay in the ICU the patient was on a mechanical ventilation, 4 different antibiotics were administrated and another surgery was performed on day 8. The 10th day he was extubated and three days later discharged in better condition.

**Results and Discussion / Discussion:** Mediastinitis is a dangerous and fatal process, arising from neck infections descending into the mediastinum. It can rapidly progress to sepsis and can frequently lead to death. Broad-spectrum antibiotics and airway management, represent the first step of treatment. Surgical clean up of the infectious focus and drainage of neck and mediastinum represent the second step. An appropriate assistance by ICU is fundamental in order to manage severe sepsis, septic shock or other complications(1).

**Conclusion(s):** DNM rests to be a destructive and fatal infection of the mediastinal connective tissue requiring the most careful assistance by therapists.

#### References:

1. Sandner A, Börgermann J. Update on necrotizing mediastinitis: causes, approaches to management, and outcomes. *Curr Infect Dis Rep.* 2011;13:278-286



## P05

### THE ADDITION OF COLLOIDS TO PARKLAND FORMULA AMELIORATES 'FLUID CREEP' IN ELDERLY BURNED PATIENTS, A CASE REPORT

Albana ALEKSI, Monika BELBA  
UHC "Mother Teresa", Tirana

**Background and Goal of Study / Background:** The objective of this article is to report a case of a 68-yr-old male patient with 40% total body surface area of 2nd-3rd degree burns and to show the use of colloids to parkland formula to avoid 'fluid creep'

**Materials and Methods:** In this article we present a clinical case and the treatment of a burned old patient, 68-yr-old, burned 40% TBSA with lime whose treatment and good outcome was challenging for us.

**Results and Discussion / Discussion:** The addition of colloid to Parkland resuscitation rapidly reduces hourly fluid requirements, restores normal resuscitation ratios, and ameliorates fluid creep. This practice can be applied selectively as needed using predetermined algorithms.

**Conclusion(s):** New approaches in treatment, new medications in the shock combustional phase, review of protocol of rehydratiton, CVP monitoring to avoid overloading, control of sepsis, appropriate nutrition, temperature control and pain supression are of a large role in our treatment.

#### Summary

The objective of this article is to report a case of a 68-yr-old male patient with 40% total body surface area of 2nd-3rd degree burns.

It is known how difficult is to rescue the old patient with major burns. This because of the changes in the physiology, the decreased cardiopulmonary reserves, malnutrition, changes in the immunology system, comorbidities, which leads to high morbidity and mortality.

New approaches in treatment, new medications in the shock combustional phase, review of protocol of rehydratiton, CVP monitoring to avoid overloading, control of sepsis, appropriate nutrition, temperature control and pain supression are of a large role in our treatment.

#### Introduction

Nowdays, many old people live and stay home alone, because the young people go abroad.

The old burned patients represent a growing number in the total burned patient number in our emergency. This segment of population presents different features and their survival from the state of burn depends from the surface and the grade of damage, the comorbities and an accurate treatment to prevent the complications and to improve the outcomes. Burns larger than 20% TBSA can cause a high mortality in this age. The pulmonary complications, those hepatic and renal from sepsis, are more lifethreatening and very often with fatal outcome than in younger adults.

In this article we present a clinical case and the treatment of a burned old patient, 68-yr-old, burned 40% TBSA with lime whose treatment and good outcome was challenging for us.

#### The Case

A male patient 68-yr old was admitted to our emergency room after he accidentally found himself within the lime pit. The place of accident was 35 km from the burn center. No venous access. No medication. No medical treatment.

The region affected were the lower extremities, the low back and the upper extremities (half of them). After washing the wounds with Nacl 0.9%, we medically treated them with petrolatum gauze and jodine povine 7.5% and the patient was transferred in intensive care. The patient was fully monitored with central venous pressure, arterial, urinary catheterization. The patient suffers from arterial hipertension and in the last two years he was subjected a coronary bypass. No signs of initial

necrotomia and the compartment syndrome. Our attention was paid to rehydrate the patient as good as possible to avoid the overloading because he was a cardiac patient. The fluid resuscitation was administered guided by Parkland formula i.e 4ml/kg/%TBSA in order to maintain a urine output 0.5-1 ml/kg/hour. We gave him Ringer lactate and after 12 hours post combustio, we gave him colloid solution (human albumine 20%-50 ml and 2 fresh frozen plazma izogroup izoRhesus). The continuously monitoring of central venous pressure helped us to judge about the speed of resuscitation, in order to avoid the overload and the forming of 'fluid creep'. In this way, our protocol of total volume infused in this patient was reduced. Dressing were changed daily. An empiric antibioticotherapy (cefazoline + metronidasole) was performed at the second day post combustio. Periodically quantitative and exfoliative wound, urine and haemoculture were taken. Pseudomonas aeruginosa was isolated at the haemoculture and the wound culture on day 6, and Imipenem+Ciprofloxacin+Amikacin begun. The nutrition was combined. Oral nutrition with hyperproteinic food and parenteral nutrition with 20 gram nitrogen and 4 ui insuline (prepared and packed from our hospital). The patient did not become katabolic. On the day 28 we performed the first skin grafting for both of the legs. The surface grafted in total was 15%. The patient was covered with antikoagulant preventive therapy during all the days. At the 8 week post combustio, the situation was complicated with a dyspnea, tachipnea, temperature, tachikardia. No signs of cianosis and syncope. Radiologic examinations findings of the CT scan of the chest with contrast, spoke of The addition of colloid to Parkland resuscitation rapidly reduces hourly fluid requirements, restores normal resuscitation ratios, and ameliorates fluid creep. This practice can be applied selectively as needed using predetermined algorithms. The addition of colloid to Parkland resuscitation rapidly reduces hourly fluid requirements, restores normal resuscitation ratios, and ameliorates fluid creep. This practice can be applied selectively as needed using predetermined algorithms. a small acute pulmonary embolism. The electrocardiogram was normal.

The addition of colloid to Parkland resuscitation rapidly reduces hourly fluid requirements, restores normal resuscitation ratios, and ameliorates fluid creep. This practice can be applied selectively as needed using predetermined algorithms.

**P08****A DOUBLE-EDGED SWORD: ANESTHETIC MANAGEMENT OF COCKAYNE'S SYNDROME BOTH IN OUT OF THE OPERATING ROOM AND WITH DIFFICULT AIRWAY**Berna KAYA UĞUR<sup>1</sup>, Ersal BOZGEYİK<sup>1</sup>, Ahmet Şenol UYAR<sup>1</sup>, Süleyman GANİDAĞLI<sup>1</sup><sup>1</sup>Gaziantep University School of Medicine Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Cockayne's syndrome is a rare, inherited, OR disorder, characterized by progressive physical and mental retardation. The syndrome is rare however presents combination of abnormalities including difficult airway and physio-pathological challenges for the anesthetists. We presented anesthetic management of a patient with Cockayne's syndrome, who had a deep-sedation for Auditory Brainstem Response Test(ABRT).

**Materials and Methods:** The case is described of a 9 year-old boy (height 88cm,weight 14.50kg)with Cockayne's syndrome scheduled for ABRT under deep-sedation in ENT clinic. The patient was totally normal to 2-years of age and referred to the hospital with difficulty in walking. Clinical diagnosis was maintained 4 years later. Anesthetic history was for tooth extraction thrice. At pre-anesthetic evaluation, microcephaly, larger teeth compared to the smaller mandible, limitation of movement in the temporomandibular joint, 2.5cm of mouth opening, deafness, dwarfism, mental retardation, limited movement of neck and joints of the extremities, kyphosis, sunken-eyes, gastroesophageal reflux was recorded. No other pathology was found in the physical examination and laboratory tests. After standard monitoring, sedation was initiated with midazolam(0.3 mg), propofol(5 mg), and ketamine(5 mg) intravenously, and 2 liters/min of 100% oxygen was given with oxygen-mask. When the test started to deteriorate at the end of 15 minutes, an additional 5mg ketamine was added and oro-pharyngeal airway was inserted carefully. After 30 minutes of testing, the patient was recovered and discharged to PACU uneventfully.

**Results and Discussion / Discussion:** The anesthetic management of ABRT is risky because the procedure requires deep-sedation in a limited environment outside the operating room. It is also challenging to administer anesthesia to patients with many anatomical and physiological pathologies, including difficult airway, in these inadequate environments. Concerning Cockayne's syndrome, there have been some reports of difficult airway, laryngospasm, gastric aspiration,etc. Since premature aging is present in these patients due to DNA repair mutation, it may be beneficial to evaluate the patients as geriatric patients in terms of drug elimination. Antacids,PPIs should be used to prevent regurgitation. Venous cannulation may be compelling, due to joint-contractures.

**Conclusion(s):** Excessive care must be taken at cases with unusual syndromes, including advanced difficult airway preparation especially at out of operating room environment.



**P09****ANESTHESIA MANAGEMENT IN A PATIENT WITH DESBUQUOIS SYNDROME:  
A CASE REPORT**

Murat TÜMER, Hazar KÖKTEN, Aysun Ankaç YILBAŞ, Fatma SARICAOĞLU

Hacettepe University Faculty of Medicine, Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Desbuquois Syndrome (DS) is an autosomal recessive syndrome characterized by short stature, joint dislocation, and defects in the hand and foot bones (1,2). Airway management can be challenging due to short neck and facial deformities. To our knowledge, there is only one case of neonatal anesthetic management in the literature (3) We share our experience with an adult DS patient who underwent femoral derotation osteotomy under general anesthesia.

**Materials and Methods:** A 20-year-old male patient with DS was consulted for femoral derotation osteotomy. His body mass index was 36 kg/m<sup>2</sup>. He had short neck with Mallampati score 3 (Fig 1). He was taken to the operating room with Covid-19 pandemic precautions. After routine monitoring, the patient was pre-oxygenated with 100% FiO<sub>2</sub> for 5 minutes. Rapid sequence induction was performed with propofol, fentanyl, and rocuronium. After induction, invasive artery and temperature monitoring was performed. Mask ventilation was easy. He was intubated using a 7.5 cuffed endotracheal tube with Glidescope LoProT3 videolaryngoscope (Cormack-Lehane II). Total intravenous anesthesia (TIVA) was used for maintenance. After the operation was completed without any problems, muscle relaxation was reversed with sugammadex. He was extubated in the operating room and transferred to the ward.

**Results and Discussion / Discussion:** Although it is mentioned that DS has a mortality rate of 33%, the exact mortality can't be calculated when it is considered that there are also milder forms which are not diagnosed (4). Our patient was also a mild form of DS. The use of videolaryngoscopy as first choice was a factor that facilitated intubation especially in the presence of expected difficult intubation and Covid-19 pandemic precautions. Although there are no cases of malignant hyperthermia in the literature and the previous case report mentioned inhalational anesthesia (3), we considered TIVA to be safer due to musculoskeletal anomalies.

**Conclusion(s):** We think that our case will contribute to the literature in terms of being the first adult case. Patients with DS can be managed safely with adequate difficult airway preparation and total intravenous anesthesia.

**References:**

1. LeMerrer, M., et al., Desbuquois syndrome. *European journal of pediatrics*. 1991. 150(11): p. 793-796.
2. Lloyd, A., et al., Desbuquois syndrome in three sisters with significantly different lengths of survival. *American Journal of Medical Genetics Part A*. 2006. 140(11): p. 1253-1255.
3. Szmuk, P., Matuszczeak, M., Carlson, R. F., David Warters, R., Rabb, M. F., & Ezri, T. (2005). Use of CobraPLATM for airway management in a neonate with Desbuquois syndrome. Case report and anesthetic implications. *Pediatric Anesthesia*, 15(7), 602-605.
4. Hall, B.D., Lethality in Desbuquois dysplasia: three new cases. *Pediatric radiology*. 2001. 31(1): p. 43-47.





**P13****PRIMARY HYPERPARATHYROIDISM AND SEVERE HYPERCALCEMIA**

Aleksandra PANOSKA<sup>1</sup>, Marija JOVANOVSKI SRCEVA<sup>2</sup>, Slobodanka SIMEVSKA<sup>1</sup>

Department of Anaesthesia, University Clinic for Gynecology and Obstetrics,  
Skopje, North Macedonia<sup>1</sup>,  
University Clinic for Anesthesiology Reanimation and Intensive Care,  
Skopje, North Macedonia<sup>2</sup>

**Background and Goal of Study / Background:** Severe hypercalcemia with calcium values higher than 3.5mmol/l is a life threatening condition that must be urgently treated. 85% of hyperparathyroidism cases are reported to occur as a result of benign lesions of parathyroid glands. The aim of this report is to show the preoperative management of severe hypercalcemia in primary hyperparathyroidism and consequences if left untreated.

**Materials and Methods:** We present a 56-year-old woman with confirmed primary hyperparathyroidism, scheduled for parathyroid adenoma removal. Patient had history of osteoporosis, chronically obstructive pulmonary disease and anaemia. Pre-operative laboratory analysis showed moderate anaemia and severe hypercalcaemia. Calcium levels were 3.5mmol/L, PTH value of 450 pg/ml and ionised calcium of 2.0 mmol/L. ECG showed shortened QT interval and discrete Osborn waves. Abdominal ultrasound revealed calculi in both kidneys, while bone densitometry expressed diffuse osteopenia. 99mTc MIBI-SPECT scintigram confirmed hyperfunction of the right lower parathyroid gland. X-ray of the thorax showed pronounced broncho vascular changes and pulmonary effusions.

**Results and Discussion / Discussion:** Patient was commenced to immediate treatment with isotonic saline od 150 ml/hour, diuretics and pamidronate (bisphosphonates for iv usage) at dosage of 70 mg/24 hours. Calcium levels drooped consequently on the next few days from 3.5mmol/l to 3.2mmol/l to 3.0 mmol/l to 2.9 mmol/l on the fifth day when she was operated. She was discharged from hospital three days later with calcium level of 2.3 mmol/L. The hypercalcemia is a serious condition that requires urgent and aggressive treatment. Literature evidences allow up to 300 ml/hour of saline but this must be taken with a precaution as it can have cardiac implications, moreover can further worsen the pulmonary effusion. Loop diuretics as part of the treatment require a good assessment of the overall clinical condition. Bisphosphonates can also be prolonged for more than five days, but in cases where kidney function is already reduced, this is not recommended as it can cause acute renal toxicity.

**Conclusion(s):** Correction of the hypercalcemia pharmacologically accompanied with a surgical removal of the parathyroid gland is necessary for a good outcome. If left untreated, irregular heart rhythms and serious multiorgan failure can follow. Post-operative period should never be neglected as dramatic calcium reduction may develop.

**P19****WHICH COMORBIDITIES ARE SEEN IN PALLIATIVE CARE PATIENTS WITH MALNUTRITION?**Özlem DELİGÖZ<sup>1</sup>, Osman EKİNCİ<sup>1</sup>

1- Department of Anesthesiology and Reanimation, University of Health Sciences Turkey, Haydarpaşa Numune Training and Research Hospital, Istanbul, Turkey

**Background and Goal of Study / Background:** Malnutrition is frequently seen in patients in palliative care centres. Previous studies have reported inadequate nutrition in 20-50% of patients on admission to hospital(1).This shows a tendency of these patients towards malnutrition before hospital admission,and pre-existing diseases can lay the ground for this.The aim of this study was to determine which diseases most frequently accompany a diagnosis of malnutrition in patients in the palliative care centre of our hospital.

**Materials and Methods:** With institutional approval,a retrospective examination was made of the records of all the patients diagnosed with malnutrition (Nutritional Risk Screening (NRS) value  $\geq 3$ ) who received nutritional support in the palliative care centre of our hospital between January 2016 and December 2020.The patients were evaluated in respect of demographic data,NRS values and additional diseases.

**Results and Discussion / Discussion:** Evaluation was made of 1967 patients, comprising 1067(54%) females and 900(46%) males with a mean age of 73 years (range, 13-109 years).In the palliative care patients with malnutrition, hypertension was determined in 806(40.9%), malignancy in 661(33.6%), Alzheimer's Disease or Parkinson's Disease in 450(22.8%), diabetes and/or associated complications in 425(21.6%), cerebrovascular disease in 358(18.2%), dementia in 176(8.9%), heart failure in 174(8.8%), chronic obstructive pulmonary disease in 151(7.6%), kidney failure in 108(5.4%), atrial fibrillation in 99(5%) and epilepsy in 79(4%)(Table 1).

**Conclusion(s):** The results of this study showed that hypertension was the most common comorbidity of malnutrition.This can be attributed to the high prevalence of hypertension in Turkey.The second most common comorbidity was malignancy, which was consistent with the literature. Previous studies have reported a significantly higher risk of malnutrition in patients with malignancy compared to those without (2).Malnutrition was seen in neurological diseases and the following comorbidities, which was similar findings in previous studies (3).Diabetes, like hypertension,is a very common disease in Turkey. It can be recommended that for patients with malignancies and neurological diseases, which can leave them more vulnerable to nutritional deficiencies, malnutrition diagnostic tests should be applied before hospital admission and in the early period when admitted,and thus by determining the nutritional requirement, knowledge of the nutritional status will be useful in providing the patient with sufficient nutrition and preventing malnutrition and complications.

**References:**

1. Lim, Su Lin, et al. "Malnutrition and its impact on cost of hospitalization, length of stay, readmission and 3-year mortality." *Clinical nutrition* 31.3 (2012): 345-350.
2. Derin, Nurcihan Zeynep Altundağ. "Hastanede yatan hastalarda malnütrisyon oranları ve buna etki eden faktörler." (2017)
3. Ongun, Nedim. "Nöroloji Kliniği'nde yatan hastalarda nutrisyonel durumun polifarmasi ve hastane yatış süresi ile ilişkisi." *Pamukkale Tıp Dergisi* 12.3: 467-473.

Table 1. The distribution of comorbidities in palliative care patients with malnutrition

	<b>Patients n (%)</b>	<b>Age Mean (Year)</b>	<b>Male n (%)</b>	<b>Female n (%)</b>
Hypertension	806 (%40,9)	78	574 (%63,7)	232 (%21,7)
Malignancy	661 (%33,6)	67	367 (%40,7)	294 (%27,5)
Neurodegenerative Diseases (Alzheimer or Parkinson)	450 (%22,8)	81	308 (%34,2)	142 (%13,3)
Diabetes and/or Associated Complications	425 (%21,6)	76	323 (35,8)	102 (%9,5)
Cerebrovascular Diseases	358 (%18,2)	78	141 (%15,6)	217 (%20,3)
Dementia	176 (%8,9)	83	105 (%11,6)	71 (%6,6)
Heart Failure	174 (%8,8)	81	127 (%14,1)	47 (%4,4)
Chronic Obstructive Pulmonary Disease	151 (%7,6)	77	87 (%9,6)	64 (%5,9)
Kidney Failure	108 (%5,4)	79	49 (%5,4)	59 (%5,5)
Atrial Fibrillation	99 (%5)	80	31 (%3,4)	68 (%6,3)
Epilepsy	79 (%4)	71	70 (%7,7)	9 (%0,8)
Others	79 (%4)	75	41 (%4,5)	38 (%3,5)
Total	1967	73	900 (%46)	1067 (%54)

**P21****ANESTHESIA IN EPIDERMOLYSIS BULLOSA**Esma Meltem Şimşek

Ankara City Hospital

**Background and Goal of Study / Background:** : Epidermolysis Bullosa (EB) is a rare heterogeneous disease group that has a chronic progression with minimal traumas to the skin and mucous membranes forming bullas and erosion (1). Our purpose was to provide precautions for the use of the central catheter accompanied by Ultrasonography (USI) and for possible difficult intubation to minimize the formation of new bulla in our patient.

**Materials and Methods:** : A 9-year-old girl with ASA III epidermolysis bullosa weighing 18 kg was taken to surgery for splenectomy and esophageal varicose vein ablation. The required preparations were made for difficult intubation, and the patient was intubated under anesthesia induction with 2.5 mg/kg Propofol, 1µg/kg Fentanyl Sulfate, and 0.6 mg/kg Rocuronium. Jugular catheter was inserted with USI to avoid the formation of new bullae due to skin irritation. Invasive arterial catheterization was achieved with one single entry; and 2% Sevoflurane and Remifentanyl 1µg/kg/min infusion were applied in maintaining the anesthesia. After the splenectomy was performed by the surgical team without problems, ablation was performed by inserting Nasogastric Probe (NG) with hydrophilic guiding wire. At the end of the surgery, the patient recovered from anesthesia after extubation without any problems.

**Results and Discussion / Discussion:** : Difficult intubation is predicted in epidermolysis bullosa cases due to the oral opening limitations depending on the scarring and contractures in the corner of the mouth. (1, 2). We also made preparations for possible difficult intubation in our case. We used non-invasive blood pressure measurement only in induction to avoid the formation of bulla, and applied intra-arterial cannulation to monitor the arterial blood gas and blood pressure. Previous studies recommended arterial catheterization in such patients. (2, 3, 4). We were able to achieve catheterization with one attempt in this patient. Esophagus dilatation, gastrostomy or nasogastric nutrition are performed in patients with esophagus stenosis. (2, 3). In our case, NG was inserted with hydrophilic guidewire for esophageal ablation. The patient recovered from anesthesia after a problem-free extubation.

**Conclusion(s):** It is necessary to avoid the interventions that might cause bulla in anesthesia in EB patients. Also, anesthesiologists must be prepared regarding the possibility of a difficult intubation.

**References:**

1. Yangın Z, Erkalp K, Delatioğlu H, İlhan AE, Kökten N. Epidermolizis büllözalı hastada mikrolaringeal cerrahinin anestezi yönetimi: olgu sunumu. *Gülhane Tıp Dergisi*. 2005; 47: 150-2.1.
2. Ames WA, Mayou BJ, Williams KN. Anaesthetic management of epidermolysis bullosa. *Br J Anaesth*. 1999 May;82(5):746-51.
3. Gottschalk A, Venherm S, Vowinkel T, Tübergen D, Frosch M, Hahnenkamp K. Anesthesia for balloon dilatation of esophageal strictures in children with epidermolysis bullosa dystrophica: from intubation to sedation. *Curr Opin Anaesthesiol*. 2010 Aug;23(4):518-22.
4. Karabiyik L, Güngör I, Alp GG, Kaya K. Anesthetic management of epidermolysis bullosa: a review and report of two cases. *Acta Anaesthesiol Belg*. 2009;60(1):51-4.



## P23

### EVALUATION OF THE EFFECTS OF VENOUS CANNULATION SITES ON POSTOPERATIVE DELIRIUM IN CHILDREN: HAND OR FOOT?

Ezgi ERKILIÇ, Tülin GÜMÜŞ, İrem KOCABAŞ, Mecit SANCAK, Orhan KANBAK  
Ankara City Hospital

**Background and Goal of Study / Background:** Choosing an appropriate cannulation site is important for doctors and patients. In our clinical practice, we have observed, agitation and pain were less in the postoperative period when the cannula was inserted site. we aimed to investigate whether the site of the cannula inserted following the induction of inhalation is associated with postoperative agitation and pain in preschool children who would undergo an otolaryngology operation.

**Materials and Methods:** Pediatric patients who would undergo adenoidectomy-tonsillectomy surgery between the ages of 3-7 were included in our study regardless of their genders. The patients have been randomly distributed into the groups (Group E-hand, Group A-foot). The evaluation was performed 0 and 30 minutes after extubation by FLAAC Pain Scala and PAED.

**Results and Discussion / Discussion:** When the hand and foot groups were compared in terms of P0 (PAED 0 min. rating) values, hand group results were statistically significantly higher. Similarly, at the time of P30 (PAED 30. min rating) , The Hand group was determined to be high.

**Conclusion(s):** As a result of the study, we believe that choosing the feet as the cannulation site may be useful in appropriate cases in pediatric patients.

**P26****PNEUMOTORACS RELATED TO SURGICAL TRACHEOSTOMY: RARE COMPLICATION**

Ezgi ERKILIÇ, Yasemin AKÇAALAN, Fazilet ERBAY, Tülin GÜMÜŞ, Orhan KANBAK  
Ankara Şehir Hastanesi

**Background and Goal of Study / Background:** Tracheostomy is a procedure performed to provide long-term airway in patients who are dependent on mechanical ventilation support for various reasons. It may be associated with many complications. The incidence of pneumothorax after tracheostomy is 0–17% in adults. Cases are usually detected by taking a chest x-ray due to clinical suspicion and findings. In this case, we wanted to review a rare serious intraoperative complication of pneumothorax directly associated with open tracheostomy.

**Materials and Methods:** A 67-year-old male patient followed-up with laryngeal cancer was planned to undergo tracheostomy due to the development of tracheal stenosis.

**Results and Discussion / Discussion:** He has a history of hypertension and chronic obstructive pulmonary disease. After the patient was monitored, it was found that the oxygen saturation was 85%. Following preoxygenation, he was intubated with a size 7 tube after anesthesia induction. Then, the saturation increased. Sevoflurane, remifentanyl and air-oxygen were used for maintenance of anesthesia. When the first tracheostomy cannula was inserted with slight force, it was found that the ventilation was poor. Oxygen saturation decreased after the second tracheostomy cannula was placed successfully. When the lung sounds were evaluated, it was found that there were no respiratory sounds in the right lung. When P-A chest radiography was evaluated, an image compatible with the right pneumothorax was observed. A right chest tube was inserted by the thoracic surgeon. The patient, whose oxygenation improved, was transferred to the intensive care unit for follow-up.

**Conclusion(s):** Pneumothorax may occur with direct pleural injury, deep cervical fascia injury, or an alveolar rupture during tracheostomy. When pneumothorax is suspected in a patient under anesthesia, the diagnosis should be made immediately, considering the symptoms and physical examination findings. As in our patient, a patient whose saturation does not improve after tracheostomy should be suspicious of this complication.

**P28****EVALUATION OF THE EFFECTS OF PANDEMIC PROCESS ON EMERGENCY SURGERY PROFILE;  
COMPARATIVE STUDY**

Yasemin AKCAALAN<sup>1</sup>, Ezgi ERKILIC<sup>1</sup>, Handan GULEC<sup>2</sup>, Gizem KAYAN<sup>2</sup>,  
Orhan KANBAK<sup>1</sup>, Tulin GUMUS<sup>1</sup>, Levent OZTURK<sup>2</sup>

1 Ankara Sehir Hastanesi Anestezi ve Reanimasyon Kliniği,

2 Ankara Yıldırım Beyazıt Tıp Fakültesi Anestezi ve Reanimasyon ABD.

**Background and Goal of Study / Background:** We compared the emergency surgery cases received after 16:00 in April-May 2020 during the first wave of Covid 19 after the decision to stop elective surgeries in our country and emergency surgery cases taken after 16:00 in October-November 2019 before the pandemic. We wanted to evaluate whether there was any difference in terms of case distribution, patient profile, anesthesia method and management.

**Materials and Methods:** The files of the patients in the General Operating Room of Ankara City Hospital on the specified dates were evaluated retrospectively. A total of 224 patient files were scanned in October-November and 188 in April-May. In our hospital, only general surgery, plastic surgery, ear nose throat surgery and eye diseases receive emergency cases in the general operating room under seizure conditions. For this reason, cases belonging to these branches were evaluated within the scope of our study. Assessment parameters are age, gender, type of surgery, surgical branch, ASA score, anesthesia type, postoperative exit place, discharge time, postoperative death status, laparoscopic or open surgery selection by scanning the patient files was recorded.

**Results and Discussion / Discussion:** We conducted in the first period of the pandemic, we found a decrease in the number of cases during this period. Particularly, the decrease in the number of ASA 1 patients suggested that surgeons' approach to priority surgery might change. Intubation and extubation in general anesthesia are the leading situations that pose a high risk for transmission during this period. In addition, procedures with high aerosol effect are laparoscopic procedures, bronchoscopy, use of electrocautery, and endoscopic interventions. If general anesthesia is required, the highest level of protection measures should be taken in terms of contamination. If regional anesthesia techniques are suitable for the type of surgical procedure, it should be chosen first. This situation is in line with the anesthesia guidelines recommended in the period when Covid 19 patients are increasing.

**Conclusion(s):** We found that the number of open surgical interventions increased in a statistically significant way during the Covid 19 period. Although there is a worldwide approach to the use of laparoscopic surgery, the use of open surgical techniques has increased in our hospital.



**P29****ISOLATED ACUTE CONVULSIVE SEIZURES ASSOCIATED WITH COVID-19: A CASE REPORT**

Çiğdem KIZILAY, Zehra KOÇ, Tuğçe SOLAK, Ayşe ÖZCAN, Çetin KAYMAK, Hülya BAŞAR

University of Health Sciences, Ankara Training and Research Hospital  
Department of Anesthesiology and Reanimation, Intensive Care Unit

**Background and Goal of Study / Background:** The new type of coronavirus (SARS-CoV-2) spread to other parts of China and then to other countries after it was first seen in Wuhan, China in December 2019.<sup>1</sup> Although the main target of the virus is the respiratory system, it also affects the renal, gastrointestinal system and nervous system.<sup>2</sup> This case report describes the patient who developed a possible COVID-19 related seizure during treatment and follow-up due to COVID-19.

**Materials and Methods:** 49 years-old, hypertensive female patient referred to emergency service with progressive cough and dyspnea. She had confirmed COVID-19 and had received favipiravir for 5 days. Chest CT scan revealed bilateral multifocal peribronchial and subpleural ground-glass opacities. She was admitted to intensive care unit with severe COVID-19 pneumonia. She had a tonic-clonic generalized seizure at the 36th hour of ICU admission. During the seizure, she was also apneic and required mask ventilation. Diazepam 10 mg was administered intravenously, and the seizure was controlled. All vital parameters were evaluated as normal before seizure occurred. In the laboratory examinations, CRP was measured as 39.6mg/L and IL-6 as 35.7pg/ml; other parameters were normal. Cranial CT and MRI was performed after the seizure and reported normal. The patient was consulted to a neurologist and no additional treatment was recommended. No any other seizures were observed during the ICU stay. During the treatment period, she received pulse steroid at a dose of 250 mg iv for 3 days and enoxaparin in addition to Favipiravir. The patient whose complaints regressed was discharged on the 17th day.

**Results and Discussion / Discussion:** In the light of the studies conducted so far, COVID-19 related seizures are rarely seen in patients without a neurological disease background. Since COVID-19 PCR from CSF could not be studied in our center, direct central nervous system invasion of SARS-CoV-2 could not be demonstrated. The increased level of IL-6 seen in our patient supports the systemic inflammatory response. This condition is thought to trigger the seizure.

**Conclusion(s):** Although it is a rare situation, we think that it is necessary to be alert for COVID-19 patients in terms of seizures.

**References:**

1. World Health Organization. Situation Report-51 SITUATION IN NUMBERS total and new cases in last 24 hours. Coronavirus Dis 2019. 2020;2019(February):7. Accessed June 13, 2020. [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200207-sitrep-18-ncov.pdf?sfvrsn=fa644293\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200207-sitrep-18-ncov.pdf?sfvrsn=fa644293_2)
2. Jin YH, Cai L, Cheng ZS, et al. A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). Mil Med Res. 2020;7(1). doi:10.1186/s40779-020-0233-6

**P31****ANESTHESIA MANAGEMENT IN PATIENT WITH SMA TYPE II**

Yasemin AKCAALAN<sup>1</sup>, Ezgi ERKILIC<sup>1</sup>, Mine AKIN<sup>1</sup>

<sup>1</sup>Ankara Sehir Hastanesi Anestezi ve Reanimasyon Kliniği

**Background and Goal of Study / Background:** Spinal muscular atrophy (SMA) is an autosomal recessive neuromuscular disease characterized by weakness and atrophy of the proximal muscles resulting from the progressive degeneration of the anterior horn cells of the spinal cord. Its incidence is between 1 / 6,000-1 / 10,000. In this presentation, we wanted to review the perioperative anesthesia management in patients with SMA based on our case.

**Materials and Methods:** A 14-year-old, 22 kilogram male patient, no consanguineous marriage between the parents. He was diagnosed with SMA Type 2 at the age of 1. He was taken to surgery to remove the instrumentation of the infected scoliosis surgery. In his preoperative evaluation, his spontaneous breathing was comfortable, and O2 support was not needed. There was paraplegic lower extremity, muscle weakness in upper extremity (muscle strength 2/5), severe contractures in both upper and lower extremities. The mouth opening of the patient was within normal limits, the Mallampati score was 2. Cardiology and chest diseases were consulted in the preoperative anesthesia evaluation of the patient. ECO assessment is normal. Chest diseases made suggestions about severe lung restriction due to spine deformity. After necessary monitoring procedures in the operating room, BIS monitoring and vascular access in the appropriate size, anesthesia induction was performed with midazolam, propofol and fentanyl. Entubation was performed with inhalation anesthesia without the use of muscle relaxants. Remifentanyl iv infusion and sevoflurane were used as maintenance. No problem was encountered in the intraoperative period. The patient was extubated without any problem and taken to intensive care unit.

**Results and Discussion / Discussion:** Common surgical interventions in patients with SMA are orthopedic surgeries such as osteotomy, tendon release and scoliosis surgery. Risks in anesthetic management include various problems such as respiratory failure, difficulty in airway management, gastroesophageal reflux, aspiration, increased need for postoperative intensive care, and restrictions in the use of neuromuscular blockers.

**Conclusion(s):** We preferred to use sevoflurane and opioid instead of muscle relaxants. Since it is not possible to present an ideal anesthesia method for patients with SMA, we think that the characteristics of each patient should be evaluated in addition to the experience of the anesthesiologist.

## P32

**PERINATAL ASPHYXIA-OUR EXPERIENCE AND TREATMENT AT  
NEONATAL INTENSIVE CARE UNIT**

Hristina MANDZUKOVSKA, Aspazija SOFIJANOVA, Silvana NAUNOVA,  
Tamara VOINOVSKA, Spasija NESHKOVA, Mica KIMOVSKA  
University Children's Hospital – Skopje, N.Macedonia

**Background and Goal of Study / Background:** Perinatal asphyxia is significant cause of morbidity and mortality in neonates. It is a condition with impairment of blood gas exchange, results in hypoxemia and ischemia, and leading to brain and mental damage.

**Materials and Methods:** In this retrospective study, a total of 315 hospitalized patients, 26 neonates ( 8.2 %), with perinatal asphyxia at Neonatal Intensive Care Unit at University Children's Hospital during the period of 1 January 2019 – 1 January 2021 were included. Inclusion criteria included Apgar Score in first five minutes, requirement of pressure ventilation in delivery room or invasive mechanical ventilation in NICU and confirmation of hypoxic ischaemic encephalopathy (HIE).

**Results and Discussion / Discussion:** Twenty six neonates were included in the study; 11 (42.3%) were females, 15 ( 57.7 %) males, the mean birth weight was 3.820g ( 2400-4320g), and the mean gestational age was 36.7 weeks ( 32.2-40.1). Requirement of positive pressure with bag-mask ventilation in delivery room had 17 neonates ( 65.3 %) and four of them ( 15.3% ) were immediately intubated. After transferd at NICU department, 19 of asphyxiated neonates required invasive mechanical ventilation ( 73%) and 7 neonates (27%) neinvasive respiratory support. In all twenty- six neonates were made neurological examinations and hypoxic ischaemic encephalopathy was confirmed in 6 asphyxiated neonates ( 23%).

**Conclusion(s):** Although post delivery management is improve in last several years, perinatal asphyxia is still the leading cause of neonatal mortality. Long-term follow up of asphyxiated neonates with hypoxic ischaemic encephalopathy is a major challenge and significant issue for every society to improve the approach and treatment of these patients.

**References:**

1. American academy of pediatrics. neonatal encephalopathy and neurologic outcome. 2nd edition, 2014, Washington DC. Available: [www.aappublications.org/news](http://www.aappublications.org/news): accessed on February 11, 2018.  
Rainaldi MA, Perlman JM. Pathophysiology of Birth Asphyxia, New York, USA. Clin Perinatol 2016, 43 (3):409–422.
2. World Health Organization. Newborns: reducing mortality, 2018.  
Available: <https://www.who.int/newsroom/fact-sheet/detail>, accessed on may 2,2018.  
Solayman M HS, Akber T, Islam MI, Islam MA.
3. Prevalence of Perinatal Asphyxia with Evaluation of Associated Risk Factors in a Rural Tertiary Level Hospital. KYAMC Journal 2017, 8(1).

## P33

## COVID-19 INDUCED CEREBRAL ISCHEMIA: A CASE REPORT

Ceren KAÇAN<sup>1</sup>, Kardelen TÜRK<sup>1</sup>, Filiz BİÇER<sup>1</sup>, Ayşe ÖZCAN<sup>1</sup>, Çetin KAYMAK<sup>1</sup>, Hülya BAŞAR<sup>1</sup>

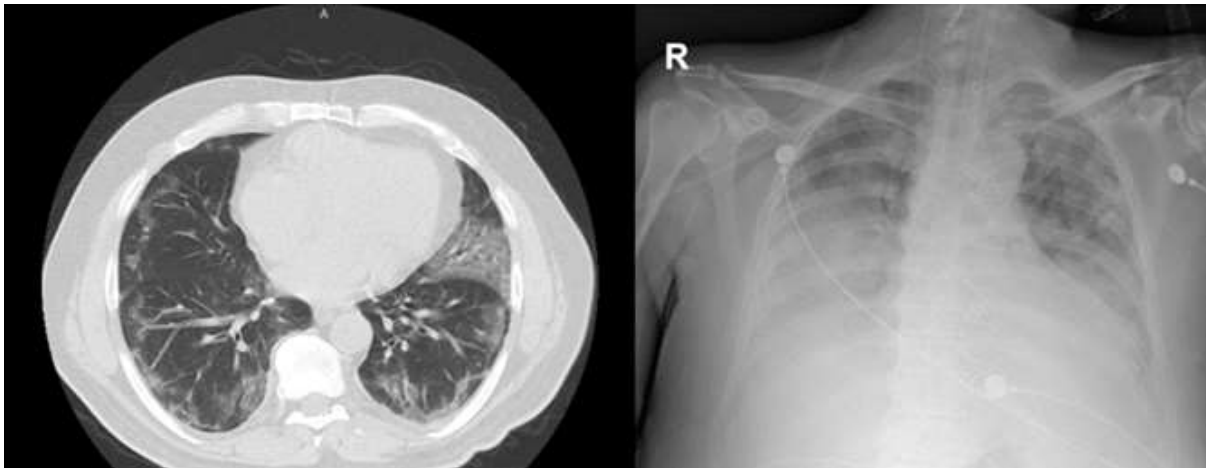
1 University Of Health Sciences Ankara Education And Research Hospital  
Department Of Anesthesiology And Reanimation

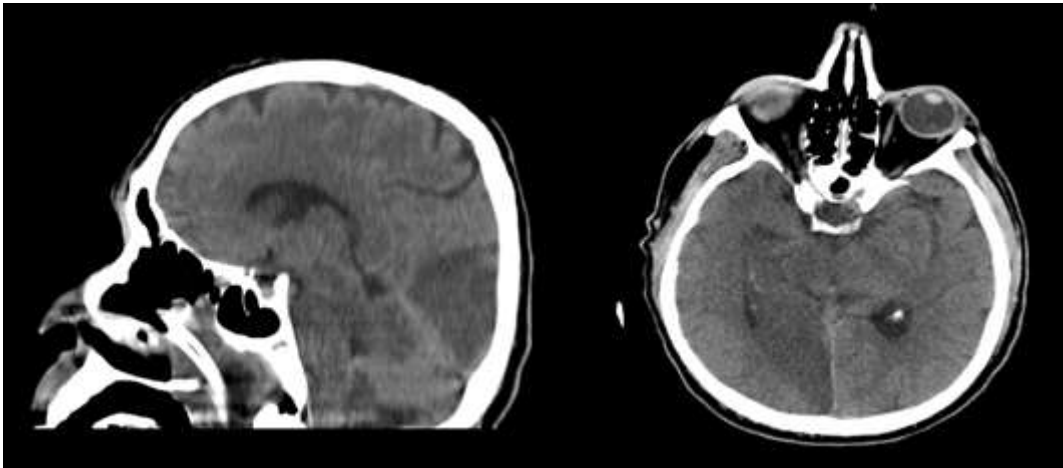
**Background and Goal of Study / Background:** Covid-19 is a disease with primarily respiratory symptoms as well as the disease also effects the other organ systems. Covid-19 can present with serious neurological symptoms. In this case, we aimed to present a patient who developed acute cerebrovascular infarction while being followed up for Covid 19.

**Materials and Methods:** A 68-year-old male patient with known asthma, heart failure, Alzheimer's disease, a history of coronary artery disease and have had CABG operation. He applied to the emergency service with the complaints of dyspnea, fever and myalgia for 15 days. Covid-19 RT-PCR test was positive, in thorax CT, ground-glass areas showing peripheral-subpleural scattered localization were detected.(Figüre 1) The patient saturation was 92% , he admitted to the service. Neurological examination was natural, oriented-cooperative, GCS: 15, d-dimer: 20000µg/L, the other laboratory results are normal, favipiravir, dexamethasone, enoxaparin sodium 4000 IU 1x1 was started. The patient, who developed sudden loss of consciousness on the 5th day of his admission, was unconscious, GCS: 7, was intubated because his respiration was superficial, and was taken to the intensive care unit. It was observed that GCS: 3, pupillary anisocoric and weakened light reflex. Our pre-diagnosis of acute cerebrovascular stroke, the treatment plan was changed to enoxaparin sodium 2x6000IU, acetylsalicylicacid 300 mg. In brain CT, hypodense areas compatible with infarction were observed in the right occipitotemporal hemispheres, more common on the right, in the cerebellar hemispheres and the brain stem, as well as in the basal ganglia, some putamen and the capsule intern (Figure 2).There was no spontaneous respiration on the tenth day, and the patient, whose pupillary was fixed dilated, died on the thirteenth day.

**Results and Discussion / Discussion:** Covid-19 creates a prothrombotic state that causes venous and arterial thromboembolism and high D-dimer levels. Ischemic infarction areas seen in Covid-19 tend to occur generally in large vessel irrigation areas and multiple vessel irrigation areas. Despite prophylactic anticoagulation, cerebral ischemia occurred in our patient, which we think arises because of the elderly and the presence of risk factors.

**Conclusion(s):** During the pandemic process, care should be taken in terms of neurological symptoms that may develop in all patients diagnosed with Covid-19.





## P35

### CASE PRESENTATION: THE NON-ST MYOCARDIAL INFARCTION DURING COVID-19

Meryem GUREL, Ahmet Furkan GUREL, Ceren KACAN, Murat KAYKAC, Ayşe OZCAN, Hülya BASAR

1-University of Health Sciences, Ankara Training and Research Hospital,  
Department of Anesthesiology and Reanimation

**Background and Goal of Study / Background:** Introduction: COVID-19 disease has exhibited cardiovascular effects outside of its course, making the management of critically ill patients difficult(1). In this case, development and management of NSTEMI in COVID-19 severe pneumonia is presented.

**Materials and Methods:** Case: A 64-year-old male patient without coronary artery disease has rheumatoid arthritis comorbidity. In December 2020, Favipiravir treatment is started for the patient who has a positive COVID-19 PCR test. The patient applies to the emergency department as his complaints increase under treatment. While breathing room air, SpO<sub>2</sub>: 90, breath count is 16/min, bilateral ground glass opacities are detected in thorax CT. The patient is admitted to the ICU on the 7th day of his hospitalization, as his need for oxygen increases. HFO (90% FiO<sub>2</sub>, 60 l/min flow), intermittent NIV is applied in lateral and prone positions. ECG of the patient who developed pressure-like chest pain on the 2nd day in ICU, was in normal sinus rhythm, but Troponin-I increased from 3ng/L to 774ng/L and CK-MB from 1mcg / L to 67mcg/L, there was a segmental wall motion abnormality in the left ventricle. With the diagnosis of NSTEMI, medical therapy was started. Cardiac markers are as shown in Table-1. Troponin-I, CK-MB reached peak values at the 3rd hour and decreased to normal values on the 16th day. The patient was transferred to the service at the end of the 20th day.

**Results and Discussion / Discussion:** Discussion and Conclusion: Myocardial damage is common in patients with COVID-19 infection and has been associated with the severity of the disease. In studies, an increase in high-sensitivity cardiac troponin (hs-cTn) above the 99th percentile or new electrocardiographic and echocardiographic abnormalities were defined as myocardial injury. Increased hs-cTn levels are associated with disease severity and mortality in COVID-19 even after controlling for other comorbidities(2). The pathogenesis is explained by severe systemic inflammation causing deterioration and rupture in atherosclerotic plaques in the development of acute MI.

**Conclusion(s):** Conclusion: As a result, it is recommended to monitor 'High sensitive troponin-I and CK-MB' levels in critical COVID-19 patients even if there is no ECG finding.

#### References:

1. Critically Ill Patients with Variable Heart Failure in Severe COVID-19 Disease: A Case Series Integrative Journal of Medical Sciences 2021, Volume 8, 336 DOI: 10.15342/ijms.2021.336
2. Cardiovascular manifestations and treatment considerations in COVID-19 Downloaded from <http://heart.bmj.com/> on March 13, 2021 by guest.

**Table-1:** The patient's cardiac markers by hours and days

CARDIAC MARKERS/TIME	High sensitive troponin I (0-14 ng/L)	CK-MB (0-4,94 mcg/L)
Before MI	3	1.1
0.hour	774	67
3.hour	903	70
6.hour	802	40
24.hour	450	6
2.day	775	2.5
3.day	771	2.2
4.day	309	1.3
7.day	445	1.6
10.day	176	1.8
13.day	181	1.8
16.day	29	1.7
20.day	8	1

**P36****INTUBATION EXPERIENCE IN A CONGENITAL ERYTHROPOIETIC PORPHYRIA CASE**

Mehmet CAKIRCA<sup>1</sup>, Meltem BEKTAS<sup>1</sup>

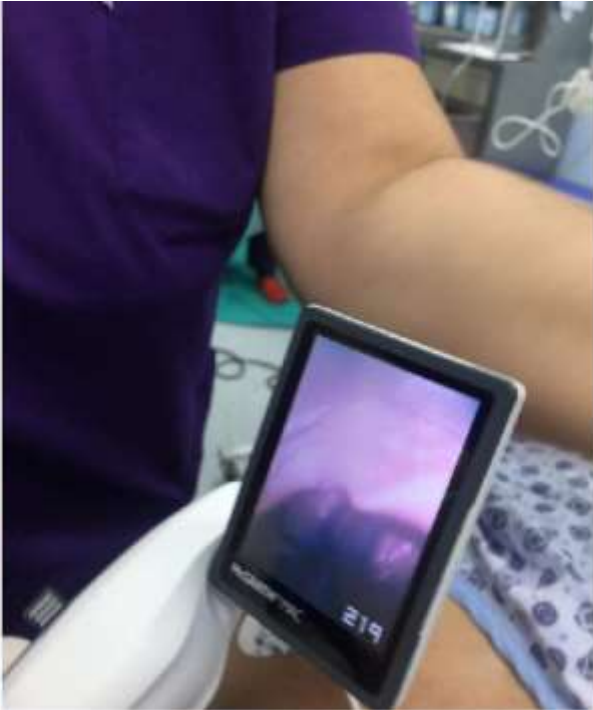
1:University of Health Sciences, Ankara Training and Research Hospital, Department of Anesthesiology and Reanimation, Ankara, Turkey

**Background and Goal of Study / Background:** Porphyrrias are a group of diseases characterized by an enzyme deficiency in the heme biosynthesis pathway, resulting in accumulation of precursor molecules in the tissue. Acute porphyrias affect nervous system while cutaneous porphyrias affect skin. Anaesthetic management is unique due to photomutilation, facial disfigurement making airway challenging, haemolytic anemia, bone demineralisation and porphyric crisis risk. Many anesthetics are metabolized by the P45- cytochromes and may cause acute attacks of porphyria.

**Materials and Methods:** Case A 34-year-old and 45 kg woman with a diagnosis of Congenital Erythropoietic Porphyria (CEP) was consulted for surgery due to evisceration of the eye. She had facial disfigurement and mutilated fingers (Figure 1). She had no additional comorbidity or drug use except porphyria. At initial admission, there was moderate pancytopenia, increased liver function tests, and subclinical hyperthyroidism in routine preoperative laboratory tests. At the pre-anesthetic visit, there was a mouth opening of 2 cm and buck teeth. Modified Mallampati score was 2B. There was no limitation of neck movement and head extension. Induction of anesthesia was performed with 2 mgkg<sup>-1</sup> propofol and 1 mcgkg<sup>-1</sup> fentanyl. Laryngoscopy was performed with the McGrath MAC video-laryngoscope (number 2 blade). Cormack Lahane score was founded as 2. 0.6 mgkg<sup>-1</sup> rocuronium was administered as a muscle relaxant. Intubation was successfully performed with a 5.5 size endotracheal tube (ETT) at the first attempt (Figure 2). Maintenance of anesthesia was provided by propofol 10 mgkg<sup>-1</sup>hour<sup>-1</sup>, 0.1 mcgkg<sup>-1</sup>min<sup>-1</sup> remifentanil infusion and 50% air-oxygen mixture. There were no intraoperative or postoperative complications.

**Results and Discussion / Discussion:** We chose propofol to induce and maintain anesthesia because its safety has been frequently reported. Opioid analgesics have been used without problems in porphyric patients, and the successful use of remifentanil was recently reported.

**Conclusion(s):** Since porphyria may present with physical examination findings suggesting difficult intubation, as in our case, essential preparations should be ready for difficult intubation. In our case, the McGrath MAC Video laryngoscope and 5.5 size ETT were good alternatives for intubation.





**P37****PREVALENCE OF SPINAL ANESTHESIA IN COMPARISON WITH GENERAL ANESTHESIA FOR CESAREAN SECTION IN COVID-19 POSITIVE PATIENTS OF THE UNIVERSITY CLINIC OF GYNECOLOGY AND OBSTETRICS, SKOPJE**

Slobodanka SIMEVSKA<sup>1</sup>, Aleksandra PANOSKA<sup>1</sup>, Dafina KARADZOVA<sup>1</sup>, Frosina NIKOLIKJ<sup>1</sup>

1 University Clinic for Gynecology and Obstetrics, Skopje, Republic of North Macedonia

**Background and Goal of Study / Background:** The goal of this study is to show the prevalence of spinal anesthesia compared to general anesthesia in C-section in covid-19 - positive mothers at the University Clinic for Gynecology and Obstetrics – Skopje, the only covid center for mothers in our country, in the period March 2020 - March 202<sup>1</sup>, as well as to explain the indication for general anesthesia in them.

**Materials and Methods:** Data was taken and processed from UC OB/GYN - Skopje in the period March 2020 - March 2021.

**Results and Discussion / Discussion:** During this period, a total of 173 C-section interventions were performed in covid- positive mothers, of which 168 (97.11%) in spinal anesthesia, 5 (2.89%) in general anesthesia. It is common knowledge that spinal anesthesia is the anesthesia of first choice for covid positive mothers due to the reduced risk of transmission of the virus to healthcare professionals as well due to the reduced risk of lung complications of the mother. At our clinic we had 5 indications for general anesthesia, one of them was due to thrombocytopenia (PLT = 36), two of them for receiving large doses of LMWH (2mg / kgTT) less than 8 hours preoperatively and in 2 patients who due to extremely severe general condition were brought to our clinic intubated for early surgical termination of pregnancy in favor of the mother. Intraoperatively patients with spinal anesthesia were significantly more stable.

**Conclusion(s):** Most of the C-sections of our clinic in covid positive mothers are performed under spinal anesthesia, which is in accordance with world standards.

/

**P39****DETERMINATION OF THE ANXIETY LEVEL IN THE CASES TO BE COLONOSCOPY UNDER ANESTHESIA**

Dilruba GÜNGÖR<sup>1</sup>, Gamze SARKILAR<sup>2</sup>, Tuba Berra SARITAŞ<sup>3</sup>, Funda GÖK<sup>2</sup>, Sema TUNCER UZUN<sup>2</sup>

1: Erzurum Bölge Eğitim ve Araştırma Hastanesi

2: Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi

3: Afyonkarahisar Sağlık Bilimleri Üniversitesi

**Background and Goal of Study / Background:** We aimed to measure preoperative anxiety levels in patients who underwent elective colonoscopy, determine the causes of anxiety related to anesthesia/procedure, and the association of demographic factors with anxiety levels.

**Materials and Methods:** The study was performed prospectively and randomly in 130 adult patients aged 18-75 years undergoing elective colonoscopy under sedation/analgesia in the endoscopy unit. Before the procedure; demographic properties were recorded. The Standardized Mini Mental State Examination (SMMT) was used for cognitive functions. Anxiety scores were evaluated based on parameters such as gender, age, marital status, education level, number of children, smoking, alcohol use, colonoscopy experience, ASA and previous anesthesia experience. The anxiety were evaluated with The State-Trait Anxiety Inventory (STAI-<sup>1</sup>, STAI-2) and Amsterdam Preoperative Anxiety and Information Scale (APAIS). APAIS-A (anesthesia), APAIS-S (surgery), APAIS-C (total) and APAIS-I (information) were calculated.

**Results and Discussion / Discussion:** Severe cognitive impairment was found in female gender, advanced age, and non-working patients. In STAI-1; gender, age, occupation, smokers and STAI-2; gender, occupation, and smokers were different. While there was no difference in APAIS-C, APAIS-I differed according to age and marital status. We found high levels of anxiety in women, nonworking, and nonsmokers. Young and unmarried people wanted to be informed more. Baseline heart rate and diastolic blood pressure were higher in severe anxiety ( $p < 0.05$ ).

**Conclusion(s):** Woman and non-working patients undergoing colonoscopy under monitored anesthesia care seem to be a patient population that needs more attention due to high anxiety scores. Thus, in this population, the prevalence of colonoscopy practices and patient acceptance may increase. About 50% of our patients had anxiety. In such outpatient operations that are not related to direct airway, the placebo effect of cigarettes may have reduced anxiety. Both STAI and APAIS may be preferred as easy and practical tests to assess patient anxiety before the procedure. More care should be given to inform young and single patients.

**P40****TREATEMENT OF COVID-19 COMPLICATIONS AT HOME CONDITIONS: A CASE REPORT**

Saimir Kuci<sup>1</sup>, Alfred Ibrahim<sup>1</sup>, Ervin Bejko<sup>1</sup>, Stavri Llazo<sup>1</sup>,  
Marsela Goga<sup>1</sup>, Ermal Likaj<sup>2</sup>, Andi Kacani<sup>2</sup>, Alket Collaku<sup>3</sup>, Diana Dhimitri<sup>3</sup>

1.Cardiac Anesthesia Department "Mother Teresa" University Hospital Center Tirana

2.Cardiac Surgery Department "Mother Teresa" University Hospital Center Tirana

3.Radiology Department German Hospital International Tirana

**Background:** In COVID-19 deep airway and alveolar destruction occurs due to inflammatory reaction resulting into severe pneumonia. In COVID-19, lung injury is not only due to viral damage to the tissues, but it is also due to the immune response that leads to activation of inflammatory cells and release of cytokines. In COVID-19, acute respiratory distress syndrome ARDS is produced due to mucinous or cellular fibromyxoid exudates, desquamation of pneumocytes and alveolar damage and hyaline membrane development.

This paper reports the clinical characteristics, diagnosis, and treatment of myself after being infected with Covid-19. After comprehensive treatment including nasal cannula oxygen therapy, antiviral and anti-infection therapies, liquid volume management, glucocorticoids, analgesia and sedation, blood tests control, anticoagulation and thrombus prevention, and electrolyte balance maintenance, after 24 days finally my health situation was good. The purpose of this case report is to provide a reference for the clinical diagnosis and treatment of myself, in home condition in this critical situation.

**Discussion:** The decision to start favipiravir was based on the use of favipiravir in some infected colleagues a few months ago, with moderate pulmonary involvement. These patients did well, had no aggravation of the pulmonary situation and were treated at home, although they had moderate forms of pulmonary involvement. We decided to use methylprednisolone based on our experience with two patients who underwent heart surgery with valvular problems and CABG which were infected with coronavirus. Starting methylprednisolone at a dose of 250 mg /d significantly improved the pulmonary radiological repertoire and significantly affected the good performance of these two patients by extubation after 7 days.

**Conclusion:** It should be noted that the situation I passed through was very difficult, viral pneumonia and bacterial overgrowth were important and the pulmonary situation could worsen. I think that aggressive treatment with the antiviral (Favipiravir) methylprednisolone, strong IV antibiotics, and pulmonary gymnastics prevented this situation from getting worse.

## P41

### ARTERIAL THROMBOSIS IN COVID 19 PATIENT

Dr.ErvinBejko, Dr.EsmerildaBulku, DrStavriLlazo, Dr.JonelaBurimi,Dr. AlfredIbrahimi, Dr.SaimirKuci  
Mother Teresa" University Hospital Center Tirana

**Background:** COVID -19 it is associated with deferent thrombotic events .

There is still to understand the mechanism of thrombotic events.

**Case Report:** We report the case of a COVID-19 patient admitted for pneumonia who developed arterial thrombosis 7 days after dehospitalisation,without a predisposing source of embolism.

**Discussion:**Our patient 69 years old male had passed covid-19 disease in moderate to severe situation,He was hospitalized for 15 days and after 7 days in home he presented to emergency room,Physical examination was concerning for absent dorsalis pedis and posterior tibial (PT) artery pulses in his left foot, which was cooler than his contralateral foot and with a necrotic aspect. He was found to have no sensation in the plantar aspect.Vascular surgery was consulted and angio ct was done.After spinal anesthesia the amputtion was performed.

**Conclusion:** Covid-19 it is not only pulmonary disease,but systemic and most importantly a vascular one

Anesthesiology Reanimation Specialists' Society

**ARUD2021**

**BALKAN STATES ANESTHESIA DAYS - VII**

