

ARUD - Anaesthesiology and Reanimation Specialists Society
MSA - Macedonian Society of Anaesthesiologists and Intensive Care Medicine

BOOK OF PROCEEDINGS AND ABSTRACTS

**ORTHOPEDIC ANAESTHESIA AND INTENSIVE CARE
Anaesthesiology and Reanimation Specialists Society
Balkan States Anaesthesia Days III**

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Dear colleagues,

It is a great pleasure for us to invite you to "Balkan States Anaesthesia Days III" which will take place during 18-21 May 2016 in Skopje/Republic of Macedonia. We, as Anaesthesiology and Reanimation Specialists' Society (ARUD), have decided to organize our 2016 Congress together with Macedonian Society of Anaesthesiologists and Intensive Care Medicine (MSA) after our previous "Balkan States Anaesthesia Days" in Prishtina/Kosovo and in Tirana/Albania aroused great interest.

Republic of Macedonia, which has a cultural heritage, a nature embodying every shade of green, and a delicious cuisine, is a little land of fairy tales in the middle of the Balkans.

Our topic is "Orthopedic Anaesthesia and Intensive Care". Handling our topic in a wide perspective, we will have the chance to discuss, interview, exchange information and share our experiences not only between Turkey and Republic of Macedonia, but among all the participants from Balkan States. In addition, we will consolidate our practical knowledge through the workshops.

We are aiming at organizing a Congress which is both socially satisfying and scientifically enriching.

We look forward to seeing you in Skopje to have an energetic and serene Congress.

Prof Meral Kanbak, MD

Andrijan Kartalov MD, PhD

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Proceedings

A STORY OF MACEDONIAN POPPY FLOWER

(From flower to science)

Marija Sholjakova,

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Why a story about the Macedonian Poppy flower? First of all, because the poppies are very beautiful flowers that exist in the main colors of my country (red and yellow). Second because throughout the ages it was the main crop planted in the country and the third, that it is connected with the development of our profession.

History of the poppy flower in the Republic of Macedonia

It is believed that Poppies originated in the Mediterranean region and southern Asia. They are now spread throughout the world and exist in 11 different types, families and subfamilies, in different colors. Very rare species could be found in North America, Mexico and South Eastern Europe. They are mostly annual plants, but some species are biennial or perennial.

According to the documents, Macedonia was not the native country of the Poppy, and information on the origin of the crop is unreliable.

The appearance of the species of the opium poppy (*Papaver somniferum*) in Macedonia is connected with the invasion of the Ottoman Empire of the Balkan peninsula (second half of the XIV century).

Poppies in Macedonia are herbaceous annual plants. Even though *papaver somniferum*, was mainly grown in eastern and southern Asia it thrived in Macedonia (southwest Europe) as well.

It can be found in Macedonian fields in many species-es and colors.

Opium poppy belongs to the family *Papaveraceae*. In Macedonia, it was first planted in the region of Kochani. Climate is an important factor for cultivation of the opium poppy. This region has mild and damp winters, sometimes with a covering of snow, and a rapid transition to a very hot and dry summer. Surprisingly the climate in Macedonia was very appropriate and the plants grew well. Very soon, the plantation of the opium poppy became the main industrial culture for the farmers in the country. One field (plant-age) with poppy was sufficient to support and nourish a 10 persons family. The farming was liberal and without any regulation. The farmers cultivated opium poppies mainly for production of the latex (katran) which was very valuable and got good price in the western countries. The farmers and the other population of the country were less informed that the poppy is the source of the crude drug opium. The local population mainly used the seed of the opium poppy for home production of oil and for cooking (pastries). The production of medical alkaloids from poppy was

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unknown for the farmers. There are some known facts about the home use of poppy seed in Macedonia. For ages it was traditionally used as re-media in the form of tea. It was known that such solution can calm stomach pain, babies' cry and can be used for pain relief. Even though in the country the farming of the opium poppy was popular, its use for fun, recreational purposes or abuses were not common.

There are certain documents where it is noted that the cultivation of opium poppy in Macedonia on a large scale existed already in about 1850. This is the period between the First and Second Opium Wars among China, the British Empire and France (1830s through the early 1860s) regarding the opium trade. The period after the end of XIX-th century until the beginning of the XX century was marked with an enormous increase of the use of the opium derivatives (morphine and its salts) for abuse.

This was the reason why during the period the first measures for limitation of the growing of the plants of opium poppy were established. In February 1909 World experts met at the first International Opium conference in Shanghai, China, but it was without any success. After this, several other conferences were organized. On January 23 1912 at the Opium Conference that took place in The Hague, the first Opium Convention was established. Since then, morphine, cocaine and their salts were recognized as dangerous drugs that should be produced only for medical purposes. The following period was full of regulations and the annex to the first Convention. All of them had the goal to put the production of the opium derivatives under control, with its primary use in medicine.

In 1931, the Kingdom of Yugoslavia signed the Geneva Opium Convention, what limited the plantation of the opium poppy in Macedonia. Those regulations caused a disaster in the Macedonian production of opium. The price of the opium became very low and the plantations of poppy flowers on Macedonian fields decreased drastically.

Manufacturing opium

This period of time in Macedonia is characterized with the start of the first manufacturing of opium for medical purposes. The quality of the extracted opium was with 17% of morphine; that put the Macedonian opium in the first place globally (f. ex Turkish opium has 14% morphine).

The cultivation of Opium poppy continued in several districts of the Republic of Macedonia - namely, Bitola, Kumanovo, Skopje, Shtip and Veles. Cultivation was most intensive in the Shtip, Radovich and Titov Veles districts, which usually produce more than 80 per cent of the Macedonian output, even today.

Poppy seeds are used for cooking, salad dressing oil, pastry or in other products.

In 1932, the private ownership of the family Ognjanovich started the first manufacturing of the opium poppies to opium. Their main business was making opium alkaloids, respectively morphine base extractions and its synthesizing to codeine. Today it grew into the pharmaceutical factory Alkaloid AD Skopje.

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Due to the specificity of its production, during its first years after the II World war, the factory had a treatment of a capacity with special significance and was under direct jurisdiction of the Main Directorate for Medical Production in Belgrade.

Today the opium poppy is cultivated and its production is monitored by international agencies. It is used for production of the principal precursor of narcotic and analgesic opiates. The industrial production of morphine hydrochloride of 4 mg, 20 mg and 100mg is widely used in medicine, especially in anesthesiology for postoperative pain treatment and pain relief.

The analgesic and narcotic medical properties of opium in form of morphine and its derivatives have been used for a long time, but the discovery of the narcotic receptors in the spinal cord opened a new epoch in the postoperative pain relief. Today modern anesthesiology and pain treatment are based on the use of opioid.

The possibility for local production of morphine had many advantages for the members of the Macedonian society of anesthesiology, because their practice is not dependent upon the import of the drugs. This fact facilitated the work of the Macedonian anesthesiologists in many critical situations.

In addition, Macedonian medical workers and anesthesiologist are among the first that promoted the use of morphine and its derivatives in cardiology and palliative medicine.

Inspiration

Images of opium poppies have been found in ancient Sumerian artifacts (circa 4000 BC). The beauty of the poppy flower and its effects was inspiration for many painters. The poppy fragments can be found in the mosaics, frescoes and ornaments of the old Macedonian churches or mosques. The famous Macedonian painters Lazar Lichenoski, Vangel Naumovski, Milosh Kodzoman, Rubens Korubin and others were inspired from the poppy flower and are authors of several beautifully paintings.

"Many modern writers, particularly in the 19th century, have written about the opium poppy and its effects, notably Thomas de Quincey in *Confessions of an English Opium Eater*". The beauty of the flower and the hard work on its plantation was inspiration for two Macedonian poets who wrote poems dedicated to the "Afioni" (Kosta Racin and Venko Markovski).

The visional effects of opium as inspiration was used by the French composer Hector Berlioz, to compose his *Symphonies Fantastic*.

Symbolism

The Flag

Poppies have for a long time been used as the symbol for both sleep and death. Also, the Poppy is red in color which also symbolizes the characteristics of the Macedonian state. The Macedonian poppy flower became a symbol for free-

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dom and independence. The red color of the most commonly found poppies in Macedonian fields is the base of the national flag of the Republic of Macedonia. It represents the blood of the Macedonian soldiers for its independence. The yellow color represents the sun that helps to grow the poppies, and in the same time is a symbol of freedom and independence.

The poppies had also a remarkable place in the national Coat of Arms of R of Macedonia. The Coat of Arms of Macedonia became a symbol of the origination of the Macedonian identity, and the poppy flower is part of it. This is a symbol that represents the richness of the country, and the national struggle for freedom. The sun above the Shar mountain and the waters of Ohrid lake are bounded with the ears of wheat, the tobacco leaves and the poppy plant, the most important crops in Macedonia.

After the World War 1 the Poppy flower became a symbol of remembrance of the victims and soldiers who have died during wartime. It is said that it was the most deadly war with so many victims whose number can be compared with the number of poppies on the fields in Flandria. That is why on this remembrance day (November 11, 1919), the countries of Commonwealth put the red Poppy flower on their jackets.

The poppies became the symbol of peace and analgesia, and a symbol of anesthesia. In 1960 the Yugoslav Association of Anesthesiologists with an acclamation choose the Capsule of opium poppy as a Coat of Arms of YUARIL. In 1990 after the independence of the RM from YU theMacedonian Society of Anesthesia was established. As a continuum the Opium poppy was chosen as a coat of Arms. The design was stylized and computerized by Dr. Zvonko Krstevski.

Anesthesiology in Macedonia

The data about the real start of the practice of anesthesia in Macedonia are very obscure. We couldn't find any written document when it really started. There are some data that state that the first anesthesia performed in the Balkans was given in 1847 by the dentist Doctor Betini from Zadar (Croatia). It was only two years after the first anesthesia given in the world. Otherwise, the surgeons in old Ottoman Empire and in Macedonia, as a part of it, were very well educated for application of local or regional anesthesia.

Between the two World Wars Macedonia was a part of the Kingdom of Yugoslavia and the anesthesia procedures continued to be given by the surgeons. The documents (pictures) enclosed to the MSA by the doctors from the Hospital of Shtip, show that in the beginning of the XX century in their hospital the operations were performed under anesthesia. Probably morphine was used.

After World War 2, the widespread development of anesthesia started. Immediately after the end of the war, in Macedonia the first courses for medical technicians who were educated to perform anesthesia under the supervision of the surgeons were organized. The choice of ether as an inhalation anesthetic was crucial even in the hands of those incompletely trained medical technicians.

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In 1946, through the United Nations Relief and Rehabilitation Administration (UNRRA) Yugoslavia received aid in medical personnel and equipment (Forreger anesthesiology equipment of American origin-).

Dr. Patrick Shackleton and Dr. Rasel Davis from Great Britain came to Yugoslavia and organized the education of the first group of Yugoslav doctors in the field of anesthesiology. Among the educated doctors was Dr. Risto Ivanovski a remarkable figure responsible for development of anesthesiology in R. Macedonia and Croatia. From 1954, Dr. Ivanovski practiced anesthesia in the Military Hospital in Skopje. He was the first educator of the Next Macedonian anesthesiologists and organized the modern surgical and anesthesiology service in Macedonia. Dr. Gjurgja Klajic from Croatia also has an important role in the beginnings of anesthesia in R. Macedonia. She, with Dr. R. Ivanovski, in 1956 performed the first end-tracheal intubation for general anesthesia. The most important person in the development of anesthesiology as a science in R. Macedonia is Prof. Dr. Vladimir Andonov. He started to practice anesthesia in 1965 and later provided major contribution to the development of anesthesiology service and education of professionals in this area. Under his supervision the first Intensive Care Unit in Republic of Macedonia was developed, in which there were used sophisticated artificial ventilators. The modern Intensive Care Department was opened at the Surgical Clinic in 1993 and it was followed in other hospitals in the country. Through his effort at the Medical School at the University „Ss Cyril and Methodius“ in Skopje the Chair of Anesthesiology (1975) was established. It has made a huge contribution to the education of professionals who apply modern principles in emergency medicine and intensive care. From the year 2000, Anaesthesiology became an regular subject in the education of the medical students at the medical school at UKIM, Skopje.

The continuity of having professional progress has been retained after the independence in 1990, when Republic of Macedonia became an independent state. The existing Section of Anesthesiology as a part of the YUARIL has been transformed into the Association of Doctors of Anesthesiology, Reanimation and Intensive Care (MSA). Prof. Dr. Jordan Nojkov was elected as the first President of the Association (1990-1998). Immediately after the independence (1990), on a meeting in London, with a help of the President, Johan Zoreb, MSA was admitted as a full member of the World Federation of Anesthesiology Associations (WFSA) and in the next year as a member of the World Society for Intensive Medicine (WFSICCM).

In 1985 the number of members in the Macedonian Society of Anesthesiology was 100 and today it exceeds 250.

The Poppy flower still remains as a symbol of our profession.

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BLOOD MANAGEMENT STRATEGIES IN VERTEBRAL SURGERY

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Introduction. Blood loss during scoliosis surgery has always been a primary concern for surgeons. Excessive blood loss slows down the operation and increases the risks for the patient. Excessive blood loss requires replacement. The risk of diseases transmissible by blood transfusion such as autoimmune deficiency syndrome (AIDS) and hepatitis. It is important to minimize the need for allogeneic blood transfusions. By combining surgical and anesthetic techniques that minimize blood loss with the use of autotransfusions, it is now possible to complete a routine posterior spinal fusion without using allogeneic blood transfusions (1, 2, 3, 4).

MECHANISMS OF BLOOD LOSS DURING SCOLIOSIS SURGERY

While good surgical technique is essential to minimize blood loss, even the most careful spinal surgeon may find a wide variation among patients in volume of blood lost during what appears to be a standardized procedure. The surgeon's role in controlling blood loss begins with selection of the appropriate operation for a given patient. Because blood loss generally increases as operative time increases the time necessary to properly install a spinal instrumentation system must be weighed against its advantages. When the patient is lying prone, the intraabdominal pressure is increased, resulting in vena caval compression that increases the pressure in the venous channels around the spine (Batson's 'plexus'). This can cause increased bleeding during exposure of the spine. Positioning the patient on a device that allows the abdomen to hang free, such as the Relton and Hall frame avoids the increase in intraabdominal pressure that leads to compression of the vena cava.

Infiltration of the skin and subcutaneous tissue with a dilute (1: 500, 000) solution of epinephrine has been recommended to reduce bleeding by producing local vasoconstriction.

Subperiosteal dissection avoids tearing the numerous vessels in the surrounding muscle and greatly reduces bleeding. Bleeding from bone can be difficult to control but can be minimized by the use of topical hemostatic agents and thrombin solution have been suggested.

The common donor site for autogeneic bone graft from the iliac crest, can be a major source of bone bleeding. The primary area of bone bleeding during scoliosis surgery is the spine itself. Excision of the facet joints and laminar de-cortication add to intraoperative blood loss, but also increase the likelihood of a

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successful arthrodesis, the primary goal of the procedure. Decortication should be performed as late in the procedure as possible to minimize the time of uncontrollable bone bleeding and allow visualization of the wound for as long as possible.

AUTOTRANSFUSION

If a patient is going to receive a blood transfusion, the safest blood is the patient's own-autotransfused blood. Two commonly used methods are preoperative collection and preservation of a patient's blood and intraoperative salvage of blood lost in the wound. Preoperative collection of autogeneic blood requires that the patient donate blood that is preserved and refrigerated just like allogeneic blood. At the authors' institution, patients are allowed to donate one unit per week until ten days prior to surgery. Because a new preservative, citrate phosphate dextrose with adenine (CPDA-1), allows a shelf life of up to 35 days, typically three units can be obtained in the month before surgery. Patients are put on supplemental iron to keep the hematocrit above 30% to allow these donations. No special equipment is needed to collect autogeneic blood beyond the resources of a blood bank. It has recently become the policy of the authors' blood bank to allow parents and other family members to donate blood designated for a certain patient.

Intraoperative recovery of lost blood entails recovery of the drainage from the suction bottles. The red cells are filtered, washed, and concentrated and then reinfused in to the patient. The Cell-Saver system (Haemonectics,) is the most widely used of the several commercially available machines designed for this purpose (5). The cost of the special equipment and of the technician necessary to run it has perhaps limited its use.

Both autotransfusion methods are limited in the amount of blood that can be replaced. Intraoperative blood recovery systems can recover about 50% of the lost red cells. (4, 5) Donations for autotransfusion are limited by the effectiveness of the preservative, although in special circumstances it is possible to freeze blood for up to three years. Highly effective therapeutic regimen with a single weekly intravenous administration of human recombinant erythropoietin (rHu-EPO) for preoperative autologous blood collection in patients is very practical and comfortable. Blood substitutes such as fluorocarbon compounds or stroma-free hemoglobin are still experimental. If too much blood is lost, allogeneic transfusions will still be needed.

THE ROLE OF THE ANESTHESIOLOGIST IN CONTROLLING BLOOD LOSS

In a broad sense, the surgeon's control of blood loss is related to his skill in controlling the number and size of bleeding points and how long they stay open. Because bleeding from bone is unavoidable, the surgeon's ability to control blood loss is limited. The only thing the surgeon can do is to operate faster. The anesthesiologist controls blood flow, or how fast blood is lost through the open vessels. Two major techniques used by anesthesiologists to control blood loss are hemodilution and induced moderate hypotension.

Hemodilution decreases the loss of red cell mass by reducing the hematocrit of the blood lost

intraoperatively. The patient is phlebotomized in the operating room and several units of blood are removed and preserved. Circulating volume is maintained by crystalloid replacement. The operation is performed at normal blood pressure. At the end of the procedure, the patient is diuresed of excess fluid and her own blood is retransfused. Despite the lower oxygen-carrying capability of the blood, the decreased viscosity of the diluted blood allows better tissue perfusion so tissue oxygenation is maintained. Good results have been reported with hemodilution. Although commonly referred to as hypotensive anesthesia, these techniques are actually directed at reducing the left ventricular stroke work index. Arterial blood pressure is a relatively convenient way of assessing the patient's hemodynamic status, although as previously noted, it is not necessarily the best overall measure of hemodynamic status.

A major concern about hypotensive anesthesia during scoliosis surgery has been the potential for increasing the risk of spinal cord injury. It was feared that hypotensive anesthetic techniques would leave a narrower margin of safety due to reduced spinal cord blood flow. With reduced spinal cord blood flow, an insult to the spinal cord such as distraction or invasion of the spinal canal could be more likely to cause a neurologic deficit.

A growing body of evidence suggests there is little if any increased risk of neurologic injury with hypotensive anesthetic techniques. Several investigators have demonstrated that spinal cord blood flow can be autoregulated independently of systemic blood flow under controlled hypotension. Somatosensory evoked potentials (SEP), a noninvasive means of intraoperatively assessing spinal cord function, have been shown not to change significantly with moderate hypotension than distraction of the spine at normotension.

The anesthesiologist has several alternatives to produce hypotensive anesthesia. High levels of sevoflurane can produce hypotension and reduce blood flow by acting as a vasodilator, decreasing systemic vascular resistance, and by a direct inhibitory effect on the myocardium, decreasing cardiac output. Like most inhalation agents, sevoflurane anesthesia makes it impossible to do SEPs intraoperatively (1) and to safely and reliably perform a wake-up test. This makes sevoflurane less attractive for routine use in scoliosis surgery. Balanced anesthesia with nitrous oxide supplemented with narcotics has become popular. This anesthetic technique allows intraoperative spinal cord monitoring and is easily reversed to perform a wake-up test. Reduction of blood flow can be obtained by using intravenous hypotensive agents. The agents most commonly used are sodium nitroprusside, trimethaphan, nitroglycerine, clonidine and dexmedetomidine. One or more of the hemodynamic parameters had changed; and volume of blood loss correlated most closely with left ventricular stroke work index (LVSWI), a measure of blood flow. Because LVSWI is computed from systemic vascular resistance, cardiac output, and heart rate, an increase in cardiac output at a constant blood pressure, even at hypotensive levels, would increase LVSWI

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and increase blood loss. With induced hypotension, increases in cardiac output were mediated by increased activity in either the autonomic nervous system, the renin-angiotensin system, or both.

With a significant increase in the number and complexity of spinal deformity corrective surgeries, blood loss, often requiring massive intraoperative transfusions, becomes a major limiting factor during surgery. This scenario is particularly during posterior vertebral column resection (PVCR), where extensive intraoperative blood loss may pose a major risk to the patient, preventing smooth execution of the procedure. Tranexamic Acid (TXA) has been used in major spinal surgeries, to reduce blood loss and transfusion requirements for decades. Before skin incision, the patients in the TXA group received an intravenous loading dose of 100 mg/Kg over a 20-minute period, followed by a maintenance infusion of 10 mg/Kg/h until skin closure was completed. There were no differences in liver and renal functions between the TXA and control groups. There was no lower limb vein thrombus, symptomatic myocardial infarction, symptomatic pulmonary embolism, seizures, or acute renal failure reported in the TXA group. In this study, high doses of TXA have been shown to effectively control blood loss and reduce the transfusion requirement (6, 7)

Patient blood management strategies in vertebral surgery is a multidisciplinary approach and the efficacy of most single measures has been shown. The benefits of long-term patient outcomes are the subjects of current and future research.

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CONTINUOUS REGIONAL ANESTHESIA IS SUPERIOR TO SINGLE SHOT TECHNIQUE

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Introduction

Acute postoperative pain is one of the major challenges to the anesthesiologist. Several issues are postoperative pain related, reflecting the importance of the adequate pain treatment. Multimodal pain treatment is the modern concept. Combining different analgesic drugs and different administration techniques is important to increase the efficacy and to reduce their side effects. Systemic analgesia, neuroaxial analgesia, and peripheral nerve blocks are the reported techniques.

Acute postoperative pain is associated with a increased neuroendocrine stress response. This stress response is mediated by inflammatory substances due to tissue trauma and the activation of hypothalamic-pituitary-adrenocortical axis and finally a sympathetic response. All these pathphysiologic changes can lead to increased catecholamine levels and catabolic hormones as cortisol, antidiuretic hormone, aldosterone, renin etc. It is recently reported that stress response can lead to water and salt retention, hyperglycemia, increased fatty acids, and lactate production. Other detrimental effects are immunosuppression, increased coagulation, and poor wound healing. The preexisting diseases as diabetes, coronary artery disease, hypertension, or another end-stage organ dysfunction can be further deteriorated.

Chronic postoperative pain is associated with immobility, decreased patient recovery and rehabilitation, higher public service costs, and poor life quality. Poorly acute postoperative pain control can dramatically induce chronic postsurgical pain.

The hallmarks of multimodal approach include adequately pain control, fewer side effects, and early patient mobilization. Major advantages of a multimodal pain control are: better pain control, fewer side effects, less stress response, decreased morbidity, shorter hospital stay, and improved patient satisfaction.

Neuroaxial blockade and peripheral nerve blocks can blunt the local and systemic stress response and provide adequate pain control. This paper will be focused on the potentially advantages of continuous regional anesthesia/analgesia to the single shot technique.

Regional anesthesia/ analgesia a suitable choice

Neuroaxial blockade and peripheral nerve blocks seem to be a suitable choice in anesthesia daily practice and of course in postoperative pain control. These techniques can offer several advantages as reduced cardiovascular complications, less respiratory postoperative deterioration, decreased rate of deep venous thrombosis and pulmonary embolism, and an excellent postoperative pain control. Several controversies exist regarding the epidural approach and the current literature sustains the efficacy on pain control. Thoracic epidural anesthesia/analgesia seems to be much more effective than lumbar approach in reducing postoperative complications. Nevertheless adequate pain control is the prominent advantage of epidural technique. The anesthesiologist's skills are important in reducing the epidural/spinal route side effects as hypotension, bradycardia, respiratory depression, pruritus, postoperative nausea and vomiting etc. The systemic administration of anesthetics/analgesics is effective but associated with side effects as well. These side effects include hemodynamic instability, respiratory depression, over-sedation, postoperative ileus, increased incidence of postoperative nausea and vomiting, and urinary retention. It is recently reported that neuroaxial route can reduce the opioid requirements providing excellent analgesia. Neuroaxial route can be single shot or continuous administration through catheter insertion.

An interesting choice remains peripheral nerve block. These blocks have the advantages having less side effects (cardiovascular, respiratory) providing excellent analgesia by blocking peripheral afferent pain transmission. Peripheral blocks need absolute sterile technique, a skillful anesthesiologist, good anatomic and ultrasound knowledge, suitable supplies, and patient sedation. This anesthesia/analgesia technique is also associated with fewer complications as accidentally vascular punctures, local bleeding, local site infection, and rarely neurotoxicity. Peripheral nerve blocks can also be single shot and continuous using a catheter placed in the region. Finally is reported their efficacy for anesthetic purposes and for postoperative pain control as well. The benefits from continuous nerve block include: pain control, reduced other analgesics, and decreased joint inflammation, improved life quality, and early rehabilitation.

Continuous vs. single shot approach

Many authors had compared several anesthetic/analgesic regimens. Continuous peripheral nerve block can provide better analgesia compared to opioid use reducing also side effects. Rodgers et al found a decreased mortality when general anesthesia was combined with central regional anesthesia. Cochrane review demonstrated no benefits of regional anesthesia to general one in orthopedic surgery. This prestigious review found that continuous peripheral regional anesthesia can improve functionality after surgery.

During single shot technique the anesthesiologist tend to use long action agents that can hide complications like compartment syndrome. So continuous technique seems more suitable and the anesthesiologist can use even short-acting

agents, modulating the dose/concentration and the interval of administration as well. This administering velocity can reduce systemic toxicity and neurotoxicity.

There are controversies about the cost comparison between single shot technique and the continuous one. The conclusions are not definitive but continuous block seems to reduce hospitalization length and patient treatment costs.

It is recently reported that orthopedic surgery is strongly associated to deep venous thrombosis, so anticoagulation is of great importance. Another advantage of continuous nerve block to epidural route is a decreased risk for hematoma after anticoagulation begins.

Non adequate postoperative acute pain treatment is often accused to be related with chronic pain and reduced functionality of the extremity after orthopedic surgery. Blumental et al reported that short analgesia duration means increased risk for chronic pain installation. Continuous approach offers an advantage to prevent chronic pain by ensuring better analgesia.

Another advantage of continuous peripheral nerve block is delivery of pain treatment in home. Several authors found that this technique is the most effective analgesia in home service reducing the opioid side effects. Opioid delivery in home needs more human resources increasing the treatment costs.

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CPR IN SPACE: TECHNIQUES AND EFFECTIVENESS

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What is yet known?

Although the intensive medical selection and subsequent medical monitoring of astronauts make medical problems unlikely during space flight, there is, nevertheless, the possibility that an astronaut in microgravity (gravity; 0G) could suffer a cardiac arrest and need immediate cardiopulmonary resuscitation (CPR) (1). Additionally, traumatic causes may cause a cardiac arrest. To date, only some studies have been undertaken to investigate the implementation of emergency procedures in space (2).

The spectrum of these therapeutic interventions ranges from the initiation of chest compressions for resuscitation, to intubation (3), and anaesthesia (4, 5). In order to respond adequately to medical problems, all astronauts receive a basic level of medical training as part of their specialized astronaut technical training. In the context of future space exploration (e. g. , a mission to Mars), the longer duration of missions and consecutively higher risk of an incident requiring resuscitation, increase the importance of microgravity-appropriate medical techniques.

One of the major key issues is the implementation of adequate cardio-pulmonary resuscitation techniques in space. While CPR under normal (earth) conditions (gravity; 1G) is very well examined and established, various difficulties arise from its application in microgravity or weightlessness. The main problem is the lack of gravity and the lack of a thrust block for performing chest compressions (6). Without this, attempting compressions of the chest in microgravity only leads to pushing away from each other, without achieving a haemodynamically significant cardiac output (CO) in the patient.

So far, there are five previously described methods that deal with the solution of this problem (7). However, it is not clear yet which technique results in best CPR quality in space.

Bringing light into the shadow!

To compare the various techniques, we used the data of previously published papers. For analysis, the keywords ("reanimation" or "CPR" or "resuscitation") and ("space" or "microgravity" or "weightlessness") and the specific names of the techniques ("Standard-technique" or "standard technique" or "Strad-

dling-manoevre" or "straddling manoeuvre" or "Reverse-bear-hug-technique" or "reverse bair hug technique" or "Evetts-Russomano-technique" or "evetts russomano technique" or "Hand-stand-technique" or "hand stand technique") were used. The search results by <http://www.pubmed.com> were analysed by two independent investigators, experienced both in the fields of emergency medicine and space medicine. In addition, all cited references were checked for further publications. After identification of the relevant publications, the data was examined for comparability. Here, particular attention was paid to the various CPR-methods (chest-compression-only / chest-compression + ventilation) and the guidelines used at that time. Only studies in a 0G microgravity environment with chest-compression-only CPR were included.

A mathematical estimation of cardiac output obtained in each technique was used as a comparison parameter. As a surrogate parameter for cardiac output (CO) we used the product of the two factors compression rate (CR) and compression depth (CD): $CO = CR \times CD$. To compensate the different demands of the various guidelines we calculated the amount of chest compressions that fulfilled the minimum requirements regard to the CO (calculated for the specific CPR guidelines). As a result, we obtained the effectiveness of the different techniques based on the guideline used.

What is the best technique for CPR in space?

A total of four papers were identified dealing with CPR or BLS in microgravity. In the papers found, five different techniques for CPR in space/microgravity were identified.

- Standard side straddle (STD) method: The rescuer places him sideways and the patient is situated on the crew medical restraint system for CPR.
- 2. Waist straddling manoeuvre (SM): The rescuer straddled the patient's waist, with the patient situated on the crew medical restraint system for CPR.
- 3. Reverse Bear Hug (RBH) method: The rescuer grips the patient from the back with both arms and performs compressions.
- 4. Evetts-Russomano (ER) method: In the ET method, the practitioner places himself on top of the patient. He places his left leg over the right shoulder of the patient. The right leg of the practitioner is placed around the patient's back under the left arm. The chest compression applied against the sternum is countered by the force exerted by the practitioner's crossed legs.
- 5. Handstand (HS) method: To carry out the HS method, the practitioner places his feet on one wall of the cabin, with the patient's back against the opposite wall, and the chest compressions are applied against the sternum.

Using the mathematical model, for each study CO, CF, and CD were calculated. With the requirements given in the CPR guidelines, the percentage of CO values for each technique and each study were calculated (tab. 1).

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Method	Publication	Guideline	Min.demand CO (mm/min)	Compressions (n)	Compr.Depth (mm)	Compr.Rate (1/min)	Achieved CO (mm/min)	over min CO (%)
STD	Nov 2003, Jay et al.(6)	AHA 2000	4000	1000	19.8±1.2	100.0±3.0	1980±1179	4.34
SM	Nov 2003, Jay et al.(6)	AHA 2000	4000	1026	30.7±1.9	102.6±12.1	3150±1592	29.67
RBH	Nov 2003, Jay et al.(6)	AHA 2000	4000	893	36.8±6.4	89.3±4.1	3286±722	16.16
	Dez 2011, Kordi et al.(12)	ERC 2010	5000	1470	41.7±6.2	98.0±6.2	4087±866	14.58
	Feb 2011, Rehnberg et al.(13)	ERC 2005	4000	2195	45.7±2.4	104.5±5.2	4776±492	94.25
				2209	43.0±5.2	105.2±4.5	4524±745	75.90
				2150	41.4±5.8	102.4±6.6	4239±862	60.93
	Dez 2011, Kordi et al.(12)	ERC 2010	5000	1553	42.3±5.6	103.5±4.7	4378±778	21.21
				1575	30.0±5.3	105.0±7.0	3150±767	13.37
				1590	28.5±7.5	106.0±5.0	3021±938	14.82
				1575	27.7±7.4	105.0±5.0	2909±916	11.66
ER	Jan 2013, Russomano et al.(14)	ERC 2005	4000	1590	27.1±7.9	106.0±5.0	2873±973	12.33
				1560	34.7±9.8	104.0±7.0	3609±1262	13.52
				1575	34.8±8.7	105.0±5.0	3654±1088	10.79
		ERC 2010	5000	1590	31.5±9.4	106.0±8.0	3339±1248	9.17
				1545	31.1±8.5	103.0±10.0	3203±1187	6.50
HS	Nov 2003, Jay et al.(6)	AHA 2000	4000	983	40.1±5.1	98.3±6.3	3942±754	46.93
	Dez 2011, Kordi et al.(12)	ERC 2010	5000	1866	47.4±2.4	124.4±15.2	5897±1019	81.05

Table 1. : Studies, techniques, and parameters analysed (HS=Handstand technique; STD=Standard-technique; SM=Stradling manoeuvre-technique; RBH=Reverse-Bear-Hug-technique; ER=Evetts-Russomano-technique)

Compression depth

The HS method was superior in both the pure compression depth (44.9 ± 3.3 mm), as well as in ratio to the requirements of the guideline (ratio, 0.91 ± 0.07). With this technique the requirements for compression depth by the guidelines for CPR in the 1G environment could be almost realized.

Also the RBH- (39.8 ± 6.3 mm; ratio, 0.82 ± 0.13) and the ER-technique (35.6 ± 6.7 mm; ratio, 0.74 ± 0.14) showed good results with respect to the compression depth. While carrying out resuscitation in a kneeling position next to the patient is the standard method for CPR under earth conditions, both conventional techniques, STD (19.8 ± 11.2 mm; ratio, 0.50 ± 0.28) and SM (30.7 ± 11.9 mm; ratio, 0.77 ± 0.30), showed broad deviation and could, therefore, not achieve an adequate chest compression. In total, none of the examined techniques achieved the requirements of the guidelines (≥ 1.0) (tab. 2).

Method	Compressions (n)	Compression depth		Compression rate		Cardiac output		
		(mm)	ratio	(min ⁻¹)	ratio	(mm/min)	ratio	over min CO (%)
STD	1000	19.8 ± 11.2	0.50 ± 0.28	100.0 ± 3.0	1.00 ± 0.03	1980 ± 1179	0.50 ± 0.29	4.3
SM	1026	30.7 ± 11.9	0.77 ± 0.30	102.6 ± 12.1	1.03 ± 0.12	3150 ± 1592	0.79 ± 0.40	29.7
RBH	2363	39.8 ± 6.3	0.82 ± 0.13	94.7 ± 5.4	0.89 ± 0.09	3784 ± 812	0.82 ± 0.18	15.2
ER	20707	35.6 ± 6.7	0.74 ± 0.14	104.6 ± 5.4	1.01 ± 0.06	3716 ± 916	0.86 ± 0.21	33.0
HS	2849	44.9 ± 3.3	0.91 ± 0.07	115.4 ± 12.1	1.08 ± 0.11	5222 ± 928	1.11 ± 0.20	69.3

Table 2. : Average CPR quality (HS=Handstand technique; STD=Standard-technique; SM=Stradling manoeuvre-technique; RBH=Reverse-Bear-Hug-technique; ER=Evetts-Russomano-technique)

Compression rate

In contrast to the compression depth, 4 of 5 techniques reached the required compression rate. Nevertheless, in comparison the HS method achieved an above-average rate (115.4 ± 12.1 min⁻¹; ratio, 1.08 ± 0.11). Nearly all performed techniques met the minimum requirement in terms of the compression rate: ER (104.6 ± 6.0 min⁻¹; ratio, 1.01 ± 0.06), STD (100.0 ± 3.0 min⁻¹; ratio, 1.00 ± 0.03), SM (102.6 ± 12.1 min⁻¹; ratio, 1.03 ± 0.12). Only the RBH method did not meet the required criteria (94.7 ± 5.4 min⁻¹; ratio, 0.89 ± 0.09) (tab. 2).

Cardiac output

As surrogate for CPR quality, CO was calculated according to the mathematical estimation described above, and the results were considered in relation to the minimum requirement of the relevant guideline. Concerning cardiac output (CO), the HS method (69.3% above required CO) was superior to the oth-

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er techniques, followed by the ER technique (33. 0%). Also the SM method (29. 7%) could deliver a satisfactory CO, but shows a significant fluctuation. The RBH method (15. 2%) was unable reach a sufficient CO due to the limitation in the compression rate. The lowest CO was provided by the STD method (4. 3%) (fig. 1; tab. 2).

What does this mean for future space missions?

Due to the external circumstances (e. g. absence of gravity, cramped conditions) it is unlikely that BLS can be carried out with the same performance in space as on earth. Even under ideal conditions (immediate CPR, perfect cardiac output) not every CPR is able to achieve a return of spontaneous circulation (ROSC). This is aggravated by the fact that currently no opportunities for subsequent intensive medical therapy exist in space. Especially in this context the question arises if there is need to provide CPR in space at all. Nevertheless, against the background of future long-term missions, the present study compares the current methods to perform CPR in microgravity.

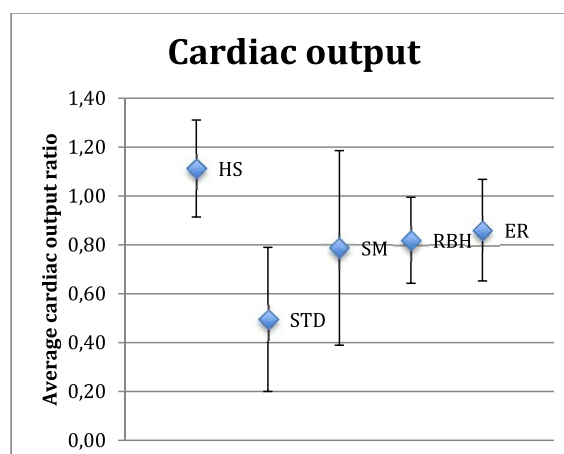


Fig. 1: Average cardiac output in ratio to guideline (HS=Handstand technique; STD=Standard-technique; SM=Stradling manoeuvre-technique; RBH=Reverse-Bear-Hug-technique; ER=Evetts-Russomano-technique)

As cardiac output cannot be measured, the product of compression rate and compression depth was used as a surrogate for the cardiac output in the present study. Even if this is only an approximation, the surrogate parameter “cardiac output” allows comparisons of different methods with respect to achieved performance/CPR-quality.

While the compression rate primarily depends on the CPR method, the compression depth depends not only on the technique but also on the manikin used in the study. The use of various manikins with variable resistance can lead to dif-

ferent results in the compression depth. How far the differently used manikins influence the cardiac output is still unknown.

Simulation of microgravity

To simulate microgravity different methods are used in the studies. In particular, recent studies are using a body suspension device (BSD) which was developed by the John Ernsting Aerospace Physiology Laboratory, Microgravity Centre, Pontifical Catholic University of Rio Grande do Sul (PURCS). In contrast to the parabolic flights with their limited study time (max. 22 seconds per parabola), long-term studies are possible with the BSD. Since some studies have been carried out with parabolic flights, the data for performance during prolonged CPR can only be compared conditionally. Whether methods like RBH, HS or ER are able to provide a sufficient cardiac output after more than 3 minutes of CPR remains unclear.

Data for the ER method already showed that the performance is not sustainable for 3 minutes with degradation in both, compression rate and depth. While under 1G-conditions rescuers are replaced every 2 minutes, possibly a more frequent change is necessary in these energy-consuming methods. Since in contrast to parabolic flights or the use of a BSD, long-term stay lead to physiological changes, it is also unclear, whether the guidelines for resuscitation are even applicable in an environment with microgravity.

Feasibility

Feasibility of a CPR technique in space is a fundamental requirement to perform CPR in reality. Even if there are good methods under experimental conditions, they must be easily applicable in microgravity, particularly in view of the correlation between the early start of resuscitation (within the first 3-5 minutes after the onset of circulatory arrest) and a higher probability of survival of (49-75%) (11).

In this respect, methods that are independent of any resources (HS, ER, RBH) are initially superior to those methods that require the patient to be restrained. However, over the entire duration of a resuscitation incident, there are substantial benefits to restraining the patient in microgravity. Taking into account the transfer of the patient to the location of medical equipment and the crew medical restraint system, and the time required to restrain the patient, a combination of multiple techniques would theoretically give the best outcome, however, this would have to be weighed against the increased complexity of training and familiarity required. For the application of the HS technique, the appropriate spatial conditions must fit, which will be a function of both the cabin dimensions and the height of the crewmembers.

Conclusion

Today, five different techniques for CPR in microgravity/space are known. Regarding to the compression depth, no technique achieved the requirements of the guidelines (≥ 1.0). Here, the HS method appears to have an advantage over

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the other techniques. Although the RBH method achieved also a good compression depth, this method showed up distinct disadvantages in the compression rate.

One possible reason for this could be the unusual compression by tension of the arms, which is, in comparison to the frontal CPR techniques, time- and energy-consuming, so that an adequate compression rate is very difficult to achieve. Both standard techniques (STD and SM) show restrictions in both compression depth and compression rate and, in addition, there is a delay to the commencement of CPR due to the requirement to restrain the patient.

Concerning quality of CPR, the HS method revealed the best results and performed better as the other techniques. However, this technique requires a specific setting (wall-to-wall distance below 2.5m) not being present at every location in space. In such a case, the ER technique is a reasonable alternative.

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ARE CENTRAL BLOCKS SUITABLE FOR DAY- CASE SURGERY IN CHILDREN?

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INTRODUCTION

In recent years there has been a trend towards performing increasing amount of surgery on children on a day-stay (ambulatory, outpatient) basis. Children are excellent candidates for day case management as they are usually healthy and predominantly require minor or intermediate surgery of short duration. The cost effectiveness of day-case surgery has put this mode of care at the top of the political agenda in many industrialised countries.

The development of day surgery began in the United Kingdom during the 1950s and 1960s in response to expert concern for the wellbeing of the child in hospital. In recent years, day surgery has become increasingly popular as it is more cost effective, is less disruptive to the family, and may reduce the risk of nosocomial infection. The European Charter of Children's rights states that "children should be admitted to hospital only if the care they require cannot be equally well provided at home or on a day basis". In the UK there is a drive from the Department of Health to perform 75% of elective surgery in the day case setting (1, 2).

Besides the economic benefits, day-case management is highly advantageous for child and family. The psychological impact of inpatient admission can not be over estimated. Problems, such as nocturnal enuresis and disrupted sleep patterns, are common place and are decreased by day-case management. Hospital acquired infection is also reduced by avoiding in-patient admission. This is particularly beneficial for immunocompromised children. A successful paediatric day-case service is one which minimises postoperative morbidity, has low in-patient admission rates and demonstrates high parental and child satisfaction.

Good quality anaesthesia is essential to achieving these goals with experienced clinicians working in child-friendly facilities. Anaesthesia is frequently the lead speciality in paediatric day-case services, developing selection criteria protocols, postoperative symptom control regimens and co-ordinating audit activity (1, 2).

Facilities for day case surgery

One of the key aspects of providing high quality paediatric day case management is location of the service. Ideally children should be nursed in customized and specifically designed paediatric day care units. However if children must be cared for on an adult unit, a separate area must be organised for them and their

parents/carers. Suitable equipment, toys games and a play area should be provided to reduce anxiety and speed recovery.

Purpose built children's day unit

This is the ideal model, if there is sufficient paediatric workload in the hospital. The environment should be child-safe and child-friendly. The design of the patient areas should ensure that preoperative and postoperative patients are separated.

Children in adult day units

These units should have dedicated children's days or sessions according to demand. The unit can be made child friendly for these sessions and appropriately trained children's nurses can be brought in to ensure best quality care.

Selection criteria

Day surgery is particularly appropriate for children, if the operation is not complex or prolonged and the child is healthy with no significant co-existing medical illness. Exclusion criteria for day care surgery include patient-related factors, surgical and anaesthetic procedures, family and anesthetic considerations.

Exclusion criteria for pediatric day case surgery connecting with patient relation factors:

- Term baby less than one month in age
- Former pre-term infant < 60 weeks' post-conceptual age
- Inadequately controlled systemic disease (asthma, diabetes mellitus)
- Active viral or bacterial infection
- Complex congenital heart disease and uninvestigated cardiac murmur
- Inborn errors of metabolism, diabetes mellitus
- Sickle cell disease
- Sleep apnoea

Most children are healthy and well – suited for a day case management. However, children with well controlled systemic disease (asthma, epilepsy) are often suitable candidates, including some who are classified as ASA grade III.

Children with malignancy can also be managed as a day case if their condition is stable and experienced clinicians deliver their care. But, the children with in-born errors of metabolism and insulin –dependent diabetics are not suitable for day – case surgery.

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Complex congenital heart disease or cardiac failure always contra-indicates day care but asymptomatic uncomplicated or corrected defects may be suitable with appropriate bacterial endocarditis antibiotic prophylaxis.

Many children (20–30%) have a 'runny nose' for a large proportion of the year. Cancellation of this entire group confers no advantage, as many of the cases are due to benign, noninfectious seasonal rhinitis or adenoidal hypertrophy. However, it is important to exclude patients with significant respiratory infection who have a risk for peri-operative complications such as laryngospasm, bronchospasm or atelectasis. This applies particularly to infants.

Children with moderate or severe respiratory infection are not suitable for day case surgery. Clinical indicators of severity include productive cough, purulent nasal secretions and clinical signs of systemic infection including fever and malaise. If the procedure is deferred, the child should be rescheduled 2 weeks after resolution of upper respiratory symptoms or 4 weeks later if the lower respiratory tract was involved.

The lower age limit for day surgery depends on various factors, including post-conceptual age, experience of the anaesthetist and the day-case facilities. Healthy, term infants may be anaesthetised for minor procedures as day-cases if paediatric anaesthetists are involved and if in-patient neonatal care is available. Pre-term or former preterm infants are not suitable for day care as they are at risk of postoperative apnoeic episodes, problems with body temperature control, necessitating in-patient observation. Most authorities will not consider day-case management for preterm infants less than 60 weeks post-conceptual age or even older if the infant has evidence of chronic lung disease (e. g. bronchopulmonary dysplasia).

Exclusion criteria for pediatric day case surgery connecting with surgical and anesthetic factors:

- Inexperienced surgeon or anaesthetist
- Prolonged procedure (>1h)
- Opening a body cavity (excluding laparoscopy)
- High risk of perioperative haemorrhage/fluid loss
- Postoperative pain unlikely to be relieved by oral analgesics
- Difficult airway (including obstructive sleep apnoea)
- Malignant hyperpyrexia susceptibility
- Sibling of a victim of sudden infant death syndrome

Surgeons considerations

Body surface operations and some laparoscopic procedures are suitable for day care. Procedures should be associated with minimal bleeding, take less than

1 h and should not produce postoperative pain which can not be relieved by oral analgesia after discharge home. Controversy surrounds the suitability of day-case tonsil and adenoid surgery. Haemorrhage is the most feared complication which is most likely to occur within 4–8 h of surgery. Pain and vomiting can be major postoperative problems that have previously precluded day-case adenotonsillectomy. However, practice is changing with increasing reports of successful day-case programmes. The key points in successful management are careful patient selection (exclude < 3 year olds and those with sleep apnoea, no respiratory tract infections, families who live more than 1 h drive from the hospital), extended postoperative observation (minimum 6 h), and optimal pain and vomiting control (liberal use of NSAIDs, prophylactic antiemetics, cautious use of opioids (3, 4).

Anaesthetic considerations

Prolonged anaesthesia, even with modern agents, should be avoided to minimise problems with vomiting and delayed recovery. Arbitrarily, procedures likely to exceed 1 h are excluded from day surgery. Peripheral and some of neuraxial blocks are more preferable than general anaesthesia for one day case surgery. Previous anaesthetic problems or an anticipated difficult airway may preclude day surgery. However, the final judgement needs to be made by experienced personnel.

General surgery Herniotomy (inguinal, umbilical, epigastric) Upper and lower gastrointestinal tract endoscopy +/- biopsy Lymph node excision/ biopsy	Urology Cystoscopy Orchidopexy Preputial adhesions and circumcision Minor hypospadias	ENT Myringotomy +/- grommets Nasal fracture reduction Adenotonsillectomy	Dental Extractions Dental procedures in special patient condition
Ophthalmology Examination under anaesthesia Lacrimal duct probing Strabismus correction	Plastic surgery Otoplasty Excision skin lesions Scar revision	Orthopaedics Change of plaster Removal of metalwork Arthroscopy Tendovaginitis digitis	Medical Imaging techniques, e. g. CT, MRI Interventional radiology/ cardiology Bone marrow sampling, lumbar puncture +/-

Table 1 Examples of procedures suitable for paediatric day surgery

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Exclusion criteria for pediatric day case surgery connecting with social factors:

- Parent unable or unwilling to care for the child at home postoperatively
- Poor housing conditions
- No telephone
- Excessive journey time from home to the hospital (>1 hour)
- Inadequate postoperative transport arrangement

The social circumstances of the child and its family are critical to successful day surgery. Unduly anxious parents and single parents with several children may feel unable to cope with their child returning home soon after surgery. Families should not live far from the hospital (< 1 h by car) and should have access to a telephone and transport to enable return to hospital, if necessary.

Pre-operative screening and investigations

An efficient system of pre-operative assessment benefits the child and family as well as the day-case service. Admission on the day of surgery is facilitated which decreases stress for the child and avoids preventable cancellation. It is not feasible for all patients to

be screened by an anaesthetist, although they should remain the final arbiter of suitability for day surgery. Nurse-led assessment utilising questionnaires completed by parents is popular and works very successfully in many UK centres. Telephone screening and computer-based questionnaires can also be used. All children must be reviewed by the surgeon and anaesthetist on admission to confirm the advisability of proceeding on the day of surgery.

Routine pre-operative investigations are unnecessary, as the majority of children are healthy. Sick cell screening remains a commonly performed investigation for day-case children.

Psychological preparation

As the interval between admission and anaesthetic induction is short, there is little chance to orientate the child to the day's events.

Sedative premedication is not commonly used for day cases and so careful psychological preparation of the child takes on added importance.

Some anesthesiologists prefer sedative premedication if for day cases used neuroaxial blocks (spinal, caudal). Programmes utilising play simulation, video presentations and visits to the day unit have all been found to improve peri-operative behaviour.

Anaesthetic management

Premedication

Although most children are not sedated before day surgery, unduly anxious children or those with learning difficulties may benefit from premedication. Traditional premedicants are

unsuitable, as they tend to produce excessive postoperative sedation. Considerable interest has surrounded the use of oral midazolam (0.5 mg kg^{-1}). This produces effective sedation within 10–30 min, improving behaviour at induction but without delaying recovery or discharge. Cutaneous anaesthesia with either tetracaine gel (Ametop- 45 min before cannulation) or a eutectic mixture of lidocaine and prilocaine (EMLA -60 min before cannulation)) has vastly increased intravenous induction for paediatric day-cases.

Anesthetic technique

The choice of technique depends on the needs of the individual child with the goal of producing smooth, atraumatic induction. Parental presence helps both the child and the anaesthetist in achieving these aims.

Pediatric Neuraxial blocks for day case surgery

Generally, for pediatric day case surgery are used general and regional anesthesia.

Today, more than a century neuraxial blocks especially spinal anesthesia were established as a highly safe anesthetic techniques. Given the hands of an experienced anesthesiologist constitute techniques of choice not only for elective pediatric surgery but also in pediatric patients at high risk. In May 2015, American Association of Anesthesiologists published the first on line edition of official Medical Journal of Anaesthesiology which were publicized two studies involving infants for hernia repair guided in general and the regional spinal anesthesia. Experts examined the effects of general anesthesia in infants and young children believe that babies and young children undergoing anesthesia several times in the first three years of life may be at higher risk of developmental and learning disabilities, also they showed that the possibility of complications (breathing complications, postoperative apnea) is much lower in the group of infants operated under the spinal anesthesia. The experts suggest that infants and small children undergoing some types of surgery could have better recovery if they receive regional anesthesia rather than general anesthesia.

In children from all regional techniques, neuraxial blocks are more usable techniques for day case operative procedures below the umbilicus.

Spinal and caudal epidural block is widely used for day case surgery in children. It provides excellent analgesia for most procedures below the umbilicus.

Spinal anesthesia would be fundamentally useful in: -one day case surgery especially in high risk and former preterm infants, a population with an increased risk of respiratory complications and postoperative apnea, children with chronic

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respiratory disease, potentially difficult airway malignant hyperthermia, congenital heart disease, to minimize hemodynamic fluctuations bullous epidermolysis, where manipulation of the airway should be avoided whenever possible, children who have difficulties in sleeping, neuromuscular disorders.

Reported applications of this block are:

- *General surgical procedures:* umbilical and inguinal herniorrhaphy, appendectomy, colostomy, pernioplasty, rectal biopsy, incision and drainage of rectal abscess, gastrostomy, closure of gastroschisis, exploratory laparotomy, bowel resection, extramucosal pylorotomy
- *Urological procedures:* orchidopexy, hydrocoelectomy, circumcision, cystoscopy, suprapubic catheter placement, vesicostomy, hypospadias repair, ureteral reimplant;
- *Orthopaedic and lower extremity procedures:* hip or lower extremity incision and drainage, foot or lower extremity amputation, reposition sanguinea coxae, corrective foot operative procedures, tendon lengthening, miotomy, lower extremity osteotomy, osteotomia innominata sec. *Salter* (pelvis osteotomy), muscle biopsy
- *Miscellaneous applications:* meningomyelocele repair, cardiothoracic surgery (PDA ligation, ASD/VSD closure), diagnostic cardiac catheterization, radiation oncology, chronic pain management.

Contraindications for spinal anesthesia

Absolute contraindications are the same as in adults and include: allergic reaction to local anesthetics, local and systemic infection, coagulopathy, intracranial hypertension, hydrocephalus, intracranial hemorrhage and parental refusal. Hypovolemia and spinal deformities, such as spina bifida or myelomeningocele, could be considered relative contraindications for spinal anesthesia, however, this technique has been used in the repair of myelomeningocele in infants.

Anatomical and physiological differences in children

- The spinal cord ends at L3-L4 level at birth, and reaches L1-L2 by the end of first year. The dural sac is at S4 at birth and reaches S2 by the end of first year. That's the reason why spinal anesthesia in neonates is administered at L4-L5, and in yearling and older children L3-L4 level
- SA technique itself is successful if you apply it for operative procedures that do not last more than 2 hours. In neonates and infants breakdown of local anesthetic is much faster than adults, and the amount of local anesthetic is higher, because of double more production of cerebrospinal fluid than in adults (neonates 10 ml kg⁻¹, infants 4 ml kg⁻¹, adults 2 ml / kg⁻¹)

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- In neonates and infants proportions of the structures of the nervous system in terms of muscle and bone mass is greater, and it requires the use of higher concentrations of local anesthetic
- The greater medulla spinalis blood flow, increases the faster decomposition of local anesthetic
- The children, hemodynamically are very stable up to six years of age, even if the block mounts to the T4 level (due to the smaller venous capacity of the lower extremities, less dependence on vasomotor tone in neonates, immature sympathetic autonomic system, less compensatory vagal activity). The children over 6 years haemodynamic changes were comparable those found in adults. Preloading before SA is not a routine in children.
- Myelination is incomplete at birth and continues to develop into the fourth year. Endoneurium is loose, presenting little barrier to drug diffusion, with faster onset and offset of block.

Premedication protocols before performing a subarachnoid block

The standard preoperative fasting guidelines are required to be followed before elective spinal anaesthesia, 2-3 h fasting for clear fluids, 4 h for other fluids and 6 h for solids is usually followed in most centers. Adequate premedication is the key to a smooth regional procedure in children. Various drugs via different routes may be used to achieve a well sedated child who allows venous puncture, placement of monitors and even a lumbar puncture. Combination of midazolam, ketamine and atropine (performing oral, intramuscular or intravenously) are quite effective and safe for premedication in most cases.

Performing a subarachnoid block and maintenance of airway

In neonates, infants and young children, for a safe perform of spinal block, there are several important factors for maintain the airway.

- In newborn, breathing is primarily diaphragmatic, and if the block goes higher, is required ventilatory support
- Ventilatory support is sometimes necessary in the course of giving spinal block due to respiratory depressive effect of sedatives (ketalar + midazolam), which is necessary for maintaining the position of the baby during delivery of spinal
- Giving pacifier sometimes reduces the need for sedativ
- The temperature in operating room should be 25° or higher. Infants and babies react with apnea in low and high room temperatures
- More comfortable position for infant and baby is lateral decubitus position with easily hiperextension head, in order to avoid obstruction of the airway

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- Commonly used anesthetic is ropivacain and isotonic 0. 5% bupivacain, which is an effective agent for neonates at a dose of 1mg/kg^{-1} for infants, children up to 15 kg $0.6\text{--}0.8\text{mg/kg}^{-1}$ and $0.4\text{--}0.6\text{mg/kg}^{-1}$ for 15-25 kg.

Addition of adjuvants to local anesthetic is not very popular in children's spinal block, because of possibility of postoperative respiratory depression. Fentanyl (1mcg/kg^{-1}) and morphine (30mcg/kg^{-1}) increases the duration of spinal block and provides prolonged postoperative analgesia without significant respiratory and hemodynamic alterations.

Complications

Complications associated with spinal anesthesia in children are extremely rare and therefore, it is a safe and efficient technique in this population. Hypoxemia, intraoperative apnea and bradycardia are usually due to the prematurity of patients amenable to this type of anesthesia. They can also be the consequence of an excessively flexed neck during the lumbar puncture, a too high block, or the additional sedation. The hemodynamic consequences of a high spinal block are usually not important in young children, but the respiratory effects may require ventilator assistance. Postdural puncture headache (PDPH) is rare in paediatric patients (4, 5).

Caudal block-epidural block - Caudal epidural block is widely used for day surgery. It provides excellent analgesia for most procedures below the umbilicus. It is usually used as an adjunct to general anesthesia but also is used like a solo technique for surgical procedures below the umbilicus. A caudal block is performed at infants and children in the lateral decubitus position, both thighs and knees are flexed. The anatomic landmark is the sacral hiatus; a "recess" located between the 5th sacral cornua. These cornua are palpated as two bony prominences that are about 0.5 cm apart and are located cephalad to the intergluteal fold. If it is difficult to identify the cornua, the coccyx is palpated and a finger is slid cephalad to the "recess". A 22-gauge short beveled needle or angiocatheter is inserted into the sacral hiatus (recess between the cornua) at a 45° angle. The needle or catheter is aspirated to confirm the absence of blood and/or cerebrospinal fluid (CSF). The optimal dose and volume of drug to give in the caudal space has been studied extensively, often-cited formula that determines the volume of drug needed to achieve the desired level (by dermatome) of blockade.

Volume of local anesthetic (ml) = 0.05ml/kg/dermatome to be blocked

Another technique described by Armitage involves giving: 0.5ml/kg for lumbosacral level blocks, 1ml/kg for thoracolumbar level blocks, and 1.25ml/kg for mid thoracic level blocks. Bupivacaine 0.25% (maximum volume 20ml) is the drug most often used. Volume of drug injected affects the level of blockade; drug concentration affects density of the block. It is important, not to exceed 3mg/kg of either ropivacaine or bupivacaine to avoid causing local anesthetic toxicity. Lower drug doses are recommended in infants less than six months of age, because they have less alpha-1-glycoprotein. This increases the plasma concentrations of free local anesthetic and increases the likelihood of exceeding

toxic drug levels. There is potential for lower limb weakness delaying discharge which can be minimised by using dilute local anaesthetic solutions (e. g. bupivacaine 0. 125%). The addition of clonidine ($0.5-1 \mu\text{g/kg}^{-1}$) doubles, while ketamine (0.5 mg kg^{-1}) quadruples duration of local analgesia with minimal side-effects making these adjuncts suitable for day case surgery. Another caudal-epidural adjuvants are fentanyl $1-2 \mu\text{g/kg}$, morphine $30-70 \mu\text{g/kg}$, epinephrine (1: 200. 000). When the surgical procedure last longer than 3-4 hours, the block can be “re-dosed” at the end of the procedure with one half of the initial volume of local anesthetic like single short injection or through caudal catheter. If a medication infusion pump designed for neuraxial use is available, continuous drug infusion, $0.2-0.4 \text{ mg/kg/hr.}$ of a 0. 1% - 0. 2% solution of ropivacaine or bupivacaine can be used. The drug dose is reduced by 30% for <6-month-old infants (4, 5, 6).

Epidural block - (access to the epidural space to other levels except caudal). Indication for lumbar epidural block is operative procedures below Th 10 (lower limbs, genitals and lower abdomen), but it is used in combination with general anesthesia for surgery of the upper and lower part of the abdomen. Epidural blocks can be performed like single- short injection, but the safest and most often is application of local anesthetic through the epidural catheter for intraoperative and postoperative analgesia. Epidural block is performed with Touhy- needle 19, 20 G and adequate epidural catheter placed between L3-L4 interspace using “hanging drop” or “loss of resistance” technique for determining the epidural space. Continuous thoracic epidural block is used for intra and postoperative analgesia of thoracic operative procedures. The catheter is placed between Th 7-Th11. Dosage of local anesthetic is $0.3-0.5 \text{ ml/kg}^{-1}$ of 0. 1-0. 25% bupivacain (or 0. 1-0. 2% ropivacaine). The drug dose is reduced by 30% for <6-month-old infants.

Complications of continuous epidural and caudal block in children are: total spinal block, damage of epidural vessels, local hematoma, puncture of dura, local – site infection, hypotension, urinary retention (rare), postpuncture headache (rare), neurological damage.

In children from all regional techniques, spinal and caudal blocks are more usable techniques for day case operative procedures below the umbilicus.

The main disadvantage of spinal block that is limited for operative procedures which last not more than 150 min due to rapid absorption of local anesthetic, which is the result of extensive vascularization. Many studies suggested that this advantage in one way is advantage for one day- case surgery in children especially infants, because the patient is discharged at the end of the day, with a very infrequent incidence of complications such as, lower limb weakness, stable vital signs (hypoxemia, bradycardia, postoperative apnea), without nausea and vomitus (7, 8).

The caudal epidural block is also widely used regional technique in pediatric one day surgery, for procedures below the umbilicus, duration of surgical analgesia lasts 3-4 h, and sometimes the children has lower limb weakness or urinary retention delaying discharge. This disadvantage can be minimized by using dilute

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local anesthetic solution with addition of clonidine and ketamine, which prolongs duration of local analgesia with minimal side-effects (7, 8).

Postoperative analgesia

Pain control is essential for the success of children's day surgery. A multimodal approach using *local anaesthesia, paracetamol and NSAID* (nonsteroid antiinflammatory drug) can help in achieving this.

This forms the mainstay of postoperative pain relief. The advantage over opioid analgesics includes a lack of respiratory depression and sedation. They do not cause nausea or vomiting. Use of NSAIDs is not recommended below six months of age due to the possibility of immature renal function and hepatic metabolism. Most commonly used agents are:

- Diclofenac (1 mg/kg, PO/PR 8 hourly prn)
- Ibuprofen (5-10 mg/kg PO 6-8 hourly).
- Paracetamol (10-15 mg/kg PO/PR/IV, maximum 60 mg/kg/day <3 months, 90 mg/kg/day in older children).
- Dexamethasone i. v (0.5 mg/kg⁻¹) prolongs postoperatively analgesic effect of caudal block

Opioids /The routine use of long-acting opioids is inadvisable as it causes significant morbidity, notably excessive sedation and vomiting. Fentanyl (1–2 µg kg⁻¹ IV) or codeine (1 mg kg⁻¹ orally/rectally) are useful agents for day-cases.

Postoperative nausea and vomiting (PONV)

Commonly performed day-case procedures are associated with a high incidence of PONV (e. g. orchidopexy, appendectomy). Apart from the surgical procedure, other risk

factors for PONV include previous history, motion sickness and early postoperative mobilisation. Reduction in PONV can be achieved by minimising exposure to known precipitants (e. g. opioids) and treating the high-risk patient prophylactically. Ondansetron (0.1 mg kg⁻¹) is particularly suitable as it is non-sedating and does not produce extrapyramidal side effects. Dexamethasone (0.1 mg kg⁻¹) has useful synergistic action in difficult PONV cases.

Postoperative management

Recovery

After day surgery, children should recover in a fully equipped recovery room, room by staff experienced in the management of unconscious paediatric patients. Although timing the transfer of a child from the first stay recovery room is usually decided intuitively, some day units use the Steward score to objectively assess the return of protective reflexes. Wakefulness, movement and airway control are assessed and assigned a score of 0, 2 and 2.

Discharge criteria

Children may be discharged when their vital signs are stable, pain and nausea are well controlled and there are no surgical problems. Many centres have required children to drink prior to discharge. However, studies have shown that there is no excess morbidity in children who refuse to drink provided they have received peri-operative IV hydration. Similarly, the

ability to pass urine has been challenged and is now only required on surgical grounds (e. g. following penile surgery). Before the child is discharged, it is vital that parents receive clear verbal and written instructions about the child's aftercare, particularly for analgesia, diet, resumption of normal activities, such as return to school. Telephone contact parents-hospital is also important.

Reasons for in-patient admission

The commonest problems requiring in-patient admission are intractable vomiting and severe pain. A widely quoted benchmark for in-patient admission is 1–2%. The possibility of admission should always be discussed with parents at the screening stage.

CONCLUSION

Day-case management is beneficial for children, their families and the providers of health care. Modern anesthetic techniques which aim to minimize post-operative morbidity are essential for successfully delivering this mode of care. Neuraxial blocks as subarachnoid block is quick and easy for application, with fast action, good muscle relaxation, allows cardiovascular and respiratory stability, a rare occurrence of nausea and vomiting, decreased postoperative morbidity and shortened recovery, difficult urination occurs less frequently, less intraoperative and postoperative blood loss, a cost effective less than general anesthesia, can be repeated many times, the ideal method for "day case surgery". Most of mentioned advantages for spinal block also belong to caudal block. In the hand of experienced regional anesthetist this advantages makes the spinal and caudal anaesthesia more frequently used techniques than general anesthesia for lower abdominal and limb operative procedures.

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CHANGES IN PEDIATRIC ANESTHESIA PRACTICE: FLUID MANAGEMENT

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INTRODUCTION

The art of pediatric fluid management still presents challenges to the anesthesiologists and surgeons. Administration of fluids during the surgery is aimed to maintain homeostasis. Fasting, surgery and anesthesia cause stress and alter physiology, especially in children. The goals of perioperative intravenous fluid therapy are numerous and included replacement of preoperative fluid deficits, maintains of the fluid therapy, replacement of blood loss and replacement of third space losses.

The perioperative management of blood and fluid replacement in the pediatric population is constantly changing. For half a century, maintenance fluid therapy in children has been based on Holliday and Segar's recommendation (1), which was related to studies of metabolism in pediatrics. This recommendation, best known as the '4/2/1' rule, has been largely used in pediatric practice and particularly in pediatric anesthesia, and still figures among the most pediatric anesthesia textbooks. While a consensus has existed for a long time on this rule for fluid management in children, several papers on severe complications of perioperative infusions have been published in the recent years, raising some concerns on this topic.

Recently, both the composition and the volume of maintenance fluids were challenged and reevaluated. The content of sodium is insufficient in many situations such as medical emergencies and postoperative period. The volume of fluids required in the postoperative period after major surgical procedures has also been reevaluated recently.

This review will focus on recently views of perioperative maintenance fluid therapy in children.

THE HISTORY OF FLUID MANAGEMENT

In 1957, Holliday and Segar published an important paper (1), in which they calculated the metabolic rate of healthy children at rest and during activity. As the maintenance needs for water paralleled energy metabolism, then the estimated caloric expenditure was used to determine the maintenance fluid therapy (1 ml of water is required for each calorie consumed). They elaborated recommendations, known as the Holliday and Segar's formula. In the absence of sweating, insensible water losses and urine are the sole significant components of wa-

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ter requirements Using Holliday and Segar's methodology, the insensible water losses for a 10 kg child are 50 ml/kg/day, with 16 ml/kg/day subtracted for endogenous water production, equating to a net insensible loss of 34 ml/kg/day. As the obligatory urinary losses for excreting the solute load of cow's milk is 66 ml/kg/day, the total of the maintenance fluid requirements in this child would be 100 ml/kg/day. The Holliday and Segar's formula is reported in Table 1. The maintenance electrolyte needs were calculated from the amount of electrolyte delivered by the same volume of human milk. The daily needs were 3 mmol/kg/day sodium and 2 mmol/kg/day potassium. Electrolyte and water requirements, hypotonic solutions (0. 2% saline equivalent), have had widespread use for decades and are still popular in pediatrics despite recent controversies. In another study, indirect calorimetry was used for the calculation of metabolic rate, fluid volume and electrolyte requirements in anaesthetized infants and children. Lindahl (2) found that energy wastage during anesthesia was 50% lower than that calculated by Holliday and Segar for hospitalized children, and was close to the basal metabolic rate. There was a good agreement in fluid requirement within the two studies.

Weight	Hourly fluid requirements	Daily fluid requirements
<10 kg	4 ml/kg	100ml/kg
10–20 kg	40 ml + 2 ml/kg Above 10 kg	1000 ml + 50 ml/kg Above 10 kg
>20 kg	60 ml + 1 ml/kg Above 20 kg	1500 ml + 25 ml/kg Above 20 kg

Table 1. Hourly (4/2/1 rule) and daily maintenance fluids according to child's weight (1).

HYPERGLICEMIA AND HYPOGLYCEMIA

Hyperglycemia

The important issue during perioperative fluid management in children is administration of dextrose. In the last 20 years, there has been a complete reevaluation of the place of glucose in routine intraoperative solutions. Energy requirements during anesthesia are close to basal metabolic rate. Administration of dextrose was considered in the early days to avoid perioperative hypoglycemia, which may be difficult to diagnose in an anesthetized child, but the risk of hyperglycemia was at that time underestimated. Hyperglycemia can be harmful for the brain. In experimental studies, the effects of brain ischemia or anoxia are worsened if glucose is given before the insult (3). Among the mechanisms involved in the production of this damage are both glucose aerobic metabolism and the production of an intracellular acidosis with the associated hydrogen ions. It is important to make a difference between adults and children. A recent article reviewed the differences between neonates and adults for (4) glucose.

There is an increase in concentration of some glucose transporter proteins and phosphorylation enzymes in the brain from the neonatal period to adults, as the metabolic rate increases (4). The cerebral metabolic rate for glucose increases from the neonatal period to reach a maximum at 6 years (6.8 mg glucose/min/100 g) and then decreases to the adult value (5.5 mg glucose/min/100 g). Unlike the adult brain, the neonatal brain is able to metabolize ketone bodies and free fatty acids to generate adenosine triphosphate (ATP). The brain is also able to metabolize lactate to produce ATP. Thereby it is possible that hyperglycemia may be less deleterious in neonates than in adults for several reasons: hyperglycemia is responsible for an increase in high-energy reserves and glycogen stores, glucose uptake and lactate accumulation are slower during hyperglycemia and lactate clearance is greater.

The danger of hyperglycemia in the perioperative period is a real clinical issue that has been extensively reviewed. Hyperglycemia can induce osmotic diuresis and consequently dehydration and electrolyte disturbances. Several animal studies have also demonstrated that hyperglycemia will increase the risk of hypoxic-ischemic brain or spinal cord damage. Thus, intraoperative hyperglycemia should be avoided.

Hypoglycemia

Glucose, like oxygen, is essential for the normal brain to function. Depending on its severity, hypoglycemia has three important effects on central nervous system. First, it may provoke a stress response (increase in plasma cortisol, epinephrine, glucagon and growth hormone). Second, regional blood flow may increase to a maximal 300% change with a loss of cerebral vascular autoregulation in the case of severe hypoglycemia. Third, it alters cerebral metabolism leading to a shift from glycolytic precursors to Krebs' cycle, alteration of ion homeostasis and acid-base abnormalities. All these changes can lead to clinical symptoms and permanent neuronal damage (5).

The risk of hypoglycemia at induction of anesthesia has been evaluated in several studies. It varies between 0 and 10% among the studies, depending on the blood plasma level threshold for hypoglycemia (range 1.7–2.7 mmol/l). Hypoglycemia was not found in those studies in the children who drank clear fluids 2–3 h before surgery. Furthermore, the children who were allowed to drink clear fluids 2–3 h before anesthesia presented with the same normal blood glucose level at induction of anesthesia than the children allowed to drink clear fluids up to 6 h before surgery.

Hypoglycemia is known to induce brain damage especially in newborn infant. However, the risk of preoperative hypoglycemia has been demonstrated to be low in normal healthy infants and children (1–2%), despite prolonged fasting periods (5). Thus, it would appear that in the majority of patients there is no need to administer glucose in the perioperative period nor there is a need to monitor blood glucose in these patients.

HYPONATREMIA

For more than half a century children have been infused with hypotonic fluids, mainly dextrose 5 or 10% in 0.2–0.25% saline (1). The relevance of this principle has been questioned recently, as a significant number of articles have reported severe hyponatremic encephalopathies related, totally or partly, to the use of hypotonic solutions.

Hyponatremic encephalopathy is the most severe complication of hyponatremia and can lead to death or permanent neurological damage. Over 50% of children with serum sodium less than 125 mmol/l will develop hyponatremic encephalopathy (6). Sodium is the main cation of extracellular fluid (ECF). Changes in the blood sodium concentration mirrors ECF volume changes. As water moves freely across the cell wall, water movement across membranes will follow the variations of the effective osmolality (tonicity) in the ICF and the ECF. In the brain, the endothelial tight junctions prevent sodium moving across the blood–brain barrier. Normally, there is equilibrium between the tonicity of the brain intracellular content and that of the extracellular space. When there is an acute decrease in serum osmolality, in the case of hyponatremia, there is a shift in water from the extracellular space to the brain interstitium and the brain cells, in order to lower the brain osmolality and to match that of hypotonic plasma. If there is an acute drop in plasma tonicity, the brain water accumulation can lead to cerebral edema. If the increase in brain volume exceeds 5–7% of its initial volume, there is a risk of brain herniation and death. Children are a group at risk of hyponatraemic encephalopathy. This is because the number of brain cells decreases with age and children have a larger brain to intracranial volume ratio compared with that of adults. Animal studies, have shown that there was a limited cerebral Na^+ - K^+ -ATPase system in prepubertal rats and newborn dogs, reflecting a limited ability to extrude sodium from the brain and, as a consequence, a greater vulnerability to hyponatremia. This finding explains why the clinical symptoms of hyponatremic encephalopathy occur at lower sodium concentrations in children. The average sodium concentration in children with hyponatraemic encephalopathy is 120 mmol/l, while the concentration in adults is 111 mmol/l. Postoperative hyponatremia is the most frequent electrolyte disorder in the postoperative period. Severe hyponatremia (<120–125 mmol/L) may result in transient or permanent brain damage (6). Most postoperative hyponatremia observed in ASA I children are due to the administration of hypotonic fluids when capacities of free water elimination are impaired. Other causes of hyponatremia include pituitary or adrenal insufficiency, brain injuries or brain tumors associated with salt losses, and inappropriate secretion of ADH. Plasma ADH is often increased in postoperative period as a result of hypovolemia, stress, pain, or traction of dura mater. The combination of ADH secretion and infusion of hypotonic fluids will produce dilutional hyponatremia. Profound hyponatremia promotes cerebral edema which clinical signs include decreasing level of consciousness, disorientation, vomiting, and in severe cases seizure activity. Acute symptomatic hyponatremia is a medical emergency which requires immediate therapy. Hypertonic NaCl should be administered to increase plasma sodium up to 125 mmol/L, as the risk of seizure decreases above this value. Water restriction may

be sufficient only in normovolemic patients without clinical signs. Diuretic may be used in patients with normal or high vascular volume.

Postoperative hyponatremia should be prevented by avoiding hypotonic solutions during surgery and in the early postoperative period.

The European Consensus Statement on intraoperative fluid therapy in children. (7)

The German Scientific Working Group for Pediatric Anesthesia presents a Consensus Statement recommending that intraoperative fluid should have an osmolarity and sodium content close to that of plasma, a glucose concentration of 1 or 2.5% and metabolic anions to act as bicarbonate precursors to prevent hyperchloremic acidosis. The ideal glucose concentration of intraoperative fluid as 1%, and 2.5% glucose also appears in the Statement.

CONCLUSIONS

I. Murat and M. -C. Dubois (8) in their review article, combined the two approaches, and proposed the simple recommendations, which we could apply during our practice:

- Hypovolemia should be treated rapidly.
- After major surgery in patients at risk of high ADH secretion, daily maintenance fluids are to be reduced by one third during the first postoperative day provided the child is normovolemic.
- Composition of fluids is a compromise between high sodium requirements, energy requirements and osmolarity of the solution. 5% dextrose is usually adequate to provide energy needs in the early postoperative period. In order to limit the osmolarity of the solution, our choice is to give a ready to use D5 salted hydrating solution containing NaCl 4 g/l, and KCl 2 g/l. All extra losses (gastric tube, chest tubes etc.) are to be replaced with Lactated Ringer.
- Plasma sodium and glucose concentrations should be monitored at least once daily in acute patients;
- Hidden fluid administration such as fluids used to dilute antibiotics or analgesics, should be taken into account. Drugs have to be diluted in normal saline whenever possible to avoid the administration of large volumes of electrolyte-free solutions especially in infants;
- Finally, one should keep in mind that recommendations are just a framework and that it is of critical importance to individualize fluid therapy in unstable children (8).

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TRAUMA OF THE HEART AND GREAT VESSELS

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Background

In modern society and frequent crush accidents, blunt trauma has become a major health problem. Improvements in the techniques of transporting injured patients and in the care given outside the hospital have increased the number of patients with severe injuries who reach the emergency room alive. Nevertheless, chest injuries are the cause of many deaths. (1-3) Injury to the heart is involved in 20 percent of road-traffic deaths, and the thoracic aorta or arch vessels in 15 percent. (4-7) In clinical series of patients with blunt trauma to the chest, the rate of cardiac injury varies widely, depending on diagnostic criteria, but then incidence would be around 15 percent; for injury to the thoracic aorta or arch vessels, the figure might be 4 percent (Table 1).

Cardiac Trauma

Mechanisms and Types of Injury

Massive compression of the chest may crush the heart, ascending aorta, or innominate artery between the sternum and the thoracic vertebrae. Direct injury by a fractured sternum may damage the right ventricle or the ascending aorta. Traction or torsion may tear the heart and the thoracic aorta at points of attachment: the junction of the venae cavae and pulmonary veins to the atria, the aortic annulus, the origin of the arch vessels, the aortic isthmus, and the aortic hiatus (Figure 1)

Injuries to the heart and great arteries most commonly encountered in patients with blunt chest trauma. (6) A sudden rise in blood pressure during compression of the chest may injure the cardiac valves or lacerate the ventricular wall or septum. (7) The risk to the valves varies with the different events of the cardiac cycle. In early diastole, the aortic valve is vulnerable to injury because it has just closed and is not supported by the empty left ventricle. In early systole, a competent atrioventricular valve may be damaged because of an increase in ventricular pressure.

Myocardial contusion is a common injury that may impair ventricular contraction and lead to arrhythmia. It is characterized by patchy areas of muscle necrosis and hemorrhagic infiltrate (7) that can be recognized at surgery or autopsy but not with conventional imaging studies. Therefore, the clinical diagnosis of cardiac contusion is an extremely vague and subjective one, often made only in patients with a history of chest trauma. (6)

TABLE 1. INCIDENCE OF INJURY TO THE HEART AND GREAT VESSELS IN PERSONS WITH BLUNT CHEST TRAUMA.*

POPULATION AND TYPE OF INJURY	INCIDENCE	
	AUTOPSY STUDIES	CLINICAL SERIES
	percent	
Cardiac injury		
Persons with blunt chest trauma		
Cardiac trauma	15-20	16-76
Persons with cardiac trauma		
Valve rupture	5	Some case reports
Coronary-artery rupture	2	Some case reports
Chamber rupture	36-65	0.3-0.9
Right atrium	10-15	36-65
Right ventricle	19-32	17-32
Left atrium	1-7	20-31
Left ventricle	17-44	11-15
More than one chamber	23-32	6-10
Injury to the great arteries and arch vessels		
Persons with blunt chest trauma		
Injury to the great arteries	15-17	4
Persons with injury to the thoracic aorta		
Ascending aorta and arch	8-23	0-10
Aortic isthmus	70-86	80-90
Aorta at the aortic hiatus	0-14	0-5
More than one site (including arch arteries)	2-20	5-10
Persons with injury to the arch arteries		
Innominate artery	NA	20-61
Left or right common carotid artery	NA	0-26
Right subclavian artery	NA	12-19
Left subclavian artery	NA	13-19

*Rates of incidence are from the medical literature. Specific criteria for inclusion in the studies varied. Figures for cardiac injury are from Shorr et al.,¹ Santavirta and Arajärvi,³ Parmley et al.,⁴ Bu'Lock et al.,⁵ Fulda et al.,⁹ Kato et al.,¹⁰ and Baumgartel.¹¹ Figures for injury to the great arteries and arch vessels are from Shorr et al.,¹ Williams et al.,⁶ Sturm et al.,⁷ Prêtre et al.,¹² Rosenberg et al.,¹³ Castagna and Nelson,¹⁴ and Smith and Bansal.¹⁵ NA denotes not available.

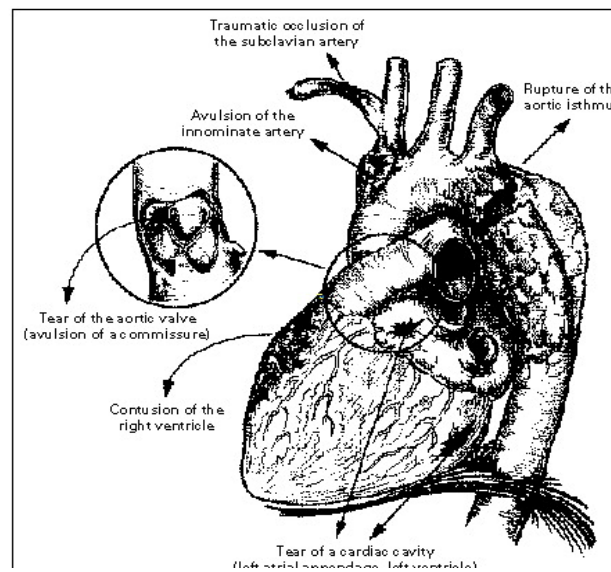


FIGURE 1

Natural History

The rupture of a cardiac cavity, a coronary artery, or the intrapericardial portion of a major vein or artery is usually instantly fatal because of acute tamponade. The few patients who survive usually have tears in a cavity under low pressure. In a few patients, the hemopericardium may initially be asymptomatic, become organized, and after a few months or years, lead to constrictive pericarditis. Myocardial contusion induces cardiac failure that usually improves with time. Areas characterized by dyskinesia recover proper function and most arrhythmias resolve within a few hours. Injury to a coronary artery can lead to myocardial infarction, either immediately or after a few hours, because of spasm or dissection of the arterial wall. (4) Regurgitation from valvular tears tends to worsen with time. Cardiac failure due to traumatic aortic insufficiency or mitral insufficiency develops within a few weeks; failure due to tricuspid insufficiency may appear only after several years.

Diagnosis

A patient with angina-like chest pain or progressive dyspnea after trauma must be suspected of having a cardiac injury. Many patients with cardiac injury, however, do not present with characteristic symptoms. (7, 2) The physical examination suggests a heart injury if complex arrhythmias, a precordial thrill, or a murmur is present, but these specific signs of heart injury are often lacking. In some patients, cardiac injury is reflected only by the hemodynamic status. Systemic hypotension and elevated venous pressure are important signs of cardiogenic shock. The jugular veins, however, may not appear distended in patients who have bled from other lesions, and severe or refractory hypotension may be the sole sign of a cardiac injury.

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Serial 12-lead electrocardiography (ECG), Holter-monitor recordings, measurements of cardiac-enzyme levels, and radionuclide tests have not been proved to have diagnostic reliability in cardiac injury and hence are not suitable screening tests. Arrhythmias can have causes other than cardiac injury, and creatine kinase MB (CK-MB) isoenzymes can be produced by other injured organs. (7) Furthermore, because of the small amount of myocardial necrosis produced in a lacerated myocardium (or after myocardial contusion), enzyme measurements can still have normal results even though severe cardiac failure may ensue.

Bedside echocardiography enables rapid examination of the heart and thoracic aorta with little interference with other diagnostic or therapeutic procedures; it has become an important diagnostic tool in chest trauma. With multiplane analysis and color-flow Doppler imaging, echocardiography can be used to detect anatomical anomalies (pericardial effusion, areas of ventricular dyskinesia, and valvular dysfunction) and physiologic anomalies of the heart (abnormal blood-flow patterns). Transesophageal echocardiography frequently requires intubation, and cannot be performed in patients with severe trauma of the face or the cervical spine.

Assessment and Management

In patients admitted to the hospital with blunt trauma to the chest or with multiple injuries, there should be a high degree of suspicion that a cardiac injury has occurred. Routine tests should include: base-line chest radiography, ECG, and measurement of cardiac-enzyme levels. The prognosis, however, is excellent if the patient's condition is stable. If details of the accident (for instance, bending of the steering wheel) and signs of thoracic trauma (numerous rib fractures) suggest particularly severe impact to the chest, one should monitor the patient closely for several hours. If their condition remains stable and the ECG reveals no abnormalities or only minor changes (nonspecific changes in the ST segments or T waves), these patients can be admitted to a regular ward. (A patient with angina-like chest pain, raised enzyme levels (a CK-MB level or a CK-MB fraction of more than 5 percent), or minor arrhythmias (sinus tachycardia, premature atrial beat, or unifocal premature ventricular beat) should be monitored in an intermediate care unit and evaluated with echocardiography if these symptoms persist longer than 12 hours. (7) A patient with progressive dyspnea, ischemic patterns on ECG, or complex arrhythmias, should be treated in an intensive care unit, receive specific therapy, and be investigated further, initially with echocardiography. Taking this approach to patients in stable condition does not exclude the possibility that a few cardiac lesions may not initially be recognized.

Shock in a patient after trauma is initially due to inadequate filling of the heart or acute ventricular failure. A cardiac cause of shock should be suspected in any patient with severe chest trauma, with hypotension that is disproportionate to the estimated loss of blood, or with an inadequate response to the administration of fluid. The most frequent causes of cardiogenic shock after trauma are cardiac tamponade and ventricular akinesia. (3, 9, 10) These two conditions can often be identified with transthoracic echocardiography. This examination

should be done rapidly in the emergency room in suspected cases and, if trans-thoracic studies do not permit diagnosis, transesophageal views should be obtained. The detection of a hemopericardium that impairs cardiac filling requires prompt drainage, ideally by means of a surgical subxiphoid approach in the operating room. The surgically created drainage can be profuse or persistent, in which case immediate thoracotomy is required to control bleeding. Shock from ventricular akinesia may respond to appropriate filling, to inotropic support, or to a reduction in afterload. If these measures fail, intraaortic balloon counterpulsation should be considered to enhance cardiac output (but only after a lesion of the aortic isthmus has been ruled out). (1) Cardiogenic shock from a traumatic valvular or septal tear is rare and requires surgical correction. It may be wise to postpone this operation for one or two days if supportive measures allow it. Cardiopulmonary bypass is necessary for the repair of intracardiac lesions, and the required anticoagulation may precipitate bleeding from other injuries.

Thoracic-Aorta and Arch-Vessel Trauma

Mechanisms and Types of Injury

Deceleration and traction are the classic wounding mechanisms of the thoracic arteries. Horizontal deceleration creates shearing forces at the aortic isthmus, the junction between the relatively mobile aortic arch and the fixed descending aorta. (6) Vertical deceleration displaces the heart caudally and into the left pleural cavity and acutely strains the ascending aorta or the innominate artery. Sudden extension of the neck or traction on the shoulder can overstretch the arch vessels and produce tears of the intima, disruption of the media, or complete rupture of the arterial wall. (6) These injuries may in turn lead to dissection, thrombosis, pseudoaneurysm of the involved vessel, or hemorrhage.

Natural History

Minor lesions of the arterial wall (e. g. , a mural hematoma or a limited intimal flap) have a benign course and frequently regress spontaneously. One must be aware of these lesions because, with the improved resolution of radiologic and echocardiographic studies, they are increasingly diagnosed. Pseudoaneurysms, even small ones, have an insidious course. Very few remain stable over time. They tend to expand and rupture, but may also lead to thrombotic embolization, fistulization to adjacent organs, or the compression of nearby structures.

Rupture of the thoracic aorta immediately leads to death in 75 to 90 percent of cases. (5, 6) The few survivors owe their lives only to fragile perivascular hematomas and surrounding tissues that maintained blood within the vascular lumen. The natural history of aortic rupture has been extrapolated from autopsy reports; without repair, 30 percent of initial survivors die within 24 hours after rupture and more than 50 percent die within one week. (5) These grim statistics have led aortic rupture to be considered a time bomb that often creates an atmosphere of alarm in emergency rooms. This sense of alarm, however, is excessive. Autopsies have never proved that aortic rupture itself was the cause of death, and many patients may have died of associated injuries. The results

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of nonoperative management of aortic rupture, initially undertaken in patients with extremely severe neurologic conditions and then used on patients in stable condition by a few teams, have confirmed that the immediate prognosis for patients who initially survive aortic rupture is less dismal than previously thought. (1) Although good results are reported by those who advocate delaying repair by a few days, no evidence currently validates delaying the repair of aortic rupture beyond the time required for the evaluation and treatment of other emergency conditions. In recent studies, death from the sudden hemorrhage of an aortic tear or from associated injuries occurred during the first hours after admission in 8 to 13 percent of patients with aortic rupture.

Bleeding from an arch vessel is usually contained by local tissues. In rare instances, the avulsion of the origin of an arch artery causes massive bleeding into a pericardial or pleural cavity. Acute occlusion of the innominate or subclavian artery rarely leads to ischemic symptoms of the arm or hand, owing to the rich collateral network of vessels. Acute occlusion of the common carotid artery, however, may result in brain ischemia. This artery is also prone to traumatic dissection, which may extend distally to occlude the internal carotid artery after a few hours and thus produce a delayed neurologic deficit. Because of the low blood pressure inside the vessel, the tearing of a thoracic vein does not lead to major hemorrhage unless it bleeds into the pleural cavity, which can occur with the azygos or pulmonary veins. (1)

Hematomas in the mediastinum from a vein injury are common and, although generally innocuous, can be troublesome if they produce a widening of the mediastinum visible on chest radiography. This sign is a hallmark of thoracic arterial injury and should be followed up with further testing and imaging.

Diagnosis

Severe deceleration may have torn a thoracic artery despite the absence of external signs of chest trauma. The circumstances of the accident may be the sole clue to such an injury. Specific signs of an injury to the thoracic aorta are rarely present. Pseudocoarctation or decreased blood pressure in the left arm occurs in only 5 percent of patients with rupture of the aortic isthmus. Clinical signs of injury to an arch artery are more common and include cervical or supraclavicular hematomas, bruits, and diminished peripheral pulse. Coma or a hemisyn-drome may occur in cases of the rupture of a common carotid artery. The denervation of an arm due to laceration of the brachial plexus is frequently associated with rupture of the subclavian artery.

Chest radiography is essential to screen for injuries of the thoracic aorta and arch arteries (Figure 3 - Anteroposterior Chest Radiograph Showing Enlargement of the Upper Mediastinum after Avulsion of the Innominate Artery.). The most reliable radiographic signs of an arterial injury are a widening of the superior mediastinum, blurring of the aortic-knob contour, and enlargement of the paratracheal stripe.

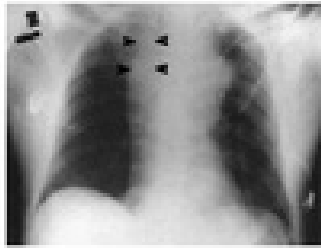


FIGURE 3

Computed tomography (CT) of the chest has a better predictive ability than does standard radiography, but a physician must frequently rely on indirect signs, such as a periaortic hematoma, to diagnose a rupture of the aorta, (4) and CT can miss many arch-vessel injuries. Helical CT more precisely delineates arterial lesions and has excellent accuracy.

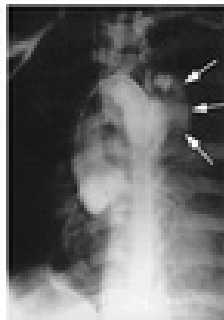


FIGURE 4

Aortic angiography provides images of the entire thoracic aorta and arch vessels (Figure 4 -Angiogram of the Thoracic Aorta Showing a Traumatic Pseudoaneurysm of the Aortic Isthmus (Arrows)) that are easy to read, but the procedure requires some time. (4) Transesophageal echocardiography is rapid and accurate in the evaluation of the aortic isthmus (3) but does not precisely analyze the distal part of the ascending aorta and the arch vessels, because of the interfering presence of the respiratory tract.

Assessment and Management

A particularly troublesome presentation of chest trauma occurs if the circumstances of the accident suggest injury due to severe deceleration but the results of chest radiography are normal. In a patient with a normal chest radiograph, the risk of an injured aorta is very low, but the diagnosis must be excluded. For this purpose, CT is appropriate. Normal CT results almost certainly rule out an injury to the aorta and obviate the need for further examination. The patient should nevertheless undergo regular chest radiography (for up to six months after injury), with further investigation of any new mediastinal abnormality.

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If the mediastinum is enlarged after trauma to the chest, the risk of a thoracic arterial injury is increased, and a diagnosis must be established. In this case, angiography is appropriate, because both CT and transesophageal echocardiography can miss certain vascular injuries, especially of the arch vessels. Figure 3 shows an enlarged mediastinum caused by an avulsion of the innominate artery that was not detected by transesophageal echocardiography.

Differential diagnosis obtained bleeding from spine trauma or from extremities' bonds.

Our experiences

During 16 years we have treated 22 patients with acute chronicle trauma consequences. All patients' data are shown in the next table:

Age of patient	Type of trauma	Intervention	Outcome
18	Puncture of the heart during pericardial drainage	Urgent surgery	Exitus lethalis - After 4 hours
21	Puncture of the heart during pericardial drainage	Urgent surgery	Exitus lethalis - After 8 hours
67	Rupture of LAD with tamponade during angio	Urgent surgery	3 years survival after surgery
32	Blind trauma-contusio- Constrictive pericarditis	Surgery-pericardiectomy	1 year survival after surgery
57	Blind trauma-contusio- Constrictive pericarditis	Surgery-pericardiectomy	7 months after surgery died due to global heart failure
58	Posttraumatic aortic arch aneurysm	Surgery	6 years survival after surgery
59	Posttraumatic rupture of the descending aorta	Urgent surgery	4 years survival after surgery
28	Posttraumatic dissection of the descending aorta	Conservative	5 years survival after trauma
63	Posttraumatic dissection of the arch and descending aorta	Conservative	8 years survival after accident
37	Acute dissection of the proximal part of descending aorta	TEVAR	5 months survival after intervention
26	Acute dissection of the proximal part of descending aorta	Urgent surgery	6 years survival after surgery

Medical treatment aimed at controlling or reducing stress on the aortic wall should be performed in any patient with a suspected or identified aortic tear. Such treatment should include the prevention and treatment of hypertension, adequate sedation and analgesia, and the prevention of movement of the tho-

racic vertebral column. Short-acting beta-blockers reduce blood pressure, the force of the arterial upstroke, and heart rate and are particularly suitable for reducing stress on the aortic wall.

Surgery is indicated for the repair of most arterial lesions. Repair of the ascending aorta and the aortic arch usually necessitates full circulatory support with extracorporeal circulation or by stent transcatheter stent implantation.

Conclusion

All types of trauma in cardiothoracic surgery needs to be recognized on time, diagnosed. Multidisciplinary team model ensures adequate and prompt treatment with good clinical patient outcome.

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TRAUMATIZED PATIENTS IN ICU

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Introduction

Trauma is a major health problem and a leading cause of morbidity and mortality in the younger population. Trauma is the leading cause of death in the age group of 1- 44 years, and after malignant and atherosclerotic disease in all age groups. The extent of injuries is wide and varied, ranging from isolated violations limb or an organ, to the serious multi-organ injuries. Traumatized patient who requires treatment in the ICU is the severely injured patient with multiple injuries that required intensive monitoring and resuscitation. The treatment in the ICU also require some patients with isolated injuries of organs, such as brain injury with GCS under 8 or isolated violations of the liver, spleen, kidney or pelvic fractures. According to the Berlin definition polytrauma is a violation of the two regions of the body with AIS 3 or more (Abbreviated Injury Scale - AIS), in the presence of at least two pathological conditions (hypotension, SBP > 90 mmHg, GCS >8, coagulopathy (aPTT > 40, INR ≥1, acidosis. The complexity of the clinical features, and making a decision on the treatment of injuries, requires a multidisciplinary approach in the treatment of polytraumatized patient. The last thirty years have significantly improved the results of treatment of multiple trauma due to the advanced diagnostic and therapeutic methods. ¹ Treatment of polytraumatized patient is a challenge for doctors intensivists who must know the respiratory, cardiovascular, metabolic and immunological disorders that may occur or as a result of the trauma itself or complications that may occur. In multiple injured patients complications are common that further complicate the situation. In the primary survey, airway, breathing, and circulation are assessed and immediate life-threatening problems must be diagnosed and treated. An easy-to-remember mnemonic is ABCDE: airway, breathing, circulation, disability, and exposure/environment control. The primary survey usually takes no longer than a few minutes, unless procedures are required. The primary survey must be repeated any time a patient's status changes, including changes in mental status, changes in vital signs, or the administration of new medications or treatments. Virtually all critically injured patients require some degree of immediate physiologic support on arrival to the ICU. This includes assurance of adequate respiratory and ventilator support as well as aggressive intervention to minimize secondary central nervous system (CNS) injury, resolve critical acid-base and electrolyte disorders and restore normothermia. ² Treatment is aimed towards normalization of physiologic parameters: pulse rate (60-100 beats per minute), blood pressure (mean arterial pressure 90-100 mm Hg), pH (7. 35-7.

45), urine output (>0.5 mL/kg/h for adults, 1 mL/kg/h for children, 2 mL/kg/h for neonates), mental status, serum lactate level, and no base deficit.³ The secondary survey is performed only after the primary survey has been finished and all immediate threats to life have been addressed. The secondary survey is a head-to-toe examination designed to identify any injuries that might have been missed. Specialized diagnostic tests are performed to confirm potentially life-threatening injury only after the primary survey has been completed, all immediate threats to life are treated or stabilized, and hemodynamic and ventilation status are normalized. These tests include CT scanning, extremity radiography, endoscopy, and formal ultrasonography. The secondary survey ends with the assessment of the musculoskeletal system, and this is when the orthopedist's skills are required. Palpate all joints and long bones, and assess pulses, capillary refill, sensation, and motor strength. Also determine whether different limb lengths may indicate hip fracture or dislocation or pelvic fracture. Splint all fractures above and below the joint after realignment of the limb. Perform immediate reduction of dislocations, especially if neurovascular compromise is present.⁴ The tertiary survey is performed 24 hours after the polytrauma patient has been admitted to the ward or ICU or 24 hours after the initial surgery, except if it was considered a "damage control" operation.⁵ The massive violation leads to activation of the immune system and early immune response is defined as a systemic inflammatory response syndrome (SIRS). The infection, ischemia or surgery can boost the immune response and correlate with morbidity and mortality in the traumatized patient.⁶ Systemic inflammation has been associated with the initiation of the coagulation cascade and the appearance of coagulopathy. Approximately 25-35% of traumatized patients already on admission to the emergency department are with some degree of coagulopathy. Coagulopathy in the traumatized patient may be a result of acidosis, hypothermia, hemodilution or systemic inflammation.⁷ Coagulopathy is one of the indicators of severity and correlates with mortality.⁷

Patients and Methods

We analyzed the patients who were hospitalized in the ICU, University Clinical Center Tuzla in 2015. due to trauma. All patients were on admission to ICU placed peripheral intravenous cannula larger diameter (2 or more) or a central venous catheter, depending on the severity of injuries, and included fluid with the monitoring of vital parameters. After the first review estimated the injuries were estimated, and appropriate specialists were invited in consultation and proper diagnostic tests were conducted after which we planned further therapeutic treatment. If necessary, additional specialist examinations or diagnostic tests were made. All the patients were evaluated on SIRS score on admission and after 72 h, and on DIC score after 24 and 72 h, and assessed on the occurrence of changes in coagulation.

SIRS score was graded based on the following parameters:

- Body temperature higher than 38° or less than 36°
- Heart rate greater than 90 beats per minute

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- Respiratory rate greater than 20 breaths per minute or pCO₂ less than 32 mmHg (4, 3kPa)
- WBC count greater than 12, 000 or less than 4000, or the presence of more than 10% immature neutrophils

Every positive parameter values to a point. Two or more points indicate the systemic inflammatory response of the body.

DIC score was graded on the basis of parameters:

- Platelet count: more than 100 points = 0; 50-100 = 1 point; less than 50 = 2 points
- Increased value of fibrin degradation products (D dimer) is not elevated = 0 points; moderately elevated = 2 points; markedly elevated = 3 points
- Prolonged prothrombin time: less than 3 s = 0 points; more than 3 s = 1 point; more than 6 s = 2 points
- The value of fibrinogen: greater than 100 mg / dl = 0 points; less than 100 mg / dl = 1 point.

Score 5 and higher indicates the presence of DIC - a. Based on the obtained data assessed the correlation of changes in coagulation with the intensity of the inflammatory response, as well as the correlation of these changes with the outcome of treatment.

Statistical analysis was done by descriptive statistics with calculation of the mean and standard deviation, and t-test, χ^2 test to calculate the significance of the established results. Relationships between variables were tested using the Pearson and Spearman correlation. Statistical analysis was performed with a confidence interval of 95%, a value of $p < 0.05$ was considered significant.

Results

During 2015. received a total of 693 patients, of which 66 patients hospitalized due to trauma (54 male and 12 female). The average age was 39. 12 years. Injuries are, in most cases sustained in a traffic accident and that in 68% of cases in the car, and in 11% of cases as pedestrians (Figure 1). Injuries prevailed brain and lungs, as well as fractures of facial bones (Figure 2). The average duration of hospitalization was 12.27 ± 12.14 days. The mean systolic blood pressure on admission to the OIT was 124.59 ± 26 mmHg and diastolic 68.10 ± 19.13 mmHg, and heart rate 106.96 ± 25.03 , with good correlation of blood pressure with the outcome of treatment (table 1). On admission to the ICU, 23 patients are connected to mechanical ventilation with an average duration of 6.43 ± 8 days. Due to the injuries 35 of patients underwent surgery. All patients had already on the admission a systemic inflammatory response syndrome, assessed by SIRS score. The average value of SIRS score on admission was 2.10 ± 0.65 , with a decreasing tendency and an average value of 1.48 ± 0.70 after 72 hours (Figure 3). SIRS score was well correlated with the duration of mechanical ven-

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tilation and outcome of treatment, but also with DIC score (Table 2). After 24 hours the DIK score averaged 2.5 ± 1.04 (Figure 4), and after 72 hours 3.59 ± 1.48 , and correlated well with the result of treatment, duration of mechanical ventilation, and the value AT III (table 2). In 21 patients complications have arisen, mostly pneumonia and sepsis (Figure 5), and in 16 patients the treatment was ended in death.

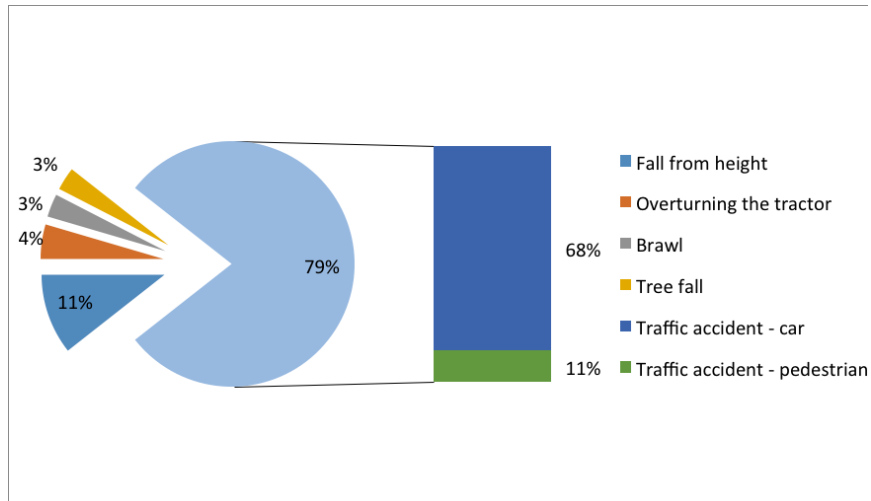


Figure 1. Mechanism of injury

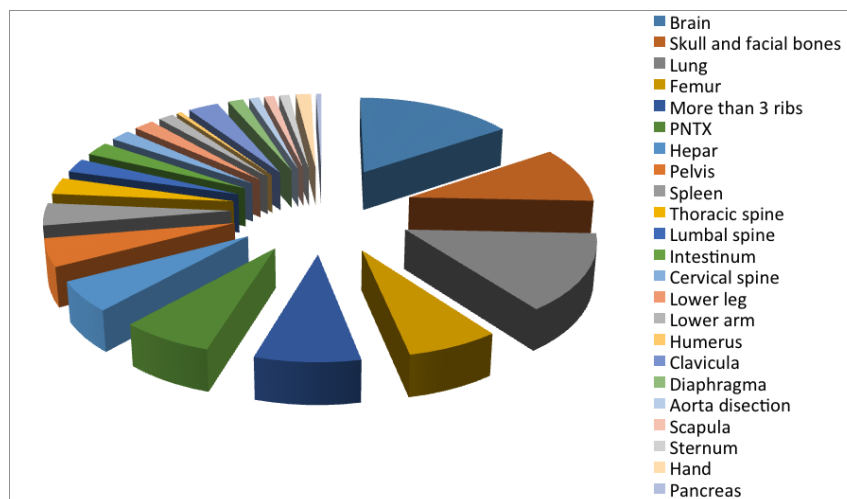


Figure 2. Type of injury

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Variable	Sistolic BP/ outcome	Diastolic BP/ outcome	HR/outcome
Value			
Sample size	66	66	66
Correlation coefficient r	-0,4663	-0,5357	0,0294
Significance level	P=0,0001	P<0,0001	P=0,0172
95% Confidence interval for r	-0,6365 to -0,2528	-0,6885 to -0,3374	0,05417 to 0,4991

Table 1. Correlation between hemodynamic parameters and outcome

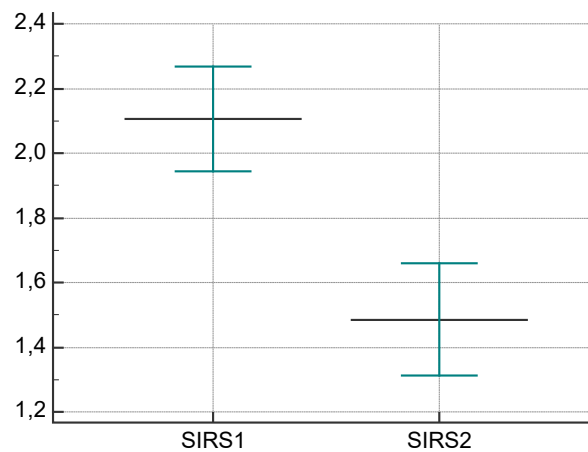


Figure 3. SIRS score on admission and after 72 hours

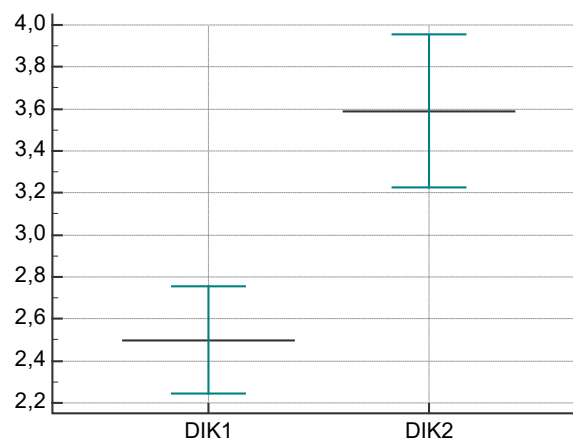


Figure 4. DIK score after 24 and 72 hours

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Value	Sample size	Correlation coefficient r	Significance level	95% Confidence interval for r
Variable				
SIRS1/outcome	66	0,7039	P<0,0001	9,5567 to 0,8082
SIRS2/outcome	66	0,7525	P<0,0001	0,6241 to 8413
SIRS1/MV	66	0,3293	P=0,0069	0,09485 to 0,5292
SIRS2/MV	66	0,1639	P=0,1884	-0. 08134 to 0,3905
SIRS1/DIK1	66	0,5102	P<0,0001	0,3060 to 0,6696
SIRS2/DIK2	66	0,5158	P<0,0001	0,3128 to 0,6737

Table 2. Inflammation parameters

Value	Sample size	Correlation coefficient r	Significance level	95% Confidence interval for r
Variable				
DIK1/outcome	66	0,65	P<0,0001	0,4841 to 0,7707
DIK2/outcome	66	0,7791	P<0,0001	0,6619 to 0,8591
DIK1/complications	66	0,2361	P=0,0564	-0,006339 to 0,4523
DIK2/complications	66	0,3434	P=0,0048	0,1106 to 0,5405
DIK1/MV	66	0,2749	P=0,0255	0,03516 to 0,4847
DIK2/MV	66	0,4218	P=0,0004	0,2003 to 0,6024
DIK1/AT III 1	66	-0,4624	P=0,0001	-0,6336 to -0,2482
DIK2/AT III2	66	-0,5098	P<0,0001	-0,6692 to -0,3054

Table 3. Coagulation parameters

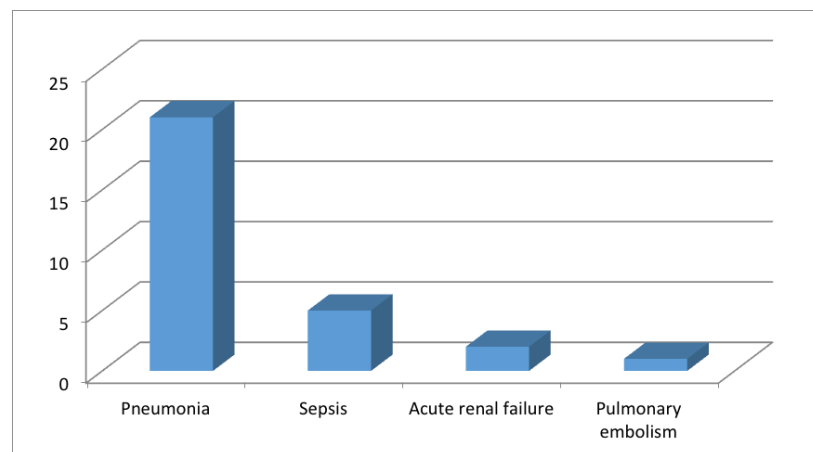


Figure 5. Complications in traumatized patients

Discussion

Injuries can be caused by any combination of external forces that act physically against the body. The leading causes of traumatic death are blunt trauma, motor vehicle collisions and falls. The initial assessment involves a physical evaluation and can also include the use of imaging tools to accurately determine a type of injury and to formulate a course of treatment. The initial assessment is critical in determining the extent of injuries and what will be needed to manage an injury, and treating immediate life threats. The body responds to traumatic injury both systemically and at the injury site. This response attempts to protect vital organs such as the liver, to allow further cell duplication and to heal the damage. The immune system responds rapidly to traumatic injuries by reacting to tissue damage. Following this initial response to injury, cells and mediators of the innate and adaptive immune systems undergo temporal change that have been categorized into pro inflammatory and counter inflammatory immune responses and are commonly referred to as SIRS, CARS, or MARS.¹³ In our study 83% of patients had SIRS on admission, with a decreasing tendency in the further course, and significantly correlate with outcome and duration of mechanical ventilation, as well as with DIK score. SIRS is common, with 92.4% of patients manifesting SIRS at admission. SIRS is the most prevalent during the first week post injury (91% of patients manifesting SIRS), decreasing to 69% and 50% during post injury weeks 2 and 3.⁸ The SIRS score provides useful information regarding a patient's physiological state and represents a compensatory response to injury. SIRS leads to the initiation of the coagulation cascade which may be started and by the action of the trauma itself. Initiation of the coagulation cascade results in the activation of the external, internal or both coagulation pathways. Coagulopathy in trauma patients, and specifically acute traumatic coagulopathy (ATC), is associated with higher transfusion requirements, longer intensive care unit and hospital stays, more days requiring mechanical ventilation, and a greater incidence of multiorgan dysfunction. Compared with patients who do not have coagulopathy, those with coagulopathy have a three-fold to fourfold greater mortality, and are up to eight times more likely to die within the first 24 hours following injury.⁹ In our study, DIK score correlated well with outcome and during of mechanical ventilation. The tendency of SIRS score decreasing, and the tendency of increase DIK score from admission to further, indicates that due to the measures intensive care taken it came to calming the parameters of inflammatory reactions, but it remains a long-lasting effect by the activated coagulation cascade. Monitoring of coagulation parameters is important to monitor the effect of treatment of the traumatized patient.

Conclusion

Trauma causes complex sequence of reactions of the body which then cascading connect to each other. Due to complexity of the reaction, traumatized patient requires intensive monitoring and treatment in order to timely recognize disorders that can seriously impair or endanger the life of a traumatized patient. Trauma itself, but also the systemic inflammatory response syndrome triggers a response of coagulation system which significantly affects the outcome of treat-

ment. This points to the importance of monitoring parameters of coagulation from the beginning of intensive treatment of traumatized patients in order to timely detect and correct the disorder and thus impact on the prevention of complications and outcome of treatment.

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FLUID RESUSCITATION IN POLYTRAUMA

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Trauma is a global disease with increased morbidity and mortality and serious socio-economic consequences, while polytrauma is the leading cause of death in young adults. Epidemiological data indicate that bleeding is the major cause of mortality in multiple trauma patients and that most related to bleeding deaths occur within the first 6 hours after in-hospital admission. It is worth mentioning that traumatic hemorrhage is the most frequent preventable cause of death¹. Therefore, “fluid resuscitation” has a pivotal role in the initial management of multiple trauma patients, particularly before surgical intervention, aiming to replace blood loss, restore intravascular volume and preserve tissue perfusion. However, the ideal type and volume of the administered fluids are still under investigation.

In the pre-hospital fluid resuscitation, the available options include crystalloids (isotonic or hypertonic solutions) and colloids such as dextrans, gelatins and hydroxyethyl starches (HES). During in-hospital management, blood and hemoderivatives are also available and may be utilized accordingly.

During fluid resuscitation in trauma patients, fluid’s pharmacokinetic and pharmacodynamic parameters should be taken into consideration and guide medical decisions.

The major concerns regarding the use of isotonic normal saline solution include its short intravascular half-life and the risk of induced *hyperchloremic metabolic acidosis* following high-volume administration. Ringer’s lactate, though enriched with calcium and potassium, contains less sodium & chloride than plasma and is slightly hypotonic in comparison with it.

Hypertonic fluids are used for a short period during initial management and administered at low amounts. It has been found that hypertonic solutions result in better volume expansion with less tissue edema compared to isotonic solutions and that have immunomodulatory properties that may confer neuroprotection especially in patients with head injury.

From colloid solutions, gelatins are rarely used in developed countries due to their limited ability to expand the intravascular space comparing to crystalloids and their potential risks of anaphylactic reactions. The clinical use of dextrans is also limited due to their adverse effects such as severe anaphylactic reactions, **coagulation abnormalities, interference with cross-match and precipitation of acute renal failure**. The first and second-generation HES are associated with various side effects including **coagulation disturbances, anaphylactoid**

reactions, and renal impairment. However, the third generation HES (tetra-sarches) with lower molecular weight, lower molar substitution and lower C2/C6 ratio, it seems to have improved pharmacokinetic and pharmacodynamic profile, and are widely used.

Generally, colloids are considered to have a greater intravascular persistence when compared to crystalloids. However, there is no convincing evidence showing a clear superiority of colloids over crystalloids in trauma victims.²

Traditionally, "Aggressive Volume Replacement" was used during resuscitation of trauma patients. However, recent evidence indicates that early, aggressive fluid resuscitation strategies lead to a poor clinical course and an increased mortality rate.³ Large volume of the administered fluids can aggravate hemorrhage by increasing blood vessel wall tension and influx and enabling the release of a clot and by causing dilutional coagulopathy. Apart from that, secondary abdominal compartment syndrome after aggressive fluid resuscitation has been reported in polytrauma patients treated with large amounts of isotonic crystalloids solutions. The underlying pathogenic mechanism was the drop of oncotic pressure and the development of increased tissue edema.

Last years, a *restrictive fluid* resuscitation approach has been introduced in this clinical setting, the "Hypotensive Resuscitation Strategy", which advocates minimal intravenous fluids use in trauma patients. It is also known as "Permissive hypotension" or low volume resuscitation. Permissive hypotension is contraindicated in patients with brain injury or spinal cord injury, where sufficient perfusion pressure of CNS is deemed necessary. Also, increased attention is needed in elderly patients and in patients with chronic hypertension. Prospective randomized controlled trials in trauma patients with hemorrhagic shock have shown benefits from both, out of hospital and in-hospital hypotensive resuscitation strategy.⁴ Besides, Permissive hypotension, along with Hemostatic resuscitation and Damage control surgery are the three major components of the "Damage control resuscitation", which consist the most modern approach to initial management of polytrauma patients.

Assessment of fluid responsiveness during resuscitation is based on the clinical evaluation (hemodynamic parameters, urine output, capillary refill time etc.) and laboratory measurements. Transthoracic echocardiography has been established as a valuable hemodynamic monitoring tool to guide fluid management and predict fluid responsiveness in major surgery and in critically ill patients hospitalized in intensive care unit. Recent evidence supports the use of Limited transthoracic echocardiogram (LTTE) to guide management of hypotensive trauma patients during their initial resuscitation.⁵ Serum lactate or base deficit measurements are sensitive tests to estimate and monitor the extent of bleeding and shock, while the initial base deficit has been established as a potent independent predictor of mortality in patients with traumatic-hemorrhagic shock.⁶

Regarding the initial fluid resuscitation of trauma patients the relevant updated European Guidelines recommend the initiation of fluid therapy in hemodynamic unstable bleeding trauma patients and the initial use of crystalloids. In

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patients without brain injury, is recommended a target systolic blood pressure of 80 to 90 mmHg until major bleeding stops. In addition, administration of vasopressors is suggested to maintain target arterial pressure in the absence of a response to fluid therapy. Hypotonic solutions, such as Ringer's lactate, should be avoided in patients with severe head trauma. Hypertonic solutions' administration is indicated in hemodynamically unstable patients with penetrating torso trauma. Whenever colloids are used, it is suggested to be administered within the prescribed limits for each solution. During bleeding, repeated Hct measurements are recommended, and red blood cells should be transfused to achieve target hemoglobin of 7 to 9 g/dl. Finally, serum lactate and/or base deficit measurements are recommended to estimate and monitor the extent of bleeding and shock.⁷

In conclusion, a point of care approach should be applied in each individual, taking into account age, comorbidities, as well as severity and type of injury.

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GENERAL OR REGIONAL ANESTHESIA IN OBESE PATIENT

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1. Introduction

Obesity is a worldwide health-care problem. Its prevalence has been rising affecting almost every human organ system (e. g. cardiovascular, pulmonary, urinary and gastrointestinal, endocrine etc.) and causing chronic medical diseases (e. g. systemic hypertension, diabetes mellitus, obstructive sleep apnea syndrome, non alcoholic steatohepatitis etc.) In adults, the body mass index (defined as ratio of body weight in kilogram and squared body height in meter) has been used as the comparative measure to define:

- **overweight** - (BMI = 25–29 kg/m²),
- **obese** - (BMI = 30–39 kg/ m²)
- **morbidly obese** - (BMI > 40 kg/m²).
- **super morbid obesity** - (BMI >55 kg/m²)

The name is derived from the Latin word **obesus**, which means fattened by eating. Individual must be considered obese when the amount of fat tissue is increased to such an extent that physical and mental health is affected and life expectancy reduced. (1)

Country	Prevalence of BMI 30 kg/m ² (%) males	Prevalence of BMI 30 kg/m ² (%) females
Greece	30.3	26.4
Malta	28.1	36.1
United Kingdom	23.7	26.3
Germany	22.9	22.1
Croatia	20.2	32.2
Belarus	16.2	17.6
Denmark	12.0	8.3
Turkey	31, 4	32.5

Table 1. Prevalence of obese adults (BMI - 30 kg/m²) males and females (15–100 years) in the selected European countries according to WHO data in 2010

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Category	Examples
Cardiovascular disease	Sudden (cardiac) death; obesity cardiomyopathy; hypertension; ischaemic heart disease; hyperlipidaemia; cor pulmonale; cerebrovascular disease; peripheral vascular disease; varicose veins; deep-vein thrombosis and pulmonary embolism
Respiratory disease	Obstructive sleep apnoea; c Obesity hypoventilation syndrome
Endocrine disease	Diabetes mellitus; Cushing's disease; Hypothyroidism;
Gastrointestinal disease	Hiatus hernia; inguinal hernia, gallstones;
Genitourinary	Menstrual abnormalities; female urinary incontinence;
Malignancy	Breast, prostate, colorectal, cervical and endometrial cancer
Musculoskeletal	Osteoarthritis of weight-bearing joints,

Table 2. Medical and surgical conditions associated with obesity

2. Regional Anesthesia in Obese

The use of regional anaesthesia in the obese reduces the risks from difficult intubation and acid aspiration and also provides safer and more effective postoperative analgesia. For thoracic and abdominal procedures, most anaesthetists advocate the use of combined epidural and general anaesthesia. This has advantages over general anaesthesia alone, including reduced opioid and potent inhalational anaesthetic requirements, reduced postoperative pulmonary complications, decreased postoperative nausea and vomiting (PONV) and improved postoperative analgesia, allowing physiotherapy and a better cough. and therefore reduced post-anaesthesia care unit (PACU) and hospital length of stay. If sedation is required during regional anaesthesia this should be kept to the minimum. Despite these advantages, RA can be technically challenging in the obese. These challenges are related to difficulties in patient positioning, identifying the usual bony and muscular landmarks, and the depth of needle penetration. (2)

Drug dosage adjustment in regional anesthesia in obese patient

In obese patients, the vena cava is compressed from the weight of the abdominal contents. At one time it was postulated that collateral circulation through the distended extradural veins reduced CSF volume. However, magnetic resonance imaging (MRI) demonstrated that the increased abdominal pressure probably decreases CSF volume by displacing tissue into the vertebral canal through the

intervertebral foramina rather than by changing venous volume from aortocaval compression. Since CSF volume is less in obese patients, the total volume of local anesthetic needed to achieve the same height of neural blockade should be less than in normal weight patients.

Many authors recommend the low dose and the low concentration of local anesthetic for neuraxial block in obese patients. The other did not find evidence for different doses of hyperbaric bupivacaine if single shot spinal anaesthesia is used for caesarean delivery in obese or normal weight patients.

Complications of Spinal Anaesthesia in the Obese Patient

According to literature, the incidence of failed or partially failed SpA ranges is between 0.5 and 17%. The incidence of postdural puncture headaches (PDPHs) ranges is between 0.7 and 11%. Multiple attempts by young trainees as well as experienced operators lead to a more significant reaction of hemodynamic parameters. Obese pregnant patients having spinal anesthesia with low doses of hyperbaric bupivacaine (7.5–10mg) experienced higher sensory blocks than non-obese patients. Similarly, patients undergoing urologic procedures given 4mL of isobaric 0.5% bupivacaine at the L3-L4 space demonstrated a positive correlation between the height of blockade and obesity.

Bedside US assessment of the lumbar spine may facilitate the performance of spinal anesthesia in morbidly obese patients, particularly if no landmarks can be identified or a landmark-based approach has been unsuccessful. Fluoroscopic imaging has also been used in an extremely obese patient to identify relevant landmarks, to approximate the distance to the intrathecal space, and to confirm proper position of the spinal needle (22 gauge, 3.58 inch (75 cm) - 7inch- (17.5cm). The reduced incidence of postdural puncture headache in the morbidly obese patient may be the result of a decreased pressure gradient between the subarachnoid and the epidural spaces, owing to extended epidural veins and increased epidural fat which reduces spinal fluid leakage.

3. Epidural in obese patients

Obese parturients (BMI>30kg/m²) in labor have significantly reduced epidural analgesic requirements, and have higher sensory blocks with a similar dose of local anesthetic than normal weight patients. It would seem to be easy to administer local anesthetics in smaller volumes or in divided doses until an appropriate sensory block is achieved for any obese patient undergoing epidural anesthesia. Increasing weight is significantly correlated with the depth of placement of an epidural at all epidural sites (lumbar, lower, and upper thoracic) and with all approaches (midline, paramedian). The magnitude of catheter movement is greatest with obese patients.

The incidence of complications with epidural anesthesia increases with increasing weight. For example, inadvertent epidural venous puncture during placement occurred more frequently in obese parturients, and this resulted in a higher incidence of multiple punctures. The epidural route for opioid administration

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is preferred over other routes because it produces less drowsiness, nausea and respiratory depression, earlier normalization of bowel motility, improved pulmonary function, beneficial effect on cardiovascular function with a reduction in left ventricular stroke work and reduced hospital stay. When combined with a general anesthetic, epidural anesthesia may result in earlier time to tracheal extubation than with a balanced anesthetic alone.

4. Obesity and the respiratory system

Morbid obesity is associated with reductions in functional residual capacity (FRC), expiratory reserve volume (ERV) and total lung capacity. FRC declines exponentially with increasing BMI. Obese individuals desaturate rapidly after induction of anaesthesia despite pre-oxygenation. This is a result of having a smaller oxygen reservoir in their reduced FRC and an increase in oxygen consumption. Oxygen consumption and carbon dioxide production are increased in the obese as a result of the metabolic activity of the excess fat and the increased workload on supportive tissues. Basal metabolic activity as related to body surface area is usually within normal limits. (3)

Söderberg and colleagues found an intrapulmonary shunt of 10–25% in anaesthetized obese subjects and 2–5% in lean individuals. FRC can be increased by ventilating with large tidal volumes (10–15 ml kg⁻¹) although this has been shown to improve arterial oxygen tension only minimally. The addition of PEEP improves FRC and oxygenation but leads to reductions in cardiac output and oxygen delivery. (3)

Increasing BMI is associated with an exponential decline in respiratory compliance. In severe cases, total compliance can fall to 30% of predicted normal. Although accumulation of fat tissue in and around the chest wall leads to a moderate reduction in chest wall compliance. Increased pulmonary blood volume in obese decreases lung compliance. Significant obesity is also associated with an increase in total respiratory resistance.

OSA - Obstructive sleep apnea

OSA is defined as apnoeic episodes secondary to pharyngeal collapse that occurs during sleep and it may be obstructive, central, or mixed. The incidence of OSA increases with obesity and increasing age. More than 95% of cases go unrecognized. The diagnosis is confirmed by sleep studies. The acid-base disturbance of OSA, i. e. respiratory acidosis, is initially limited to sleep, with a return to homeostasis during the day.

The OSA characteristics are:

1. Frequent episodes of apnoea or hypopnoea during sleep.
2. Snoring;

3. Day-time somnolence, associated with impaired concentration, memory problems and morning headaches caused by nocturnal carbon dioxide retention and cerebral vasodilation.

4 Pathophysiological changes: Recurrent apnoea leads to hypoxaemia (leading to secondary polycythaemia); hypercapnia; systemic vasoconstriction, or pulmonary vasoconstriction (leading to right ventricular failure).

Patients with OSA have increased adipose tissue in the pharyngeal wall, particularly between medial and lateral pterygoids. This results in increased pharyngeal wall compliance, with a tendency to airway collapse.

Obesity hypoventilation syndrome

A long-term consequence of OSA is an alteration in the control of breathing, which is a central apnoeic event. Such episodes, which are associated with a progressive desensitization of the respiratory centres to (nocturnal) hypercapnia, are initially limited to sleep, but eventually lead to type II respiratory failure. At its worst, such obesity hypoventilation culminates in Pickwickian syndrome, which is characterized by obesity, hypersomnolence, hypoxia, hypercapnia, right ventricular failure and polycythaemia. The obesity hypoventilation syndrome affects control of breathing, and includes obese patients who have a daily variation in ventilation and a $\text{PaCO}_2 > 5.9 \text{ kPa}$.

Lung compliance is decreased due to increased pulmonary blood volume. Reduced chest wall compliance results in part from the weight of adipose tissue around the thoracic cage, affecting the inspiratory threshold. There is a linear increase in alveolar-arterial (A-a) oxygen tension gradient with increasing BMI. Airway resistance is increased and correlates with BMI. It is further increased when we transfer patient from a sitting to supine position.

Preoperative evaluation of the airway in obesity patients:

(1) Assessment of head and neck flexion (atlanto-occipital flexion and extension) and jaw mobility

(2) Inspection of oropharynx and dentition (large tongue, excessive palatal and pharyngeal soft tissue)

(3) Inadequate thyro-mental and sterno-mental distances;

(4) Assessment of arterial blood gases, lung function tests and complete blood count (to exclude polycythaemia);

(5) Inspection of previous anaesthetic charts and questioning the patient about previous difficulties, especially any episodes of upper airway obstruction associated with anaesthesia or surgery, pregnancy, head and neck radiotherapy or development of signs and symptoms of upper airway obstruction.

(6) A large neck circumference (greater than 60cm) is a useful indicator associated with a 35% probability of difficult laryngoscopy.

(7) Further imaging of the airway with soft tissue X-rays and CT.

5. Obesity and the cardiovascular system

Healthy obese individuals demonstrate an increased cardiac output; elevated left ventricular end-diastolic pressure (LVEDP) and left ventricular hypertrophy on echocardiography. Left ventricle systolic function is also impaired, especially during exercise; when the ejection fraction rises more slowly, than in lean individuals. The problem is often compounded by hypertension and ischaemic heart disease. (4)

Hyperinsulinaemia, which is characteristic of obesity, can contribute by activating the sympathetic nervous system and by causing sodium retention. In addition, insulin resistance may be responsible for the enhancement in pressor activity of norepinephrine and angiotensin II. Hypertension leads to concentric left ventricular hypertrophy and when added to the increased blood volume, increases the risk of cardiac failure. Other factors such as hypertension, diabetes mellitus, hypercholesterolaemia and reduced high density lipoprotein levels, which are all common in the obese, will compound the problem.

The morbidly obese tolerate exercise badly with any increase in cardiac output being achieved by increasing the heart rate, without an increase in stroke volume or ejection fraction. This is often accompanied by an increase in the filling pressures. Increased activity in the renin-angiotensin system and secondary polycythaemia play a role in this volume expansion. In the same way, changing position from sitting to supine is associated with significant increases in cardiac output, pulmonary capillary wedge pressure and mean pulmonary artery pressure, together with reductions in heart rate and peripheral resistance.

LV dilatation results in increased LV wall stress and hypertrophy, progressing to reduced ventricular compliance. Diastolic dysfunction is characterized by impaired ventricular filling, and ultimately by an elevated LV end-diastolic pressure. Furthermore, LV failure and pulmonary vasoconstriction result in pulmonary hypertension and dilatation of the right heart.

The obese patient is more at risk from arrhythmias because of: myocardial hypertrophy and hypoxaemia; hypokalaemia from diuretic therapy; coronary artery disease; increased circulating catecholamines; OSA (sinus tachycardia and bradycardia); and fatty infiltration of the conducting and pacing systems. This results in an obesity- atrial fibrillation, and increased risk of sudden cardiac death. There is an increased incidence of prolongation of the QT interval with increasing of BMI.

6. The obese pregnant patient difficulties:

Increased risk of chronic hypertension, pre-eclampsia and diabetes; difficult labour with increased instrumental delivery and Caesarean section; increased risk of failed intubation and gastric aspiration; increased incidence of multiple, failed attempts at epidural siting and increased risk of fetal morbidity and mortality. . Caesarean section operations tend to be longer with a higher incidence of postoperative complications, including greater blood loss, deep-vein thrombo-

sis and wound infection or dehiscence. There is an increased risk of preterm delivery in pregnant obese women. Babies born to obese mothers are at increased risk of shoulder dystocia, brachial plexus lesions, fractured clavicle and congenital birth defects such as neural tube defects. (5)

The major challenges in regional anesthesia for obese pregnant women are the identification of appropriate landmarks, adequate patient positioning prior to perform the block, choosing a needle of sufficient length and the appropriate dose of local anesthetic. Ultrasound studies confirm changes in spinal anatomy and increased skin to epidural distance during gestation.

7. Conclusion

Difficulties of performing regional techniques in obese patients must be considered. Despite the fact that a successful regional anesthetic allows minimal manipulation of the airway, it does not free the patient from the potential for airway compromise. Ultrasonography used for neuraxial blockade remains controversial. We conclude that obesity is not a contraindication for the use of regional anesthesia when performed by an experienced anesthesiologist familiar with morbidly obese surgical patients.

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REGIONAL ANESTHESIA IN PATIENTS WITH NEUROLOGIC DISEASE

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General Considerations. Patients with preexisting neurologic disease present a unique challenge to the anesthesiologist. These patients should be considered not only the neurologic disease and neuromuscular deficits, but also the secondary effects the disease may have had on other organ systems. Common to most neurological diseases is the existence of muscular weakness with autonomic dysfunction, cardiovascular or respiratory difficulties, but also the presence of bulbar dysfunction and a risk of aspiration pneumonia. These patients are often malnourished and finally, there is a problem with therapy, because there are a number of drugs that alter pharmacokinetics and pharmacodynamics properties of anesthetics. The cause of postoperative neurologic deficits is difficult to evaluate, because neural injury may occur as a result of many factors such as surgical trauma and stress, improper patient positioning or tourniquet pressure, prolonged labor and anesthetic technique itself. Progressive neurologic diseases such as multiple sclerosis may coincidentally worsen perioperatively, independent of the anesthetic method. Therefore, if anesthesia is indicated for operative procedure the patient preoperative neurologic status should be fully evaluated and documented. The patients should be also informed about technical difficulties, possible relapses or progression of preoperative neurologic deficits associated with the operative procedure.

When faced with neurological disease, many anesthesiologists will consider the setting of neurologic disease is contraindication for regional anesthesia. Past publications have deterred anesthesia providers from utilizing regional anesthesia on patients with pre-existing neurologic disorders. In fact, two main characteristics of the neuromuscular system are considered as a contraindication to regional (neuraxial) anesthesia: the increased intracranial pressure and evolving or unstable neuromuscular disease. Progressive neurologic disease is considered by some to be a relative contraindication to regional anesthesia because of the difficulty in determining the cause of new neurologic deficits that appear postoperatively. It is unclear if these risk factors are associated with deteriorating neurologic status in patients suffering from chronic neurologic compromise. Upton and Mc Comas first described the "double-crush" phenomenon which hypothesizes that nerve fibers in patients with preexisting neural disease are already compromised and may be more vulnerable to injury at another site when exposed to a secondary insult which include a variety of mechanical, ischemic or toxic risk factors (1). Actually, patients with preoperative neurologic deficits may theoretically undergo further nerve damage more readily. Several theoretical factors contribute to this belief: 1. an increased local anesthetic toxicity espe-

cially if higher concentrations for a longer duration are used; recently, some authors claim that lidocaine more than other local anesthetics has been shown to be neurotoxic in clinically concentrations, even in short durations, 2. neurologic injury from needle-or catheter-induced mechanical trauma to nerve, 3. ischemia secondary to local anesthetic additives; adding adrenaline and combination of stress, surgery and anesthesia all factors contribute to relapses or progression with neurologicdisease.

On the other hand, the new published evidences report about some others experiences. McSwain JR (2014) reviews the published evidences regarding regional anesthesia in pre-existing neurologic disease and reports that although publications are sparse, neuraxial and peripheral regional techniques have been successfully utilized without any neurologic complications in patients with MS, Gulillain-Barre, neuromuscular and neurofibromatosis diseases and may have benefits over general anesthesia (3). In this respect, the most extensive study was done by Hebl JR (2006) in 139 patientswith a preexisting CNS disorders; it reports encouraging results of using the neuraxial anesthesia in neurologic patients, tab. 1 (2).

Neurologic Diagnosis	Number of Patients (N)	Percentage (%)
Post-Poliomyelitis	79	56.4
Multiple sclerosis	35	25
Traumatic spinal cord injury	13	9.3
Amyotrophic lateral sclerosis	5	3.6
Guillain-Barré syndrome	3	2.1
Meningomyelocele	2	1.5
Cauda equina syndrome	1	0.7
Huntington's chorea	1	0.7
Neurosyphilis with paraplegia	1	0.7

Tab. 1 CNS diagnosis and number of patients involved.

From Hebl et al. Anest Analg 2006; 103: 223-8 (the medical record of all patients with CNS disorders at the Mayo Clinic from the period 1988-2000 who received neuraxial anesthesia).

Gender distribution was 86 (62%) males and 53 (38%) females. Mean patient age was 60 ± 17 yrs. CNS diagnoses were present a mean of 23 ± 23 yrs. . The majority of patients had sensorimotor deficits at the time of block placement. A satisfactory block was reported in 136 (98%) patients. There were no new orworsening postoperative neurologic deficits occurred when compared to preoperativefindings (0.0%; 95% confidence interval, 0.0%–0.3%). Given all these experiences, the authors concluded it may be prudent to reconsider the long-standing belief that neuraxial anesthesia be considered an absolute contraindication with this population.

Regional anesthesia and Chronic Disorders of Central Nervous system. *Multiple Sclerosis (MS)* is a degenerative disease of the CNS characterized by multiple sites ofdemyelination in the brain and spinal cord. The peripheral nerves are

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not involved. Symptoms predominantly start in the early adulthood and women are predominantly affected. Vision disturbances, sensory deficits, limb weakness and bowel or bladder dysfunction are the initial clinical manifestations. The course of the disease consists of exacerbations and remissions of symptoms, and the unpredictability in the patient's changing neurologic status must be appreciated when selecting an anesthetic technique. Stress, surgery, and fatigue have been implicated in the exacerbation of multiple sclerosis.

It is generally agreed that local anesthetics administered in clinically appropriate doses and concentrations do not cause nerve damage. However, prolonged exposure to high concentrations of local anesthetic solutions may result in permanent neurologic deficits. Theories to explain any exacerbation of MS symptoms by spinal anesthesia focus on the potential for an increased susceptibility of demyelinated areas of nerves to the direct neurotoxicity effects of local anesthetics. In addition, intrathecal morphine has also been used successfully without exacerbation in pregnant patients with multiple sclerosis (2). Patients with underlying nerve dysfunction may have a decreased requirement for local anesthetic and a decreased threshold for neurotoxicity. Epidural anesthesia has been recommended over spinal anesthesia because the concentration of local anesthetic in the white matter of the spinal cord is one-fourth the level after epidural administration. A dilute solution of local anesthetic with spinal or epidural anesthesia is also advised (3).

Past cases reported that epidural and, more often, spinal anesthesia have been implicated in the relapse of MS, although the evidence is not strong and contradictory. But, recent comprehensive reviews and editorials have suggested that both spinal and epidural anesthesia may be safely administered for MS without any neurologic complications nor increased anesthetic duration (4). In addition, 12-month obstetric follow up for neurological complications after spinal anesthesia has been reported for successful procedure without neurologic complications in parturients affected by MS. It seems that pregnant patients with MS are characterized by remission during gestation because of a presumed immunomodulatory protective effect (similar to other parturients with autoimmune disorders such as RA). In fact, patients who have had a full-term pregnancy have a tendency toward an increased time interval to sustained disability (5). Patients are likely to have more relapses in the first 3 months postpartum period (regardless of whether they received an epidural).

Despite concerns, there are many reports of successful use of epidural anesthesia in multiple sclerosis patients without evidence of relapse. A large prospective observational study of 254 parturients with MS found that epidural analgesia to not affect the rate of relapse or worsen pre-existing neurologic symptoms (4). Because multiple sclerosis is a disorder of the central nervous system, peripheral nerve blocks should not affect neurologic function and should be considered appropriate anesthetic techniques. Due to the lack of clinical studies and mostly anecdotal case reports, the anesthesiologists have to do their own judgment regarding the use of peripheral blocks in patients with MS.

Amyotrophic Lateral Sclerosis (ALS) is a degenerative disease of lower motor neurons, motor nuclei of the brainstem, and descending pathways of upper motor neurons. The etiology remains unclear, most frequently affects males and starts around the age of 60 with the incidence of about 2 people/100,000 per year. The parts of the body affected by early symptoms of ALS depend on which motor neurons in the body are damaged first. About 75% of people contracting the disorder first experience "limb-onset" ALS- weakness or atrophy in an arm or leg. About 25% of cases begin with "bulbar-onset" ALS. A smaller proportion of people experience "respiratory-onset" ALS. Death from myocardial or respiratory failure ensues, often within 6 years of the onset of symptoms.

There is a very small number of studies in this area: epidural anesthesia has been successfully used in patients with ALS- it was reported in three cases in which lumbar epidural anesthesia was used, emphasizing the advantage of avoiding tracheal intubations (3). In this patient population, any duration of mechanical ventilation could accelerate the loss of muscle tone, and weaning from the ventilator could be a challenge. However, a high epidural or spinal block can affect intercostal muscle function with detrimental effects in patients with minimal ventilatory reserve.

Regional anesthesia and Disorders of Peripheral Nervous System. Some metabolic disorders like diabetes mellitus, lumbar radiculopathy, poliomyelitis and sensory-motor peripheral neuropathy, Guillain-Barre syndrome or serious nutritional deficiencies, all present potential management dilemmas for anesthesiologists. Clinically, the peripheral neuropathy predominantly affects the lower extremities with presents of paresthesias, weakness, and sensory loss but subclinical peripheral neuropathy may be present before the onset of pain, paresthesia, or sensory loss making it difficult to define the actual risk of neurologic complications in these patients. The use of regional anesthesia in patients with preexisting peripheral neuropathies depends on a thorough analysis of the risks and benefits for each individual patient. *Diabetic patients* with peripheral and autonomic neuropathies are encountered frequently in patients presenting for anesthesia and surgery. The associated autonomic neuropathy may be significant, with anesthetic implications related to each patient. The presence of combinations of diabetes-associated microangiopathy of nerve blood vessels and underlying nerve dysfunction may have implications with prolonged exposure to local anesthetic solutions and decreased requirement for local anesthetic in diabetic patients. Furthermore, large doses of local anesthetics have been associated with an increased risk of myocardial depression with episodes of exaggerated hypotension, even an increased risk of cardiac arrest (2). On the other hand, the diabetic patient might benefit from a regional anesthesia because the technique allows an improved ability to maintain blood glucose control with the inhibition of the surgical stress response. Ultimately, the awake patient might report some serious perioperative symptoms such as angina. This must be weighed against other risks and benefits that would affect the patient. A large retrospective study of 567 patients with a sensorimotor neuropathy or diabetic polyneuropathy who underwent regional neuraxial block evaluated the risk of neurologic complications. All patients had a single neurologic peripheral neu-

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ropathy and the majority of patients had episodes of sensorimotor deficits at the time of surgery; only two (0.4%; 95%CI 0.1%-1.3%) patients experienced new or worsening postoperative neurologic deficits when compared to preoperative findings. The investigators concluded that neuraxial blockade does not appear to increase the risk of neurologic complications among patients with diabetic sensorimotor or polyneuropathy (6).

Guillain-Barre syndrome is an acute autoimmune inflammatory demyelinating disease of the peripheral nervous system (1:100,000/year). It begins in the lower extremities and progresses cephalad over hours to days. Bulbar dysfunction and intercostal muscle weakness may ensue, with resultant respiratory failure and the patient's inability to protect their airway. Painful distal extremity paresthesias are common. Autonomic dysfunction occurs in a significant number of patients, which results in hemodynamic instability, tachycardia, and cardiac conduction disturbances. Ninety percent of patients will have the most progressive symptoms within 2 weeks.

Regional, in particular epidural anesthesia has been used successfully in patients with *Guillain-Barre* without adverse effects. Normally, no patients received local anesthetics in the acute phase of disease although these patients had some residual effects from an episode of *Guillain-Barre* in the past. Although the number of study case reports are infrequent, it has not been shown that opioids might cause some toxicity administered neuraxially in patients with neurologic disease—even in the setting of acute demyelination. However, when considering regional techniques, patients can have exaggerated responses to indirect vaso-pressors because of their autonomic dysfunction (3).

Neuromuscular junction diseases. Myasthenia gravis and Lambert Eaton syndrome are immune diseases that disrupt this process in the neuromuscular junction. Consequently, patients have an elevated risk of postoperative respiratory failure that may be decreased through regional anesthesia and avoidance of general anesthesia and paralytics.

Myasthenia gravis is an autoimmune disorder of unknown etiology characterized with presence of postsynaptic acetylcholine antireceptor antibodies (70%–90% of patients) thus affecting the neuromuscular junction and blocking the neuromuscular transmission. Clinically, patients have skeletal muscle weakness worsened by activity and improves with cholinesterase inhibition. Although smooth and cardiac muscle are uninvolved, myocarditis and dysrhythmias may be present. Treatment include cholinesterase inhibitors, corticosteroids, immunosuppressant's, plasmapheresis, and thymectomy. Progressive weakness may be associated with progression of the disease (myasthenic crisis) or may reflect excessive muscarinic effects of anticholinesterase drugs (cholinergic crisis). Ocular symptoms are common.

Evidence: the safety and utility of neuraxial techniques is well described in patients with myasthenia gravis. The usage of regional anesthesia may reduce respiratory risk by avoiding the depressant effects of opioids as well as inhaled agents and neuromuscular blockers. In addition, postoperative analgesia and

chest physical therapy can also be managed better with neuraxial analgesia. In myasthenic parturients, neuraxial anesthesia is preferred for both cesarean and vaginal delivery. Further, early neuraxial analgesia for labor pain may prevent weakness by circumventing fatigue and stress pain that can exacerbate myasthenia gravis. In addition, ester local anesthetics may display a prolonged elimination half-life, suggesting that amide local anesthetics may be preferable when high or repeated doses are anticipated (3).

Muscular Dystrophy and Myotonias. Muscular dystrophies are primary disorders of muscle resulting in progressive weakness. *Duchenne's* muscular dystrophy is the most common and most severe type. It involves a degeneration of skeletal muscle with atrophy and increased fat and fibrous tissue, but no evidence of denervation. The result is progressive symmetric weakness culminating in death by 15–25 years of age usually attributable to congestive heart failure or pneumonia. Diagnosis is based on muscle biopsy, and increase of serum creatine kinase may be followed to track progression of the disease.

Regional anesthesia may offer significant advantages in these patients. The use of agents known to trigger malignant hyperthermia can be avoided in this population of patients who have an increased risk of this complication. The risk of pulmonary aspiration may be decreased provided that regional anesthesia allows sedation to be minimized. Finally, regional techniques are not without problems. Kyphoscoliosis may lead to technically difficult placement of spinal or epidural blocks. Paralysis of intercostal muscles from regional anesthesia may predispose to respiratory insufficiency (7).

Myotonic Dystrophy: Myotonic dystrophy is inherited as an autosomal dominant trait with progressive deterioration of skeletal, cardiac, and smooth muscle function. Initially, involvement of the intrinsic hand and facial muscles progresses to proximal limb musculature as well as bulbar dysfunction with weakness of pharyngeal and laryngeal muscles. Symptoms become chronically evident in the second or third decade. Associated endocrine disorders also occur, including DM, adrenal and thyroid dysfunction. The cardiac system is particularly affected with a significant risk of dysrhythmias and atrioventricular block. Bulbar dysfunction and delayed gastric emptying make these patients at high risk for pulmonary aspiration. Ultimately, death occurs as a result of cardiac or respiratory insufficiency. Treatment is mostly supportive. When patients with myotonic dystrophy present for anesthesia, the preoperative evaluation of pulmonary function is critical.

Regional anesthesia in patients with marginal ventilator reserve, the effect of high epidural or spinal blockade on intercostal muscle function must be considered, especially because many of these patients may have diaphragmatic dysfunction (5). When performing regional anesthesia, additional sedatives and anxiolytics should be used with caution. Respiratory status should be continuously assessed for signs of hypoventilation or apnea. Pregnant patients with myotonic dystrophy may require anesthesia for labor and delivery. General, spinal, and epidural anesthetics have been used successfully in these patients

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for caesarean delivery. However, myotonia and weakness may be exacerbated during pregnancy. Patients with myotonic dystrophy are at increased risk for caesarean delivery because of prolonged labor, as well as postpartum hemorrhage from uterine smooth muscle dysfunction. Cold is a well known trigger for myotonic contractions. Therefore, no matter what technique is used, normothermia is required throughout the perioperative period

Chronic Spinal Cord Injury. The prevalence of patients with chronic spinal cord injuries is increasing. Although potential hemodynamic and respiratory instability may make general anesthesia preferable in the acute phase of spinal cord injury, regional-neuraxial anesthesia may be reasonable alternatives for patients with chronic spinal cord injury. The chronic stage of spinal cord injury is characterized by skeletal muscle spasticity and autonomic reflexes below the level of injury (approximately 85% of patients with lesions at or above T5). This afferent stimulus activates preganglionic sympathetic nerves, resulting in severe hypertension because of intense vasoconstriction below the level of the lesion. Challenges with regional anesthesia in patients with chronic spinal cord injury include assessment of block effectiveness (lack of sensation), technical difficulties with block placement (muscle spasticity or previous spinal surgery), unreliable spread of local anesthetic (scarring or anatomic deformities) and delayed diagnosis of neuraxial hematoma. Evidence: despite all these issues, numerous publications report for successful use of neuraxial anesthesia with spinal cord injury patients with present of hyperreflexia. Spinal and epidural anesthesia were logical prophylactic or therapeutically choices to prevent autonomic hyperreflexia because the afferent limb of the reflex would be blocked. Spinal anesthesia has been shown to be particularly useful, but epidural blocks are less reliable. Parturients at risk for autonomic hyperreflexia from uterine contractions are likely to benefit from the early use of continuous lumbar epidural analgesia after the onset of labor (2).

Intracranial Tumors, Aneurysms, and Arteriovenous Malformations. Patients with preexisting intracranial masses (primary or metastatic brain tumors) and vascular lesions (aneurysms, or arteriovenous malformations) are at increased risk for neurologic compromise during spinal or epidural anesthesia. Alterations in intracranial pressure and mean arterial pressure associated with neuraxial block may result in subarachnoid hemorrhage, cerebral infarction, or cerebral herniation. Dural puncture is not recommended in patients with evidence of increased intracranial pressure such as cerebral edema, lateral shift of the midline structures, and obliteration of the fourth ventricle since dural puncture causes an acute leakage of cerebrospinal fluid which decreases CSF pressure and may produce cerebellar herniation. In patients with uncorrected vascular malformations, the decreased CSF pressure increases the aneurysmal transmural pressure (mean arterial pressure-intracranial pressure) gradient and may result in subarachnoid hemorrhage.

Conclusion. The goal of this study is to review several of the more common neurologic disorders that an anesthesiologist may encounter and outline information currently exists to help the usage of regional anesthesia. Performing

regional anesthesia in patients with preexisting neurologic or neuromuscular disease remains controversial; no controlled studies have been performed, and accounts of complications have appeared in the literature as individual case report. Secondly, there are a variety of patients with differing neurologic conditions and comorbidities so it is not simply to provide definitive conclusion with regard to the safety of regional (neuraxial) anesthesia within this specific patient population.

On the other hand, the recent evidence has reported that the risks commonly associated with regional anesthesia and analgesia in patients with preexisting CNS disorders may not be as frequent as once thought. Even more, it is reported that regional anesthesia can be safely utilized and may have benefits over general so it is prudent to reconsider the long-standing belief regional anesthesia to be an absolute contraindication within these specific patient population. However, regional anesthesia should be avoided in the setting of acute nerves inflammation and lower concentration of local anesthetics should be considered. In this manner, neuraxial catheters may aid in the slow titration of local anesthetics thus minimizing neurotoxicity. The ultrasound guidance may aid also in the reduction in local anesthetic dosage and avoidance of needle trauma. To make definitive conclusion, further publications regarding regional techniques in this population are needed.

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ENHANCED RECOVERY AFTER SURGERY (ERAS)

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The concept of Enhanced Recovery After Surgery (ERAS) was first described and promoted by Henrik Kehlet. This technique was originally described as a method of treating patients following colonic surgery with multimodal rehabilitation program to reduce post-operative pain and accelerate rehabilitation.

ERAS is about improving patient outcomes and speeding up patient recovery after surgery.

Two important principles lie behind enhanced recovery. Both must be in place to bring the full benefits of enhanced recovery:

Clear communication: a full range of information and explanation

A fully structured and well organised sequence of clinical care.

The doctors, nurses and other healthcare professionals have planned a wide range of care that help recover as fast as possible. This includes well established medical and nursing practice, such as good control of pain and nausea but also a number of modern and innovative practice.

As effectiveness of ERAS protocols are well documented in literature with colon, rectal and pelvic surgeries, pancreaticoduodenectomy and radical cystectomy, ERAS protocols are now modified and implemented in various surgical subspecialties like orthopedic surgeries, gynecological surgeries, hepatic surgeries, cardiac surgeries and esophagus and bariatric surgeries. Initial results are encouraging; ERAS protocols are both safe and feasible.

There are 3 components of the ERAS multimodal care pathways:

1- Preoperative: Preadmission counseling, fluid and carbohydrate loading, no prolonged fasting, no bowel preparation, antibiotic and thrombo prophylaxis, no premedication,

2-Intraoperative: Short acting anaesthetic agents, no drains, avoidance salt and water overload, normothermia

3- Postoperative: No nasogastric tubes, prevention of nausea and vomiting, avoidance salt and water, early removal of catheter, early oral nutrition, non-opioid analgesia, early mobilization.

Although ERAS pathways have not been shown to adversely influence patient satisfaction or quality of life, the full impact of the various strategies employed,

as well as earlier discharge from hospital after major surgery, requires further research for a better understanding.

ERAS protocols are aimed primarily at achieving early recovery, which leads to a shorter hospital stay without adversely affecting morbidity. Many studies have evaluated ERAS with a particular focus on changes in the length of hospital stay (LOS). Several meta-analyses of randomized trials in colorectal surgery showed a decrease in LOS with ERAS, compared with traditional care, without compromising patient safety. However, LOS as a surrogate measure of recovery has some issues, as it is influenced by a number of non-clinical factors that differ by country, including cultural and traditional background and insurance status.

Whilst it is self-evident to some that ERAS should be cost effective, targeted studies investigating the cost-benefit interplay of ERAS protocols are conspicuous by their scarcity. A sound economic basis for implementing ERAS protocols in various surgical specialties would greatly enhance the argument in favour of ERAS.

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ANTIPLATELETS, ANTICOAGULATION AND REGIONAL ANESTHESIA

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Benefits of the regional anesthesia techniques in decreasing morbidity, mortality and improving overall outcome of surgical patients are well known. (1) One of the major complications of performing peripheral or neuroaxial blocks is bleeding which can lead to permanent neurological damage. Patients receiving antithrombotic therapy are at higher risk of bleeding. The development of standards for the prevention of perioperative venous thromboembolism (VTE), as well as the introduction of increasingly more potent antithrombotic medications, resulted in concerns regarding the increased risk of neuraxial bleeding. Also, a large number of patients are on chronic antithrombotic or antiplatelet therapy. Anticoagulation with warfarin is indicated for patients with a history of VTE, mechanical heart valves, and atrial fibrillation. Patients with bare metal or drug-eluting coronary stents require antiplatelet therapy with aspirin and thienopyridine derivatives (clopidogrel). (2)

Because of the increasing mean age of the general population, longer life expectancy and more accurate primary and/or secondary cardiovascular prevention programs, the use of antiplatelet

treatments has progressively grown over the last 20 years. When these patients present for elective or urgent surgical procedures, balancing the risks of bleeding and thromboembolism is essential. Making a decision for interruption of anticoagulant/antiplatelet therapy and, whether the patient will need bridging therapy to minimize the risk of thromboembolism is often difficult.

Premature discontinuation of anticoagulant/antiplatelet therapy is associated with a higher risk of thrombosis.

On the other hand, anticoagulant/antiplatelet therapy can significantly raise perioperative haemorrhagic risk in surgical and regional anesthesia procedures. Anaesthesiologists are facing a double challenge: the choice of the best and safest anaesthesiological technique for the patient, and how to manage haemostasis in the perioperative period.

The actual incidence of neurologic dysfunction resulting from hemorrhagic complications associated with neuraxial blockade is unknown. Although the incidence cited in the literature is estimated to be less than 1 in 150,000 epidural and less than 1 in 220,000 spinal anesthetics, recent epidemiologic surveys suggest that the frequency is increasing and may be as high as 1 in 3000 in some patient populations. In general, establishment of overall risks and benefits of

antithrombotic therapy in the patient undergoing surgery (or neuraxial block) is difficult. (3)

A number of guidelines and expert recommendations on the perioperative management of anticoagulant/antiplatelet therapy have been published.

The individualized approach to thromboprophylaxis is complex and because of that, most recommendations are group-specific, with modifications based on the presence/absence of additional risk factors. Guidelines for antithrombotic therapy including appropriate pharmacologic agent, degree of anticoagulation desired, and duration of therapy continue to evolve.

The guidelines, recommendations and consensus statements are designed to encourage safe and quality patient care, but they cannot guarantee a specific outcome. They are also subject to timely revision as justified by evolution of information and practice. (3)

Practice guidelines or recommendations summarize evidence-based reviews.

They are based on case reports, clinical series, pharmacology, hematology, and risk factors for surgical bleeding.

As a result, these consensus statements represent the collective experience of recognized experts in anesthesia and anticoagulation.

An understanding of the complexity of this issue is essential to patient management. It is critical to determine whether the planned procedure necessitates interruption of antithrombotic/antiplatelet therapy and, if so, whether the patient will need bridging therapy to minimize the risk of thromboembolism during the time the antithrombotic effect is subtherapeutic. In many patients, antithrombotic therapy may be safely interrupted until adequate surgical hemostasis is achieved. In other patients, bridging anticoagulation with unfractionated or LMWH is required until the time of surgery (and reinitiated in the immediate postoperative period). It may also be necessary to postpone elective surgeries in patients where a suitable "bridge" has not been identified and antithrombotic therapy is critical; premature discontinuation of dual antiplatelet therapy in patients with coronary stents has been associated with stent thrombosis, myocardial infarction and death.

Defining the high and low risk patients is essential. According to Guidelines for management of severe perioperative bleeding from the European Society of Anaesthesiology, high-risk patients are atrial fibrillation patients with a CHADS₂ score > 2, patients with recurrent VTE treated for <3 months and patients with a mechanical valve. While, low-risk patients are atrial fibrillation patients with CHADS₂ score ≤ 2 and patients treated for > 3 months for a non-recurrent VTE. (4)

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American Society of Regional Anesthesia and Pain Medicine Evidence - Based Guidelines for perioperative management of anticoagulant and antiplatelet therapy

Perioperative management of anticoagulant therapy

Preoperative:

Discontinue warfarin at least 5 days before elective procedure

Assess INR 1 to 2 days before surgery, if INR > 1.5, consider 1-2 mg of oral vitamin K

Reversal for urgent surgery/procedure, consider 2.5-5 mg of oral or intravenous vitamin K; for urgent reversal consider fresh frozen plasma

Patients at high risk of thromboembolism

Bridge with therapeutic subcutaneous LMWH (preferred) or intravenous UFH

Last dose of preoperative LMWH administered 24 hrs before surgery, administer half of the daily dose

Intravenous heparin discontinued 4 hrs before surgery

No bridging necessary for patients at low risk of thromboembolism

Postoperative:

Patients at low risk for thromboembolism

Resume warfarin on postoperative day

Patients at high risk for thromboembolism (who received preoperative bridging therapy)

Minor surgical procedure – resume therapeutic LMWH 24 hrs postoperatively

Major surgical procedure – resume therapeutic LMWH 48- 72 hrs postoperatively or administer low dose LMWH

Assess bleeding risk and adequacy of hemostasis when considering timing of the resumption of LMWH or UFH therapy.

Perioperative management of antiplatelet therapy

Patients with coronary stents

Elective surgery postponed for the following durations if aspirin and thienopyridine (eg, clopidogrel) therapy must be discontinued

Bare metal stents 4-6 weeks

Drug eluting stents 12 months

If surgery cannot be postponed, continue aspirin throughout perioperative period

Patients at high risk for cardiac events (exclusive of coronary stents)

Continue aspirin throughout perioperative period

Discontinue clopidogrel at least 5 days (and preferably 10 days) before surgery

Resume clopidogrel 24 hrs postoperatively

Patients at low risk of cardiac events

Discontinue antiplatelet therapy 7-10 days before surgery

Resume antiplatelet therapy 24 hours postoperatively

Regional Anesthetic Management of the Patient on Oral Anticoagulants

It is recommended that the anticoagulant therapy must be stopped (ideally 4-5 days before the planned procedure) and the INR must be normalized before initiation of neuraxial block. 1B

It is recommended against the concurrent use of medications that affect other components of the clotting mechanisms and may increase the risk of bleeding complications for patients receiving oral anticoagulants and do so without influencing the INR. These medications include aspirin and other NSAIDs, ticlopidine and clopidogrel, UFH, and LMWH. 1A

Anesthetic Management of the Patient Receiving Antiplatelet Medications

Nonsteroidal anti-inflammatory drugs seem to represent no added significant risk for the development of spinal hematoma in patients having epidural or spinal anesthesia. Nonsteroidal anti-inflammatory drugs (including aspirin) do not create a level of risk that will interfere with the performance of neuraxial blocks. 1A

The actual risk of spinal hematoma with ticlopidine and clopidogrel and the GP IIb/IIIa antagonists is unknown. Management is based on labeling precautions and the surgical, interventional cardiology/radiology experience. 1C

The actual risk of spinal hematoma with ticlopidine and clopidogrel and the GP IIb/IIIa antagonists is unknown. Management is based on labeling precautions and the surgical, interventional cardiology/radiology experience. 1C

On the basis of labeling and surgical reviews, the suggested time interval between discontinuation of thienopyridine therapy and neuraxial blockade is 14 days for ticlopidine and 7 days for clopidogrel. If a neuraxial block is indicated

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between 5 and 7 days of discontinuation of clopidogrel, normalization of platelet function should be documented.

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IS TRANEXAMIC ACID PERFECT HAEMOSTATIC AGENT FOR SURGICAL BLEEDING?

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Introduction

Surgical bleeding is stressful not only for the patient but also for the surgeon, anesthesiologist and intensivist. Although mortality rates of 0.1% related to bleeding are observed for surgical procedures, it may be 5% to 8% for elective vascular surgery, and increase to 20% in the presence of severe bleeding (1). Other surgical procedures which put patients at higher risk of massive bleeding are trauma, orthopedic surgery including hip and knee replacement as so as spine surgery, major surgery for liver diseases and cancer surgery. Excessive bleeding in these interventions increases the need for blood transfusion which is a serious risk for complications that include compromised coagulation. Massive transfusion modulate the immune response, causes abnormalities of electrolytes, clotting factors, pH and temperature, which may contribute to coagulopathy and irreversible shock. Today it is confirmed that this approach might leads to rebleeding and to worsen survival. Increasing the risk of postoperative infection, massive transfusion becomes independent predictor for mortality, morbidity and duration of stay in ICU.

Perioperative bleeding is dependent not only on the extent/complexity of the surgery but also on the coagulation profile of the patient. None score is designed to assess the degree of bleeding, and there is no one 'magic measure' which is appropriate for determination the extent of bleeding. Although bleeding from surgical sites is usually controllable, there may be significant bleeding which is due to coagulopathy that can be acquired or congenital and which may favor surgical bleeding. The causes of surgical bleeding are multifactorial, increased fibrinolytic activity being one of them (2). A platelet count and coagulation screening, can assist in the identification of the pathogenesis of bleeding.

Strategies in the management of surgical bleeding

There are several strategies to reduce surgical bleeding, but the most effective strategy is to improve surgical technique for adequate surgical haemostasis and rapid control of bleeding in order to prevent fibrinolysis. After the extensive tissue injury that occurs in surgery, fibrinolysis is considered to be an important contributor to bleeding and coagulopathy which worsens bleeding. Multiple interventions are advocated to reverse this life-threatening condition (fresh whole blood, high ratio plasma/platelets, fibrinogen concentrate and tranexamic acid). It is confirmed that administration of antifibrinolytic agents decrease bleeding and need for allogenic transfusions. The agents most commonly used are the lysine analogues, ϵ -aminocaproic acid and tranexamic acid, and a bovine-de-

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rived protease inhibitor, aprotinin. Lysine analogues interfere with the binding of plasminogen to fibrin, necessary for activating plasmin, whereas aprotinin is a direct plasmin inhibitor. The choice among haemostatic agents is based on the clinician's sense what the therapeutic efficacy would be, what will be the safety profile, and the costs — a balance that depends on the characteristics of individual patients and available resources (3). Huge number of studies confirmed the role of aprotinin and lysine analogues for prophylaxis against anticipated major bleeding. The role of antifibrinolytic agents in the treatment of massive refractory hemorrhage was established after several recent studies were performed. There are promising results nowadays with the use of tranexamic acid (TXA) as a primary haemostatic agent which perioperatively stabilize the multiple micro-clots that are formed within the surgical wound. But not only to reduce perioperative bleeding, TXA is used also in the prevention of potentially massive bleeding. It is already accepted that TXA should be given in massive bleeding, even in the absence of clinically diagnosed hyperfibrinolysis.

Antifibrinolytic therapy with tranexamic acid

The idea of using TXA and assessing its effect on blood transfusion in surgical patients with expected massive bleeding was a guide for many studies of which some are going now. Systematic review of using TXA in surgery by Ker et al, identified 129 trials between 1972-2011 including 10 488 patients. The relationship between blood loss with TXA and extent of bleeding showed that TXA has decreased blood loss by 34% and the percentage of reduction in blood loss with TXA differed by type of surgery, timing of TXA and trial quality, but differences were small. The effect did not vary over the doses assessed, so the conclusion from this review is that TXA reduced blood loss in surgical patients by 1/3. A total dose of 1mg appeared to be sufficient for most adults and there is no evidence to support higher doses (4). Preoperative prophylaxis with TXA to minimize blood loss and transfusion requirements has been assessed in other systematic review and cumulative meta analysis for the cardiac surgery, and other operations that are considered for a high risk of bleeding or refractory bleeding (5). All these studies in the past 10 years were designed to assess TXA therapeutic efficacy in terms of reduced need for transfusion or decreased perioperative blood loss. In all studies with data on blood transfusion, TXA was effective in reducing blood loss during and after surgery and appeared to be free of serious adverse effects. However safety data are lacking for the more clinical relevant end points such as thrombotic complication, myocardial infarction, stroke, renal failure or dysfunction, mortality or need for reoperation. The question that arises regarding TXA safety was first established in CRASH2 study. The evidence from the study is that there is no increased risk in trauma patients, no increased risk in hip and knee replacement. But, the use of any drug that potentiates haemostasis inevitably carries a risk of thrombotic complications, particularly in patients with atherosclerosis or risk factors for thrombosis. Researchers in CRASH2 study, used the fact that tissue injuries in trauma and surgery are similar, and showed that, if given within 1 hour, tranexamic acid reduces mortality in bleeding trauma patients. Treatment administered between 1 and 3 h also reduced the risk of death due to bleeding, while treatment given after 3 h seemed to increase the risk of

death due to bleeding without increasing the risk of vascular occlusive events. Furthermore, authors recommended the first dose of TXA to be administered at the site of injury. CRASH-2 is an example of the complexity of relations between coagulation, fibrinolysis, and inflammation outcomes after tissue injury. Further research regarding trauma and TXA is needed to determine how patient selection and inter current treatment affect safety and efficacy. Till now, there is no evidence on the increased risk in trauma, but CRASH-3 will address the issue of head injury.

Another study is currently recruiting participants for assessing the effect of pre-hospital anti fibrinolytic agents on traumatic coagulopathy and haemorrhage (the PATCH study). The purpose of this research is to determine whether administration of TXA in severely injured adults as soon as g possible would improve their chances of survival and their level of recovery at six months. The question arises form this study whether TXA have an anti-inflammatory effect? There are certain views that TXA has an anti-inflammatory effect resulting from fibrinolysis regulatory mechanism. Having in mind that free plasmin activates platelets, transiently activates/deactivates factor V and factor VIII, and binds to receptors on the endothelium and monocytes initiating inflammatory processes, then if plasmin production is blocked by TXA, platelets, coagulation and inflammation would be less activated.

There are promising results of the effect of TXA in other clinical settings as it is present in the HALT-IT trial which assess whether early administration of tranexamic acid in people with acute gastrointestinal bleeding can decrease death within 28 days of hospitalization. The effects of the treatment on rebleeding, need for surgery or radiological intervention, blood product transfusion, thromboembolic events and other adverse medical events are also assessed. The HALT-IT trial began recruitment in July 2013 and is aiming to recruit 8, 000 patients from hospital worldwide by April 2017. World maternal antifibrinolytic trial (WOMAN trial) is a another large pragmatic randomized double-blind, placebo controlled trial to quantify the effects of the early administration of tranexamic acid on death, hysterectomy and other relevant outcomes. 20, 000 adult women, after delivery who have clinically diagnosed postpartum haemorrhage, are eligible if the responsible doctor is for any reason substantially uncertain whether or not to use an antifibrinolytic agent. There are other studies that are going on and should answer questions about possible side effects of different groups of surgical patients. The analysis of effectiveness and safety of tranexamic acid use and postoperative outcomes in patients undergoing total hip or knee arthroplasty showed that patients who received TXA showed lower rates of transfusion, thromboembolic complications, acute renal failure and complications. Several reports suggest that tranexamic acid can induce seizure activity in the postoperative period when using in cardiac surgery but it is more evident in pediatric population, so doses of TXA should be reduced or even avoided in children. A proposed mechanism for seizures is the structural similarity of tranexamic acid to γ -aminobutyric acid as a potential cause of neurotoxicity. It is also confirmed that TXA if used in high dose ($> 4\text{mg}$ in adults) may

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be associated with the development of postoperative seizures in patients with renal dysfunction.

However there are other studies that examined other possible beneficial effect of TXA. One study examined whether it is possible THA to reduce the rate of myocardial infarction post surgery. Another study assess whether topical application of dilute TXA may reduced bleeding in to the wound surface. This study adds to the evidence that this simple procedure may reduce wound bleeding after surgery (6).

Tranexamic acid as a primary hemostatic agent for the management of surgical bleeding: randomized controlled study

The objective of a randomized controlled study that is performed at University clinic of surgery "St. Naum Ohridski" is to assess the effect of TXA on blood transfusion requirements, thrombotic complications, need for reoperation, days of stay in ICU and mortality in different type of surgical interventions. The patients are compared against whether received or not TXA. Outcome measures of interest are: the number of packed red blood cells that are received depending on the type of surgery, the relation between coagulation profile of the patient and the effect of TXA, and the number of patients with some thromboembolic event such as deep vein thrombosis, pulmonary embolism, myocardial infarction or stroke. The results so far show that most of the patients who received TXA are patients undergoing radical prostatectomy, fewer patients are with polytrauma and several are orthopedic patients. There are initial results that TXA reduces the need for blood transfusions in different patient groups. Measuring the predictive value of initial coagulation profile in terms of mortality show that prothrombin and activated partial thromboplastin time are independent parameters of mortality. It is too early to draw conclusions from the study but the first experiential findings suggest applying a rational approach in order to start with early coagulation support in surgical bleeding patients especially when rotational thrombelastometry and thromboelastography are not available. The protocol includes three phases. In the first one, the goal is to stop fibrinolysis, in the second, to allow thrombin formation and finally, in the third stage, to increase thrombin formation. If the stages are accepted, this strategy should lead to successful haemostasis. In terms of the first stage, hyperfibrinolysis should be considered early and TXA is recommended immediately. Tranexemic acid should be given in massive bleeding, even in the absence of clinically diagnosed hyperfibrinolysis and the optimal dose is 10-20mg/kg/tt. When hyperfibrinolysis is considered, then in the second step, fibrinogen and platelets have to be administered in order to provide thrombin formation. During the massive bleeding fibrinogen reaches critically low levels before the platelets and other coagulation factors. A dose of 4-8 g of purified human fibrin concentrates are recommended, but they are not administrated in our patients. Fibrinogen can be compensated also through administration of other fibrin supplements such as cryoprecipitate and fresh frozen plasma which contains relatively little fibrinogen (~ 500mg/250 ml), but it is not known exactly how much. Along with fibrinogen for effective thrombin formation the crucial role plays administration of platelets. Fibrino-

gen supplementation could partially compensate thrombocytopenia, but severe thrombocytopenia can disrupt the creation of thrombus even if the values of fibrinogen and thrombin formation are normal. Platelets are administered only if the patient is bleeding continuously (the goal is to achieve target of $5 \times 10^9/L$) and if there is clear deficiency of platelets. For successful haemostasis the last stage is important, that is, the increase of thrombin formation. Bleeding that continues despite fibrin supplementation and adequate number of platelets may be as a result of insufficient thrombin formation which is a predictor of mortality in bleeding patients. In those cases, prothrombin complex concentrates may be the first line therapy for thrombin deficiency in major bleeding, but there are not enough reports on their use in massive bleeding.

Conclusion: We believe that our study will contribute to the responses of some questions to the effectiveness of TXA that have not been answered. Finally if we want to answer the question is TXA perfect haemostatic agent, we can say that in terms of efficacy, in surgery it reduces mortality and bleeding by 1/3, in terms of safety, there is no thrombotic complication, no neuro events if use 1-2 mg after its use and may reduce post procedure inflammation. Particular interest that may arise from this study is the importance of the coagulation profile of the patient before he underwent a surgical procedure and its relation to the effect of THA. Recruitment of a larger number of patients would give the answer on this question.

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HAEMOSTATIC TOOLS

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Institute of transfusion medicine (ITM) of Republic of Macedonia is responsible institution for supply of blood, blood components and factor concentrates. Laboratory diagnosis and follow up of congenital and acquired bleeding disorders are performed in Haemostasis Laboratory of ITM. According performed tests of haemostasis, adequate prophylaxis and treatment are recommended.

Patient blood management has been recognised by the World Health Organisation (WHO) as the new standard of care (World Health Alliance resolution A 63.12) (1).

A preoperative anesthesiologic visit should have an adequate assessment to detect and correct abnormalities in haemostasis (2). History of abnormal bleeding tendencies in the past (e. g. following bruises, trivial injuries and previous surgeries), congenital coagulopathy, thrombotic events (e. g. deep vein thrombosis, pulmonary embolism), and family history should be elicited. Drugs such as antiplatelet and/or anticoagulant agents (e. g. aspirin, clopidogrel, warfarin), vitamin supplements, nonsteroidal anti-inflammatory drugs, selective serotonin reuptake inhibitor antidepressants (e. g. fluoxetine, paroxetine), herbal medicines (e. g. ginkgo, ginseng, garlic) can adversely affect bleeding. Stepwise standard laboratory testing (SLT) is based on clinical evaluation (e. g. Hb, haematocrit (Hct), coagulation profile, prothrombin time (PT), activated partial thromboplastin time (aPTT), international normalised ratio (INR), bleeding time, platelets, fibrinogen, D-dimer) (3). Discontinuation of anticoagulant therapy (e. g. warfarin, anti Xa drugs, antithrombin agents) should be considered before elective surgery with appropriate specialist consultation. Whenever possible antiplatelet agents (e. g. clopidogrel, ticagrelor, prasugrel) except aspirin should be discontinued for a sufficient time prior to surgery. Patients with *in situ* vascular stents may require continuation of drugs. Selected patients may require shorter acting drugs (heparin, low-molecular-weight heparin) for transition. In emergency surgeries, reversal of anticoagulants (prothrombin complex concentrates (PCC), Vitamin K, Fresh frozen plasma (FFP)) and antifibrinolytics to minimize blood loss may be instituted (3).

The aim of intra-operative coagulation monitoring is to prevent and treat the pathological mechanisms of increased perioperative bleeding (4, 5). Clinical monitoring includes periodic visual assessment of the surgical field and communication with the surgical team as standard practice to detect impending or established coagulopathy. This entails an assessment of the amount of blood lost and the presence of microvascular bleeding from mucosal lesions, serosal surfaces, catheter insertion sites and wounds. Routine coagulation parameters

like INR, aPTT, PT, platelet count and fibrinogen levels are to be individualised. Patients with inherited coagulation defects may exsanguinate with trauma or major surgery necessitating second level coagulation tests for specific factor replacement (such as factor VIII, IX and von Willebrand factor concentrate). Thromboelastography and rotational thromboelastometry measurements should be performed at the beginning of surgery as the baseline, when clinically abnormal bleeding occurs and after therapeutic interventions.

The number of platelets does not reflect the quality of platelet function. Platelet aggregometry can be used to study the platelet function. This method can be used prior to surgery, to rapidly identify aspirin effects and platelet disorders. Optical and impedance platelet aggregometry can be used to assess platelet reactivity by measuring changes in luminescence or impedance upon platelet agonist stimulation.

In patients with congenital or acquired bleeding disorders, certain types of isolated (fibrinogen, factor XIII and factor VIIa) or combined PCC coagulation factors are clearly indicated to avoid excessive bleeding (6, 7, 8). Evidence recommends use of fibrinogen concentrate/cryoprecipitate in hypofibrinogenemia; factor XIII concentrate (30 IU/kg) in factor XIII deficiency (<60% activity); Vitamin K and PCC (20-30 IU/kg) in patients on oral anticoagulant therapy/elevated bleeding tendency and prolonged clotting time CT; recombinant factor VIIa in bleeding which cannot be stopped by conventional, surgical or interventional radiological methods and/or when comprehensive coagulation therapy fails (3). Role of desmopressin in minimizing perioperative bleeding or perioperative allogenic blood transfusion in patients without a congenital bleeding disorder is not convincing (3).

Use of antifibrinolytic drugs is one of the main strategies for decreasing blood loss and lowering the risk of transfusion during surgical (e. g. cardiovascular, trauma, orthopaedics) procedures (6, 7, 8). The synthetic derivatives of lysine, tranexamic acid (TXA) and epsilon aminocaproic acid (EACA) have been the most commonly used antifibrinolytics since the withdrawal of aprotinin. TXA and EACA reversibly bind to both plasmin and plasminogen inhibiting clot degradation at sites of bleeding. TXA is 6-10 times more potent than EACA and has a longer elimination half-life.

Successful patient blood management means a multidisciplinary, multimodal, individualised approach of standard of care. Close collaboration between orthopedic surgeon, anesthesiologist and specialist of transfusion medicine is crucial. Haemostasis Laboratory of ITM is equipped with fully automated coagulometer and aggregometer for optical and impedance platelet aggregometry. Laboratory works in two shifts and lab technicians have duty on call. Centre for Haemophilia is a part of ITM and has established multidisciplinary Haemophilia team. People with haemophilia in Macedonia have musculoskeletal complications and many of them are successfully operated by educated in Haemophilia field orthopedic surgeon. Department of haemostasis and thrombosis of ITM is involved in

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thromboprophylaxis and treatment of deep vein thrombosis due to orthopedic surgical interventions.

Our institutions have fruitful collaboration. We have to share our experiences and try to find a way for improvement of Macedonian patient blood management.

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PAIN MANAGEMENT IN ORTHOPAEDIC SURGERY: THE MANAGEMENT OF POST-OPERATIVE PAIN

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INTRODUCTION

Each year around 100 million surgical procedures are performed just in the US and more than 80% of patients experience acute postoperative pain. Less than a half record adequately controlled pain while the majority report pain severity as moderate, severe or extreme. (1)

An inadequately controlled pain negatively affects quality of life, function, and functional recovery while increase the risk of post-surgical complications and persistent postsurgical pain.

Specifically, orthopedic surgery is oftencited as among the most painful of surgeries. The severe pain seen so frequently after orthopedic surgery is largely a result of the nature of the surgical procedure, which often involves significant muscle and skeletal tissue repair or reconstruction. In addition, many of these patients have underlying chronic (persistent) pain, which, if not optimally treated preoperatively, can complicate and add to the complexity of postoperative pain management. On the most basic level, severe pain can diminish the ability to accomplish postoperative goals, such as ambulation and participation in physical therapy, that are crucial to recovery after orthopedic surgery.

The link between poorly managed acute postoperative pain and increased long-term morbidity and mortality further underscores the consequences of poorly managed pain and the importance of providing the best possible pain control in these patients.

There has been increased focus on the need for better post-surgical pain management in fact, pain is now recognized as the fifth vital sign and both government-sponsored healthcare agencies and non-governmental clinical societies have outlined strategies for improving pain management in form of guidelines. (2)

In this paper, we are going to evaluate strategies available as preoperative, intraoperative, and postoperative interventions to provide evidence-based suggestions on management of postoperative pain in general and in particular on orthopedic surgery.

PREOPERATIVE PERIOD

The preoperative period is important for the patient who needs to be prepared for the surgery and for the anesthesiologists in order to plan a perioperative pain management.

An important step is to provide tailored programs of educational interventions and support for both patients with and without special needs (such as medical or psychological comorbidities).

Increased anxiety before surgery is associated with pathophysiological responses such as hypertension and dysrhythmias and may cause patients to refuse planned surgery. Anxiety may also worsen patients' perception of pain and increase requirements for postoperative analgesia. Provision of preoperative information can alleviate patients' anxiety with demonstrated beneficial effects as fewer request of sedative drugs, reduced opioids consumption, reduced length of stay after surgery.

The educational interventions include information on treatment options and document the plan and goals for pain management. They can range from multimedia materials (video, audiotapes, web-based) to face-to-face instructions and there is not enough evidence to recommend a specific technique that should be individualized according patient need and preferences.

Developing a tailored pain management plan requires an accurate knowledge of the patient through a preoperative evaluation including assessment of medical and psychiatric comorbidities, a history of pain and use of analgesics. The responses to previous analgesics and patient's preferences about them as well as previous opioids use, dependence or any other drugs or substance abuse, should influence the planning of pain therapy. The patient itself should be involved in the establishment of the plan; it has been shown that when are engaged in collaborative care, sharing decisions with their providers, patients experience better outcome.

The pain management plan, moreover, should be adjustable according the efficacy of pain relief and the presence of adverse events. Therefore, it is recommended to check patients' condition using a validated assessment tool to track the responses to treatment.

Pain assessment scales use different methods to measure pain intensity. Although there is not an evidence of superiority of one on another, self-reported scales are the primary basis that can be supplemented (or substituted for patients who cannot adequately report their pain) by more "objective" measures such as pain-related behavior or vital signs.

Pain intensity could be quantify using Numeric o Verbal Scale Rating, Visual Analog Scale and symbols like Faces Rating Scale and Pain Thermometer. Anyway, a complete pain assessment should include more elements such as Onset, Pattern, Location, Aggravating or relieving factors, Effects on other functions.

There is not a suggested timing or frequency of reassessment. As a general guideline we can rely on the time to achieve a peak effect according to the administration route, which is 15-30 min after i. v. injection and 1-2 hours when orally.

INTRAOPERATIVE & POSTOPERATIVE PERIOD

The keyword for intra- and post-operative period management is “multimodal” analgesia, defined as the use of a variety of analgesic medication and techniques that target different mechanisms of action in the peripheral and/or central nervous system (which might also be combined with nonpharmacological interventions) might have additive or synergistic effects and more effective pain relief compared with single-modality interventions.

The main ingredient of a multimodal approach are regional anesthetic techniques that have recently sparked new enthusiasm thanks to major advances in technology. Obviously, orthopedic surgery procedures are highly amenable to these techniques; furthermore, evidence has linked the use of regional anesthesia to beneficial medical and economic outcomes. Advantages attributed to the use of regional anesthesia in orthopedics cover a wide spectrum of perioperative outcomes.

Neuraxial anesthesia can positively affect hemodynamics and reduce blood loss; can block afferent stimuli from surgical tissue injury and therefore blunt the neuroendocrine stress response. There are even studies that have associated neuraxial block with a decrease in mortality and other serious complications, and concurrently assigned economic benefits to this technique. (3)

Anesthesiologists should routinely consider use of epidural or spinal analgesia for management of postoperative pain in patients who undergo hip and lower extremity surgeries, particularly in patients at risk for cardiac complications, pulmonary complications, or prolonged ileus. A potential advantage of epidural analgesia is that it can be performed as a continuous infusion or as PCA with local anesthetics.

It is discouraged the administration of adjuvant medications because there are no clear benefit and insufficient evidence of safety.

Likewise, peripheral nerve blocks have superior results in terms of pain management, with significantly reduced opioid requirement. Other reported benefits are reduced risk for nausea and vomiting, superior recovery profile, diminished utilization of resources, and shorter times to discharge. (4)

The use of continuous rather than single-injection peripheral techniques is preferred when the duration of postoperative pain is likely to be more prolonged, because of the limited duration of analgesia expected with a single injection.

The adjuvant clonidine for prolongation of analgesia with a single-injection neural blockade could be considered; moreover, there is available a new extended-release formulations of local anesthetic (as liposomal bupivacaine).

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The use of subcutaneous and/or intraarticular infiltration of long-acting local anesthetics at the surgical site has been shown to be effective as a component of multimodal analgesia in several surgical procedures. A modification of the technique with high volume intraoperative infiltration and intra-articular re-injections (Local Infiltration Analgesia - LIA), was specifically developed for analgesia after total hip and total knee arthroplasty. (5) The evidences are still not clear so this modality should not be considered as a routine.

Regional techniques can be supported by systemic pharmacological therapies. Recommended drugs to be administered in a multimodal regimen are: opioids, acetaminophen and/or NSAIDs, selective cox-2 inhibitors, gabapentinoids.

Opioids keep maintaining a role in the management of postoperative pain. Most evidences suggest that intravenous is not superior compared to oral route that is preferred in patients who can use it. When the parenteral administration is needed it is advisable to use a Patient Controlled Analgesia device. PCA is more effective than health-care provider intermittent bolus. The adjunct of a basal opioid infusion is no more recommended because most evidence shows no better analgesia.

Acetaminophen and NSAIDs have different mechanisms of action and research indicates that the combination of the two might be more effective than either drug alone.

The use of cox-2 inhibitors has to be weight against its increased risk of cardiovascular events.

Pregabalin and gabapentin are associated with reduced opioids consumption and lower postoperative pain scores but there is insufficient evidence regarding the optimal dose or timing; higher doses are more effective but associated to more side effects.

Mixed evidence comes from the results of studies adding to traditional analgesia techniques the use of Physical Modalities. Among these, it is worthy to report Transcutaneous Electrical Nerve Stimulation (TENS): small portable devices that deliver low-voltage electrical currents through the skin, thought to activate endogenous descending inhibitory pathways activating opioid receptors to produce reduced central excitability and reduce pain through stimulatory effects on large diameter afferent fibers. It can be applied either near the surgical incision area or to acupoints away from the incision, with similar effects. Acupuncture too is neither recommended nor discouraged, limited beneficial effects were found for post-operative pain in adults but not in children.

INTEGRATED PATHWAYS

Parallel to the development in regional anesthesia for orthopedic surgery, we are assisting to a great attention in promoting a better global perioperative care, well beyond just the analgesia. From this requirements is derived the concept of Enhanced Recovery After Surgery (ERAS). It is based on standardized, coordinated, multidisciplinary perioperative care plans that incorporate several ev-

evidence-based interventions with the aim to minimize the stress response, facilitate physiological and functional recovery, reduce variability in perioperative care, decrease perioperative complications, and allow earlier hospital discharge. (6)

For example, several centres have adopted ERAS programs for total knee arthroplasty, which incorporate pre-operative patients' education, multimodal analgesia, accelerated rehabilitation and a positive attitude amongst the caregivers. Interestingly, large observational and case series studies evaluating the effects of the introduction of an enhanced recovery protocol, showed not only a reduced length of stay and less transfusion requirements but also a substantial reduction in death rate at 30- and 90- postoperative days, up to 2 years. (7)

CONCLUSION

Managing post-operative pain is no longer a simple single task but it should be integrated in a perioperative plan aiming to the best treatment for the overall wellness of the patients.

Pain management plan starts from the preoperative period, requires collaboration of other specialists and of the patient itself to be effective. It also has to be flexible so that could be adapted to patients' response to treatment during follow-up assessments. Built on the basis of evidence regarding effective interventions for the specific surgery and modifiable by factors unique to the patient.

Perioperative protocols incorporating the best evidence-based interventions effectively start producing better outcomes but still there are lacking information and not all the evidence are strong or supported by good quality studies.

Anyway, the path undertaken is the right one, we need more results for corroborating the evidence we have and, gradually add piece of efficient interventions to our protocols. We still have many gaps that future well-designed studies we hope would fill.

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SURGICAL PRIORITIES IN THE TREATMENT OF POLYTRAUMATIZED PATIENTS WITH ORTHOPAEDIC TRAUMA: INDICATION FOR EARLY TOTAL CARE OR DAMAGE CONTROL SURGERY

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Introduction: Determination of surgical priorities, extend of surgery and planning and optimal timing for fracture stabilization is essential in the treatment of polytrauma patients with multiple fracture. For most patients (hemodynamic stable) the concept for early total care (ETC) has an advantage. An unstable and extremis patient should be resuscitated and adequately stabilized before receiving definitive treatment. Damage control orthopaedic (DCO) surgery increases the chances for survival in patient at risk, with severe multiple fracture with chest and head injury. The decision whether to perform initial temporary of definitive fixation in the borderline patient is based on clinical condition.

Purpose: The purpose of this study is to present our principles based on the treatment experience based on 820 polytraumatized patient with orthopaedic trauma

Material and method: A total of 820 polytraumatized patients were treated between 2000 and 2014 year. The severity of injury (ISS) was 28 range from 16 to 75 years and GCS 9 (range from 3 - 15). The treatment management was done between 4 different periods: acute or resuscitation (1-3 hours), primary or stabilization (1-72 hours), secondary or regeneration (3-8 days) and tertiary or rehabilitation (after the 8th day). The primary goals in the resuscitation phase was to establish adequate ventilation, to maintain the circulation according ATLS - ABCs protocol (golden hour) and to access the global neurological status.

The first surgical priority to save the patient's life (resuscitation, hemorrhage control and decompression of the pathological pressure in the organ cavities) was done as a top priority. In this period, beside administration of fluids, blood and blood products, also emergent treatment of pelvic ring trauma was done by provisional stabilization with ex. fix. binders, packing or embolization). The second priority in this phase was evacuation of severe epidural or subdural hematoma. Within this surgical window, open fractures were debrided and stabilized with external fixator. An initial guillotine amputation was lifesaving for the extreme injuries - open fracture combine with vascular injury. In the next primary period in stable and borderline patients with good response to resuscitation more surgical procedures were performed as day 1 surgery (brain, eyes, facial injuries visceral and vascular injuries, open fracture, compartment syndrome, spine fracture with progressive neurological deficit and fracture of the

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long bones). Fixation of the long bones was done by intramedullary nailing or plates as ETC surgery. Definitive treatment of pelvic ring disruption was done when general condition was stabilized (in the time of silver day). In polytrauma patient unstable or extreme and those with risk factor (severe head and thoracic trauma) the principles of DCO were undertaken (temporary external fixation as a bridge to definitive internal fixation). Delayed treatment was performed in the secondary and tertiary period for complex joint reconstruction, definitive maxillofacial and soft tissue reconstruction. Definitive treatment of femoral shaft in polytraumatized patient is still controversial.

Results: Retrospectively were compared 2 groups of polytraumatized patient with femoral shaft fractures according the treatment strategies for femoral shaft fractures. Group A - intramedullary nailing (IMN) as a ETC and group B - DCO surgery. In group B ISS was higher (32) compared to group A (22). The patient in group B required more fluids (14, 21 vs 8, 21) and blood (2, 2 vs 1, 3) compared to group A in the initial 24 hours. Thoracic, abdominal, head injuries were present in significantly higher number in group B (24, 2%) than in group A (12, 4%). There was significantly higher incidence of ARDS in group A (18, 2%) than in group B (8, 6%). Also MOF was significantly lower in group B (7, 4%) than in group A (12, 1%). There were 3 unexpected deaths and 2 conscious worsening in patients with head injury in group A.

Conclusion:

Determination of surgical priorities and time of surgery is essential in the treatment of polytrauma patients.

Early fracture fixation is respected principle in stable polytrauma patients with orthopaedic trauma.

DCO surgery is strongly indicated in unstable and extreme polytrauma patients with multiple fractures.

ACUTE RENAL FAILURE; ROLE OF BIOMARKERS

Sayin M. M.

Acute kidney injury (AKI) can be defined as “a decrease in renal functions manifested by serum biochemistry and decreased urine output”. Recently, in order to make a standart definition, first RIFLE criteria has been constituted, and later AKI network has defined AKIN criteria, and later KDIGO criteria. So, the diagnosis of AKI relies on serum creatinine and urine output, two biomarkes that are insensitive and nonspecific. Furthermore, they are functional markers, and markers of injury. Therefore, there is a search for new biomarkers to diagnose AKI early, differentiate between the types of AKI, and to determine the need for renal replacement therapy and predict the prognosis. This is “a search for a renal troponin!”.

Biomarkers are of different types; disease biomarkers, toxicity biomarkers, mechanistic biomarkers, efficacy biomarkers, predictive biomarkers, and biomarkers of drug-target interaction.

Need for New Biomarkers

There have been a number of advances in the search of biomarkers for AKI, many molecules have been investigated for this purpose. New biomarkers should be investigated because; current blood and urine are consequences of injury rather than being markers of injury. Additionally, we need novel biomarkers to diagnose the injury before organ failure and monitor the effect of therapy. The absence of sensitive and specific early biomarkers of AKI, not only delays the diagnosis of AKI but also impairs the intervention strategies and clinical trial design, thus impair the invention of new therapies. We also need biomarkers for determining the place of injury in the kidney, type of injury (prerenal, renal, postrenal), etiology of the injury, and differentiate between types of injury.

An ideal renal biomarker should; (1) provide information above that traditional clinical evaluation and investigation, (2) be non-invasive, using easily accessible samples, (3) provide results rapidly, (4) be sensitive and specific to AKI, (5) have specific cutoff values to distinguish between normal and abnormal renal function, (6) give information about the stage and severity of injury, (7) provide information about the etiology of AKI, (8) differentiate between AKI and chronic kidney disease, (9) be specific for renal injury in the presence of other organ dysfunctions, (10) give some estimate on the timing of the onset of renal injury, (11) guide initiation of therapies and monitor the response to therapies, (12) help to determine the prognosis of the illness.

Search for a new renal biomarker is a challenge; (1) Etiologies that cause AKI are multifactorial, (2) Different causes of AKI, effect different locations in the nephron, (3) Different biomarkers are secreted from different locations of nephron,

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and also in different concentrations, (4) Age, comorbidities, inflammation, diabetes and different medical conditions effect biomarkers differently.

Many different biomarkers specific for one or more different stages of kidney failure are examined. Also, some are more specific for different places of nephronal injury. So, they are not easy to interpret. They are not specific, not only for different disease states but also not specific for places of nephronal injury. As well as these, some may be specific for urine, and some for serum measurements.

Serum Creatinine (sCr)

Creatinine has been used as a biomarker of AKI for many years despite its many shortcomings. It is a small molecule of 11 daltons. It is generated in the muscle and is distributed throughout the body water. Creatinine is not a sensitive or specific biomarker but has been used as a biomarker of AKI since 1950's. Its production is highly variable with age, gender, meat intake, muscle mass and diseases. Also, its static measure does not demonstrate real-time changes in glomerular filtration rate (GFR). It is not a sensitive marker of injury because it does not rise until significant kidney damage occurs. As well as that, drug-induced increase in tubular secretion of creatinine might lead to underestimation of GRF. Additionally, creatinine levels may rise in prerenal azotemia without tubular injury. So, BUN and creatinine are not metrics of tubular injury, but rather reflect functional changes.

Neutrophil Gelatinase-Associated Lipocalin (NGAL)

NGAL is a protein of 21 kDa which is secreted from different epithelial cells and leukocytes. It is secreted profusely from renal tubules after ischemic injury and first detected in urine. It is claimed to predict AKI before renal functions have been deteriorated both in patients applying to emergency departments and in patients with contrast nephropathy 2-12 hours before the dysfunction. However, there are problems that impede its routine use; It has no very well accepted cut-off value to diagnose AKI and it is not specific kidney injury. It can be secreted epithelial cells and neutrophils without AKI. Consequently, in many conditions like ICU patients, in patients with sepsis, in acute pancreatitis, in acute coronary syndrome, in COPD exacerbations and in many clinical conditions serum NGAL levels may increase leading false positive results.

Interleukin 18 (IL-18)

IL-18 is a proinflammatory cytokine of 18 kDa which plays a role immune response. It is produced by renal tubular cells, keratinocytes, osteoblasts, intestinal epithelial cells, and macrophages. IL-18 has an active role in many renal disease processes such as apoptosis, ischemia/reperfusion, allograft rejection, and malignancy. In experimental studies, its levels have been demonstrated to be increased in AKI. IL-18 is especially measured in urine. It is not increased in urinary infections, chronic renal failure, and CABG patients without kidney injury.

Cystatin C

Cystatin C is a 13 kDa proteinase inhibitor protein. In healthy proximal tubular cells it is completely reabsorbed and completely broken down. So, in under normal conditions it is found in urine in minimal concentrations. Urinary levels of Cystatin C will increase when the reabsorption capacity of proximal tubular cells decrease. Urinary Cystatin C is more sensitive than serum Cystatin C. It is a good marker of dialysis requirement in ICU patients with AKI. In septic patients it is a good predictive measure of AKI.

Serum Cystatin C is believed to be a marker of kidney function and in some studies, a >50% increase in serum Cystatin C was shown to predict AKI. However, recent studies demonstrated it has no benefit over serum creatinine or BUN as a predictor. It can be used to monitor GFR at the later stage ICU patients.

Kidney Injury Molecule-1 (KIM-1)

KIM-1 is a type I cell membrane glycoprotein. It has a cleavable ectodomain at the apical membrane of dilated tubules in acute and chronic kidney injury. In animal studies urinary KIM-1 has proven to be a highly sensitive and specific marker of kidney injury, however, it was not proven to do better than sCr in prediction of renal replacement therapies and death. It is an early urinary biomarker of AKI in ischemic and cisplatin induced injury in rats.

Liver Fatty Acid-Binding Protein (L-FABP)

FABP's are proteins that are expressed in several forms in many tissues. Liver-type or L-FABP (LFABP1) is a 15 kDa protein expressed proximal tubule, and H-FABP or FABP3 is expressed in distal tubule cells. In rodents L-FABP is secreted during ischemia/reperfusion injury and stress in the urine. L-FABP increase in urine 4 hours after cardiac surgery is known to be a risk factor for AKI. It is one of the biomarkers that are specific for AKI after cardiac surgery (serum/urinary NGAL, urinary IL-18, KIM-1, L-FABP). However, the levels of urinary L-FABP may be influenced by a number of conditions like pre-existing renal disease, early diabetic nephropathy, non-diabetic chronic kidney disease, polycystic kidney disease, and idiopathic focal glomerulosclerosis.

N-Acetyl- β -glucosaminidase (NAG)

NAG is a 140 kDa proximal tubular brush border lysosomal enzyme, that will appear in the urine during tubular injury. NAG levels in the urine are elevated during toxin and some non-toxin induced kidney injuries. In adult ICU patients it can predict AKI 12 hr – 4 days before sCr. However, it can give false positive results in rheumatoid arthritis, hyperthyroidism, and altered glucose intolerance.

 β 2-Microglobulin

β 2-Microglobulin is a 11.8 kDa protein expressed on the surface of the nucleated cells. It is filtered and completely reabsorbed and catabolized by normal proximal tubule. Any insult to the proximal tubule will lead to increased urinary

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β 2-Microglobulin. Serum levels, on the other hand, should carefully interpreted because the levels may be altered with some diseases. A major drawback of β 2-Microglobulin is its instability in urine at room temperature when the pH is lower than 5.5.

α 1-Microglobulin

α 1-Microglobulin is a glycoprotein of 27-30 kDa synthesized by the liver and freely filtered at the glomerulus, and completely reabsorbed and catabolized by the proximal tubule. α 1-Microglobulin is a more stable molecule in urine which makes it more acceptable biomarker. It is speculated that urinary Cystatin C and α 1-Microglobulin have the highest ability to predict need for renal replacement therapy. However, α 1-Microglobulin have altered serum levels with age, gender, clinical conditions like HIV, ulcerative colitis, mood disorders, liver diseases. Also lack of its international standard is another handicap.

Biomarker Combinations

NGAL is the one which draws most attention in all of the biomarkers mentioned above. However, there is no ideal biomarker. Most wise and practical way of determining the development of AKI, differentiating between the types of AKI and predicting the prognosis, might be to use them in combinations. Grouping them as a set of "AKI panel" may be the best way to get most of them.

Creatinine, although has many disadvantages, still carries its importance as the practical, easy to use, cheap, and repeatable test. Although many research has been going on, further research should be carried out "*in the search for a kidney troponin!*"

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POSTOPERATIVE COGNITIVE DYSFUNCTION IN ELDERLY PATIENTS

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Introduction: Postoperative cognitive dysfunction (POCD) and delirium (POD) are topics of special importance in the geriatric surgical population. They are separate entities and although they are not limited to geriatric patients, the incidence and impact of both are more profound in geriatric patients. **Postoperative cognitive dysfunction (POCD)** refers to problems in thinking and memory after surgery. POCD is not recognized yet in the International Classification of Diseases and is not listed as a diagnosis in the Diagnostic and Statistical Manual. The term POCD is used to represent a decline in a variety of neuropsychological domains including memory, executive functioning, and speed of processing. POCD definition: a spectrum of postoperative central nervous system (CNS) dysfunction both acute and persistent including brain death, stroke, subtle neurologic signs and neuropsychological impairment. " (1)

POCD should be distinguished from delirium or dementia.

Differences: Delirium describes an acute confusional state featuring disturbances in attention and decreased awareness of the environment. Delirium symptoms fluctuate during the course of the day, and the patient often is disoriented. In addition, hallucinations and inappropriate communication or behavior may be observed in the presence of delirium. In contrast, a typical patient with POCD is oriented but exhibits significant declines from his or her own baseline level of performance on one or more neuropsychological domains. (2)

The mechanisms leading to cognitive impairment after anesthesia and surgery are not yet fully clear. The findings of animal experiments suggest an important role for the immune response to surgery. Terrando et al (3) showed that a peripheral surgical procedure in mice activates the inflammatory TNF α /NF- κ B signal cascades, leading to the release of cytokines that impair the integrity of the blood-brain barrier. In turn, macrophages can migrate more easily into the hippocampus, with ensuing memory impairment. Cognitive function remains unimpaired if this mechanism is blocked by the activation of anti-inflammatory cholinergic signal cascades to prevent pro-inflammatory cytokine secretion. Certain persons may be genetically more susceptible to anesthetic effects. In this regard the apolipoprotein E (ApoE) ϵ 4 allele has been the focus of attention as it is not only associated with increased risk for Alzheimer's disease, but also worse outcome after cerebral injury and accelerated cognitive decline in normal elderly

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Table 1

The differential diagnosis of postoperative neurological disturbances with impaired cognitive performance

	Manifestations	Diagnostic methods	Timing	Prognosis
Postoperative cognitive dysfunction (POCD)	new cognitive deficits that appear postoperatively (impairment of: memory, ability to combine tasks, psychomotor dexterity, etc.)	pre- and postoperative psychometric testing	arises immediately after surgery, may last up to 6 months	reversible in days to months
Delirium	cognitive deficits, hallucinations, fluctuating state of consciousness, and other manifestations	various delirium scales, e.g., Nu-DESC, Cam-ICU	days to weeks, depending on cause (e.g., withdrawal phenomenon, complicating infection)	reversible if the underlying condition is treatable
Central anticholinergic syndrome	agitated type or somnolent/comatose type	reversal of manifestations on administration of physostigmine	arises immediately after surgery	reversible with medication
Dementia	impaired memory, impairment of abstract thinking and judgment, central impairment of tool manipulation (aphasia, apraxia, agnosia, and/or executive dysfunction), personality changes	various dementia tests, e.g., Mini-Mental Status Examination, Short Syndrome Test, Dementia Detection Test	develops progressively over months to years	poor prognosis, no cure available
Akinetic crisis	worsening of parkinsonism with marked akinesia and inability to verbalize	history: interruption of anti-parkinsonian medications around the time of surgery	immediately after surgery or within hours	reversible with antiparkinsonian medication

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Cognitive evaluation:

Reasoning: assessed by a multiple choice task requiring completion of a logical visual series with increasingly complex decision rules

Attention: measured by response time on a dual task (simultaneous visual selection and counting of auditory stimuli)

Primary memory: assessed by immediate recall of a list of first names (verbal memory) and recall of a trail traced on the computer screen (visuospatial memory)

Secondary verbal and visual memory: measured by delayed recall of proper names with and without semantic and phonetic cueing and delayed recall of faces associated with the proper names and recall of two narratives – one with a logical sequence and the other a description requiring visual recall

Implicit memory: time taken to recognize the previously learnt proper names and distractors progressively built up by random pixels on the computer screen

Visuospatial ability: measured by the number of elements correct in the copying of complex meaningful and meaningless figures

Language: assessed by object naming and verbal fluency.

Risk factors: Kline et al. (4) studied POCD in the context of a longitudinal study on the development and course of Alzheimer's disease. They asked whether surgery influences the course of dementia. MRI scans revealed that, 5–9 months after surgery, the volume of the cerebral gray matter was lower, atrophic changes were present in the hippocampus, and the lateral ventricles were larger. Postoperative cognitive function was especially impaired in patients who had already had a mild, subclinical cognitive impairment before surgery. The difference between patients who had and had not undergone surgery disappeared over time as dementia progressed in both groups.

Alcohol abuse and an anxious, depressed basal mood have been identified as further risk factors for POCD. In a randomized trial, Hudetz et al. (5). showed that patients with a history of alcohol abuse had worse cognitive impairment after surgery than patients with no such history, even if they stopped drinking for five weeks preoperatively; these patients also had worse cognitive impairment than patients who did not undergo surgery, whether or not they had a history of alcohol abuse. A low educational level is a further risk factor for POCD. It is presumed that there are genetic predisposing factors as well. Advanced age, accompanying cerebrovascular disease, and extensive surgery all increase the risk of POCD. Cognitive impairment is a leading manifestation of disturbed homeostasis. The same is true of tight intraoperative management of homeostasis to keep the patient in fluid, electrolyte, and glycemic balance. Longitudinal studies have clearly shown that inadequate glycemic control impairs cognitive function. Cardiovascular, respiratory, hepatic, and renal insufficiency are all associated with impaired brain performance. It is theoretically obvious that an adequate **intraoperative oxygen supply** for all vital organs is essential if postoperative cerebral dysfunction is to be avoided. These include perioperative hypoxaemia and ischaemia. However, these variables as measured by pulse oximetry and arterial pressure **were not found to be significant** by the ISPOCD group (6). This surprising result may become somewhat more comprehensible in future studies involving cerebral oximetry. Regional oxygen saturation (rSO₂) monitoring systems permit the continuous noninvasive measurement of cerebral regional oxygen balance within the frontal cerebral cortex. This technology offers additional insights into patient clinical status; however, the novelty of the technology also makes it imperative for clinicians to review important situations and limitations that may influence rSO₂. Compared with other oximetric technologies such as arterial (SaO₂) and jugular venous (SjvO₂) oxygen saturation, verification of brain rSO₂ accuracy remains technically challenging. Although there have been laboratory studies which suggest that general anaesthetic agents have toxic effects on the CNS, this effect is less evident in clinical studies. Interestingly, choice of anaesthesia (general vs regional) has not been found to be significant. (7)

Prevention: As a rule, the shorter the duration of action of the anesthetic agent, the shorter the duration of cognitive impairment in the immediate postoperative period. Patients are now often premedicated with a sedative that impairs memory, e. g. , midazolam; this practice should be critically reassessed. In a clinical study, the author found measurable memory impairment one day after surgery in patients who had been premedicated with midazolam and had then

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undergone 1–2 hours of general anesthesia with propofol and remifentanyl (7). Cognitive impairment is clearly incompatible with the modern fast-track concepts of perioperative management that are supposed to enable the patient to cooperate actively in the early postoperative period.

Conclusion There are not measuring instruments for cognitive performance dysfunction as part of routine clinical practice, because such instruments are time and labor-intensive. POCD is variously defined. Heterogeneous patient groups, different testing methods, and different study designs make it difficult to generalize from the study findings that are available. **It would be desirable for psychometric test batteries to be developed that could be implemented in routine clinical practice.** Further research could also determine the extent to which cognitive training might promote cognitive performance, particularly in elderly patients, and thereby enable patients to enjoy a more rapid recovery and a better quality of life after anesthesia and surgery.

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CARDIAC RISK ASSESSMENT OF GERIATRIC PATIENT SCHEDULED FOR ORTHOPEDIC SURGERY

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INTRODUCTION

As the population ages, there is a high incidence of cardiovascular diseases (CVD) onset due to increasing burden of identified risk factors and body's lesser ability to cope with them. The incidence of diabetes, hypertension and left ventricular hypertrophy increases after 65 years of age. The risk of perioperative complications depends of preoperative state of the patient, comorbidity and urgency, extensiveness, type and duration of the procedure (1, 2). In the elderly preoperative status can be evaluated initially by examining the patient's history, providing the interview with the patient and examining the patient and then by using other methods (2). Postoperative hypertension, arrhythmia and heart failure mainly occurs in the first two postoperative days, while the risk of myocardial infarction lasts for five to six days (1). The fact is that the elderly are undergoing surgery more often than the rest of the population. At the same time it is estimated that 19% of men and 12% of women in the age group 75-84 years have some type of CVD. Age per se doesn't have any particular significance in increasing the risk of complication development. Far greater impact have urgency and significant cardiac, pulmonary and renal diseases (2).

RISK ASSESSMENT BASED ON THE TYPE OF THE SURGICAL PROCEDURE

Surgical factors that influence the cardiovascular risk are associated with the urgency, extensiveness, type and duration of the procedure. Preoperative assessment of blood loss and fluid shifts are also extremely important (2). When it comes to orthopedic surgeries, hip surgery is one of the high-risk operations which are associated with significant morbidity and mortality. Surgical recommendations suggest that the hip operation should be carried out as soon as possible, which leaves the anesthesiologist less time to assess the patient's preoperative condition. While this is not a problem in young patients, it is important to note that the hip fracture usually occurs in older people with a large number of pre-existing diseases which requires an assessment of a great number of specialists (3).

According to the official recommendations estimated cardiovascular risk of major orthopedic surgery is about 1-5% for the occurrence of cardiac events within 30 days, however, clinicians have warned that these recommendations assume that operations are subjected to relatively young and healthy patients (3).

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Major joint replacement surgery (hip and knee) are associated with a high rate of postoperative mortality, particularly in the elderly patients with significant preoperative comorbidities. Several prospective studies have pointed to a longer stay in hospital after this type of procedures (4).

RISK ASSESSMENT BASED ON THE PATIENT'S PREOPERATIVE CONDITION

People who develop CVD usually have more than one predisposing risk factors. About 30% of coronary events in men and 56% in women are caused by joining three or more risk factors (5). The most frequent causes of CVD are hypertension, dyslipidemia, impaired glucose tolerance and obesity. In the elderly CVD are more common in women than in men (6).

Hypertension prevalence is high among the elderly, and especially isolated systolic hypertension which is a prelude to the development of coronary heart disease, stroke, heart failure and peripheral arterial disease (5).

Dyslipidemia represents an extremely important item in the assessment of cardiovascular risk in the elderly, with the highest possibility of predicting risk using relations of total cholesterol / HDL cholesterol. It has been shown that this relationship is equated with, until recently superior, LDL / HDL cholesterol ratio (5).

Diabetes has a greater significance in women, and this eliminates the advantage in relation to men. The most important entity represents insulin resistance syndrome which is promoted by abdominal obesity that has become so common in the elderly (5, 6).

It is believed that all of these risk factors can be modified by changing the lifestyle of the elderly with the aim to be less sedentary, control weight, stop smoking and consume less fat and more fruits and vegetables (5).

Interpretation of the data from the history of the disease is difficult because one must take into account the high prevalence of CVD in this age group, high mortality, co-morbidity and natural selection. Other diseases that a person has can modify the connection between risk factors and coronary disease.

ASSESSMENT OF FUNCTIONAL CAPACITY

Assessment of functional capacity is an important step in the preoperative assessment of cardiovascular risk. It is measured in metabolic equivalents (MET) and one MET is equal to the basal metabolism level. The four METs correspond to climbing two flights of stairs, while 10 METs correspond activities in more extreme sports (swimming). Functional capacity below 4 METs indicates poor functional capacity and can be considered to indicate a high risk of postoperative cardiac complications. If the functional capacity is low or unknown, the clinician is referred to the risk factors in combination with the type of operation with the aim to determine the postoperative risk (2).

INDICES OF RISK ASSESSMENT

Anesthesiologists could lead with clinical signs during the perioperative cardiovascular risk assessment. By the year 2014 there were risk indices in clinical practice, suggested by three different authors.

Detsky et al. determined that the most accurate assessment of cardiovascular risk should take into account: a history of myocardial infarction (within the last 6 months), the presence of unstable angina, the presence of pulmonary edema, the presence of aortic stenosis, valvular heart diseases, abnormal heart rhythm, as well as the assessment of the patient's general condition (PO₂, PCO₂, K, HCO₃, BUN, Creat, SGOT, etc.), type of the surgery (emergency or elective) and the patient's age (less than or more than 70). If the sum of the risk factors was 0-5 points, it indicated Class I, or 6% of the risk for complications development. While the sum of points from 26-100 points indicated Class IV, or a 100% chance of complications development (2).

Goldman suggested that during preoperative preparation a special attention should be paid to the seriousness of existing heart disease, the onset of recent myocardial infarction (within 6 months) or different types of arrhythmias, presence of aortic stenosis, the significance in the ECG (arrhythmias that do not belong to the sinus or premature atrial contractions, as well as 5 or more ventricular premature beats per minute), the patient's age (less or more than 70 years of age), the type of the planned surgical procedure (including the fact that the surgery is urgent or elective) and the general clinical condition of the patient (PO₂, PCO₂, K, HCO₃, BUN, Creat, SGOT, etc.). Each of these data points are measured and summed, and the sum of 0-5 points indicates a Class I, or 1% risk of complications development. While the sum of 25-53 points indicates the Class IV, or 78% risk of complications development. Preoperative stress test or cardiac catheterization are not used routinely, however, perioperative hemodynamic monitoring is recommended in high risk patients. According to Goldman, post operative hypertension, heart failure and arrhythmias occur in the majority of cases during the first 2 days after surgery, however, the risk of developing myocardial infarction persists for at least 5 to 6 days after the surgery (2, 5). Lee score for cardiovascular risk assessment has emerged as a modification of Goldman scale. According to this evaluation, the focus is on the six independent predictors, such as: high-risk operation, history of ischemic heart disease, history of congestive heart failure, history cerebrovascular disease, preoperative insulin therapy and preoperative serum creatinine > 2.0 mg / dL (2)

NEWER MODELS FOR PREDICTION OF CARDIOVASCULAR COMPLICATIONS

Using database of American College of Surgeons National Surgical Quality Improvement Program (NSQIP) a new model has been developed in the form of an interactive calculator in order to predict intraoperative/ postoperative myocardial infarction or cardiac arrest. After accessing the calculator one needs to enter the following information: the patient's age, presence of diabetes, patient's sex, antihypertensive therapy (if there is one), functional status, previous cardiovascular diseases, type of surgery (emergency or elective), the presence of con-

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gestive heart failure, ASA score, the presence of dyspnea, smoking, the presence of ascites within 30 days before the surgery, the presence of COPD, systemic sepsis 48 hours before surgery, acute kidney injury, the use of steroids, weight, BMI, etc. (Table 1) (7).

Procedure	(select)	Are there other potential appropriate treatment options	Other surgical options Other non-operative options None
Age	Under 65 years 65-74 years 75-84 years 85 years or older	Diabetes	None Oral Insulin
Sex	Female Male	Hypertension requiring medication	No Yes
Functional status	Independent Partially dependent Totally dependent	Previous cardiac event	No Yes
Emergency case	No Yes	Congestive heart failure in 30 days prior to surgery	No Yes
ASA class	I Healthy patient II Mild systemic disease III Severe systemic disease IV Severe systemic disease/ constant threat to life V Moribund/ not expected to survive surgery	Dyspnea	None With moderate exertion At rest
Wound class	Clean Clean/contaminated Contaminated Dirty/infected	Current smoker within 1 year	No Yes
Steroid use for chronic condition	No Yes	History of severe COPD	No Yes
Ascites within 30 days prior to surgery	No Yes	Dialysis	No Yes
Systemic sepsis within 48 hours prior to surgery	None SIRS Sepsis Septic shock	Acute renal failure	No Yes
Ventilator dependent	No Yes	Height	(in)
Disseminated cancer	No Yes	Weight	(lbs)

Table 1: American college of surgeons: NSQUIP, Surgical risk calculator. Patients and surgical information one needs to enter in an interactive calculator.

Studies conducted in order to assess the quality of the NSQUIP score indicated that the hospitals which used this calculator in their everyday practice had a smaller number of complications, as well as reduced treatment cost (7).

BIOMARKERS IN CARDIOVASCULAR RISK ASSESSMENT

Biomarker is a characteristic that can be objectively measured and which represents a specific indicator of biological processes. Characteristics of an ideal biomarker are: high levels in the heart tissue, the absence in other tissues, quick release for early diagnosis, long half-life for late diagnosis, the absence in the serum of healthy people, cost-effectiveness and positive results in clinical trials (1). Determination of serum biomarkers in patients undergoing a non-cardiovascular surgery is not used routinely, but is considered for high risk patients ($MET \leq 4$) (2).

The most commonly used biomarkers in clinical practice are: aspartate aminotransferase (AST), lactate dehydrogenase (LDH), myoglobin, glycogen phosphorylase BB, hydroxybutyrate dehydrogenase (HBDH), creatine kinase (CK), creatine kinase MB isoenzyme (CK-MB), CK-MB mass, troponin T (TnT), troponin I (TnI). Cardiac troponins T and I (cTnT and cTnI) are the most important markers for the diagnosis of myocardial infarction in the presence or absence of renal failure. BNP and NTpro-BNP are elevated in response to the excessive load of myocardial wall (1).

Development of new biomarkers such as heart-type fatty acid binding protein (hFABP), high-sensitive troponin (hsTnT), proadrenomedullin (PAMP), micro RNA (mrRNA), etc will improve the myocardial damage assessment. However, no biomarker can be used in risk assessment isolated but can only indicate patients at high risk. The so-called multi-marker approach is considered the most appropriate in clinical assessment (1, 2).

NONINVASIVE AND INVASIVE TESTS OF CVD

Preoperative noninvasive testing has a goal to provide information about the three types of CVD: left ventricular dysfunction, myocardial ischemia and heart valve abnormalities. Methods of assessment include: ECG, exercise ECG, MRI, CT, cardiopulmonary exercise testing (CPET). The most common method of invasive testing is coronary angiography (2).

CONCLUSION

Special attention should be paid to elderly patients who are prepared for major orthopedic surgeries since they are at a higher risk for developing cardiovascular complications.

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FRACTURE OF THE HIP: WHICH ANESTHESIA TECHNIQUE?

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Introduction

The hip fracture is a fracture of the upper quarter of the femoral bone. Fracture line stretches in different directions depending on the force that causes it. Hip fracture depending on their proportion with the joint capsule, can be classified such an intracapsular and an extracapsular. Depending on the anatomical localization, hip fractures can be classified such: fractures of the head, neck, trochanteric, intertrochanteric and subtrochanteric fractures. Head and neck fractures are intracapsular, while those trochanteric, intertrochanteric and subtrochanteric fractures are extracapsular. Blood loss from an intracapsular fracture at the time of injury is minimal because of the poor vascular supply at the fracture site and tamponade effected by the capsule. Occasionally, undisplaced fractures may be treated conservatively, but there is a 30–50% risk of subsequent displacement. Current preference is for all undisplaced intracapsular fracture to be treated by internal fixation with multiple screws or a sliding hip screw. Untreated, disruption to the capsular blood supply of the head of the femur by a displaced intracapsular fracture can lead to avascular necrosis of the bone, resulting in a painful hip of limited function. Therefore, surgical treatment involves cemented hemiarthroplasty. Blood loss from an extracapsular fracture may exceed one liter; the larger the bone fragments, the greater the blood loss. In addition, greater periosteal disruption causes extracapsular fractures to be more painful than an intracapsular fracture. Extracapsular fractures are fixed surgically, using either a sliding hip screw (intertrochanteric fractures) or less commonly, a proximal femoral intramedullary nail (subtrochanteric fractures). ¹

Morbidity in Hip Fractures Patients

Hip fractures occur most commonly in elderly individuals as a result of minimal trauma and falling vertically. They occur less frequently in young, healthy people as a result of severe trauma, and mostly during motor vehicle accidents, or falls from a great height. Therefore, femoral fractures in young people are accompanied by other injuries, and their treatment is difficult in terms of the treatment of fractures, which are caused by small trauma in elderly patients. Leading risk factor for hip fractures is osteoporosis. Other risk factors are: cognitive disorders, circulatory disorders, heart failure, stroke, neuromuscular pathology, peripheral neuropathy, infection, arrhythmia, postural hypotension and polypharmacy. ^{1,2,3}

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The group of elderly people includes those who are older than 65 years. Recent studies classified 'elderly' patients heterogeneously, as those older than 70 to 80 years, while patients older than 85 years were often classified as 'very elderly'. This latter cut-off has been proposed as potentially a more appropriate for old age. In this population group, there are physiological changes as a result of the process of aging. This process starts, according to some researchers, with birth and accelerates with advancing age, leading to changes that are sometimes obvious but frequently go unnoticed for a long time. One of the most widely discussed, investigated, diagnosed, and treated processes is atherosclerosis, which leads to unmistakable damage to the cardiovascular system. People in those age groups often suffer from chronic illness so they use the huge number of medications. After gaining a hip fracture as a result of fall of these patients, complications such as acute respiratory and urinary infections, heart failure, etc., are often. Malnutrition is common and it develops shortly after admission to hospital, which further exacerbates the general condition of this patient group.^{2,3}

Another issue that worsens patients' health condition is immobilization. Hip fractures cause a significant pain in the perioperative period, which increases in an attempt to move the injured or operated leg. Early mobilization and early commencement of physical therapy are important factors to reduce postoperative morbidity and mortality in elderly patients. That is why in this age group of patients an adequate postoperative analgesia is necessary. Uncontrolled acute pain in elderly patients can cause heart, lung and endocrine disorders. Trauma and pain induce "a complex response to stress", which is characterized by hormonal and inflammatory changes that lead to immunosuppression. Effective analgesia and early mobilization in patients greatly modifies the pathophysiological response to stress, prevent or reduce postoperative complications and improves patient recovery.³

Older patients with hip fracture experience some of the worst clinical outcomes among the hospital population. It is not acceptable for these patients to be anesthetized by inappropriately experienced trainees. Ideally, a consultant or specialist with similar clinical experience should anesthetize such patients. Furthermore, a core group of consultants with relevant experience of anesthetizing unwell, older patients should provide the vast majority of the service, rather than randomly allocated consultants. Similarly, an appropriately experienced surgeon should operate patients on, in order to minimize operative time and surgical outcomes (e. g. blood loss, and rate of dislocation/re-operation).¹

Mortality

Mortality after hip fracture has remained relatively unchanged for the last two decades. Currently, 8% to 10% of patients die within 30 days of surgery. However, it has been suggested that up to half of postoperative deaths are potentially preventable. Thirty-day mortality is increased for older, sicker, male patients. Up to 15–30% of patients' dies within a year of surgery.¹ Cause for mortality was changing during the time. In the early 1970s, Riske et al. as most frequent reported causes of in-hospital death were bronchopneumonia (25–49%), pul-

monary embolism (12–19%), and cardiac events (12–16%). ²Muhm et al. in their study from 2013 reported a decline in death from bronchopneumonia, with cardiac events as the principal cause of death (35–63%) in an unselected group of patients presenting with fractured femur. ³

Timing of surgery

Recommendations that have been introduced in 1989 by the Royal College of Scientists are that ideally, surgery should be performed within 48 h of hospital admission after hip fracture. In April 2010, has been accepted a new target of 36 h in the first place in England and Wales. There are meta-analyses which indicate that delaying surgery beyond 48 h from admission is associated with prolonged inpatient stay, increased morbidity (pressure sores, pneumonia, thromboembolic complications) and increased mortality (if delay is prolonged) ³. But, surgery is often delayed because of the need for additional investigation in elderly patients and their preoperative preparation, although, there is no evidence to suggest that outcome is improved by delaying surgery to allow preoperative physiological stabilization. However, the benefits of expedited surgery must be balanced against the risks of certain untreated conditions. ^{1,3}

Type of anesthesia

Surgery is the best analgesic for hip fractures. It can be performed under the general or regional anesthesia. There are a great number of studies that analyzed and compared the effects of both anesthetic techniques. There is a minimal evidence base for determining the optimal anesthetic technique for patients undergoing hip fracture surgery. Consequently, anesthetists tend to use technique with which they are familiar, half administering neuroaxial anesthesia and the remainder general anesthesia. ^{1,6}

Guay and Parker in their Cochrane systematic review from 2016 included 31 studies. Of those 31 studies, 28 provided data for the meta-analyses. The mean age of the participants varied from 75 to 86 years. Those studies were published between 1977 and 2013 and so covering a wide range of clinical practices and improvements in techniques over time. ⁴

The trial reports that many of the studies indicated a suboptimal level of methodological rigor and the number of participants included was often insufficient to allow the possibility to draw a definitive conclusion on many of the outcomes studied. The authors did not find any difference in mortality at one month between neuroaxial blocks and general anesthesia. They also did not find a difference for pneumonia, myocardial infarction, cerebrovascular accident, acute confusional state, congestive heart failure, acute kidney injury, pulmonary embolism, number of patients transfused with red blood cells, length of surgery and length of hospital stay between these two anesthetic techniques in two to twelve studies. Likewise, when potent prophylactic drugs (such as low molecular weight heparin) were used against postoperative clot formation, they did not find a difference in the risk of deep venous thrombosis. Without prophylaxis

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with potent anticoagulant drugs the risk of deep venous thrombosis was less with neuroaxial block.⁴

Based on a 2004 Cochrane systematic review of anesthesia for hip fracture surgery, that suggested that regional anesthesia may reduce the incidence of post-operative confusion, the Scottish Intercollegiate Guidelines Network has produced the only recommendation concerning choice of anesthetic technique, namely that 'spinal/epidural anesthesia should be considered for all patients undergoing hip fracture repair, unless contraindicated'. Until such time as evidence is published that confirms regional anesthesia is superior to general anesthesia, the Working Party endorses this recommendation. This endorsement is supported by a recent meta-analysis suggesting that regional anesthesia 'is the technique of choice (although) the limited evidence available does not permit a definitive conclusion to be drawn with regard to mortality or other outcomes.'⁵

Of greater importance, whichever technique is used, is that anesthesia is sympathetic to the limited physiological reserve and co-morbidities of older patients.

However this Working Party of Great Britain and Ireland does not support the administration of opioid analgesics as the sole adjunct to anesthesia for this patient group, due to the relatively greater risk of respiratory depression and post-operative confusion. Peripheral nerve blockade should always be considered, therefore, as an adjunct to spinal or general anesthesia, to extend the period of postoperative non-opioid analgesia.¹

General anesthesia

To achieving general anesthesia in this group of patients, reduced doses of intravenous induction agents should be administered. Inhalational induction is well tolerated by the elderly and allows for maintenance of spontaneous ventilation. There remains debate about whether mechanical ventilation is preferred to spontaneous ventilation. Paralysis and tracheal intubation are associated with greater physiological derangement than spontaneous ventilation, but proponents argue that mechanical ventilation reduces the risk of perioperative aspiration and allows greater control of arterial carbon dioxide levels. Intraoperative hypoxemia is common, and higher inspired oxygen concentrations may be required.^{1,6}

Neuroaxial anesthesia

Both type of neuroaxial anesthesia, spinal and epidural, and also the general anesthesia are associated with precipitous falls in intraoperative blood pressure.

Epidural anesthesia can be used as a sole continuous anesthetic technique (as a perioperative analgesia and in the same time as a intra-operative anesthesia) or as a combined spinal-epidural anesthesia. This regional technique provides excellent analgesia, but may limit early mobilization after surgery.⁷

Matot I et al. in their study from 2003, make a comparison of the analgesic effect of systemic versus continuous epidural analgesia in patients with hip frac-

ture and with high cardiac risk, and come to the conclusion that the incidence of cardiac complications was higher in patients with systemic versus continuous epidural analgesia (11 from 34 patients in systemic analgesia group versus 2 from 34 patients in group with continuous epidural analgesia). In this study epidural catheter was placed in early preoperative period, after the admission of the patients on the ward. Few other studies demonstrated that perioperative analgesic management with continuous epidural analgesia, started preoperatively, reduced the incidence of myocardial ischemia in elderly patients with hip fractures surgery. These results due to sympatholytic effect of local anesthetic, which in the same time relieve pain and decreases the stress response in perioperative period.⁷

Performing epidural and spinal anesthesia may be more difficult in elderly patients. It is often not easy to position the elderly patient appropriately in lateral position and in the most of these patients there are degenerative changes on the spine.⁶

Spinal (subarachnoid) anesthesia is commonly used, with or without sedation. Conceptually, spinal anesthesia for hip fracture fixation in elderly patients should be viewed distinctly from spinal anesthesia for caesarean section in younger patients. Lower doses of intrathecal bupivacaine (< 10 mg) appear to reduce associated hypotension. Attempted lateralisation of subarachnoid anesthesia using hyperbaric bupivacaine with the patient positioned laterally (with the fractured hip inferior) may decrease the hypotension. Co-administration of intrathecal opioids prolongs postoperative analgesia; fentanyl is preferred to morphine or diamorphine, which are associated with greater respiratory and cognitive depression.^{1,6}

Sedation may be provided, but should be used cautiously in the very elderly. Midazolam and propofol are commonly used. Ketamine may be used, theoretically to prevent hypotension, but may be associated with post-operative confusion.¹

Supplemental oxygen should always be provided during spinal anesthesia.

Peripheral nerve blockade

Blockade of the femoral, obturator and lateral cutaneous nerve of the thigh may be sufficient for peri-operative analgesia. The most reliable method of blocking all three is the psoas compartment block, although this risks a degree of neuroaxial blockade and formation of a deep hematoma in recently anticoagulated patients.^{1,6}

Anterior approaches (femoral nerve / fascia iliaca compartment block) do not block all three nerves, but reduce post-operative analgesia requirements, and are more suitable to ultrasound-guided placement and continuous catheter infusions postoperatively. Moreover, in a few studies authors and their colleagues estimated that especially fascia iliaca compartment block is simple to perform, requires minimal training, and also is an effective substitute for conventional

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treatment of pain in elderly patients with hip fractures. According to these results, fascia iliaca compartment block starts to be used as a routine technique in the emergency room in Viborg District in Denmark from January 2004 to all patients with clinically diagnosed hip fracture.^{1,6}

Pre or postoperative peripheral nerve blockade may be used to supplement either general or spinal anesthesia.

Monitoring: minimum standards for monitoring during the surgery include the continual presence of the anesthetist, pulse oximetry, capnography, ECG and non-invasive blood pressure monitoring. Core temperature monitoring should be used routinely.

Having in mind that there are high incidence of significant co-morbidities in this population, should be consider further monitoring equipment, which may include: invasive blood pressure monitoring, central venous pressure (CVP), cardiac output, bispectral index (BIS) and cerebral oxygen saturation.

Supplemental pain relief

Regular paracetamol administration should continue throughout the perioperative period. Non-steroidal anti-inflammatory drugs should be used with extreme caution in hip fracture patients, and are contraindicated in those with renal dysfunction. Similarly, opioids (and tramadol) should be used with caution in patients with renal dysfunction: oral opioids should be avoided, and both, dose and frequency of intravenous opioids should be reduced (e. g. halved). Codeine should not be administered, as it is constipating, emetic and associated with perioperative cognitive dysfunction.¹

Summary

1. Surgery is the best analgesic for hip fractures.
2. Appropriately experienced surgeon and anesthetist must undertake surgery and anesthesia.
3. Type of anesthesia depends of anesthetists' experience and choice.
4. Early mobilization is a key part of the management of patients with hip fractures.

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ATMOSPHERIC CHEMISTRY AND CLIMATE IMPACT OF ISOFLURANE (CF₃CHClOCF₃), DESFLURANE (CF₃CHFOCHF₂) AND SEVOFLURANE ((CF₃)₂CHOCHF₂).

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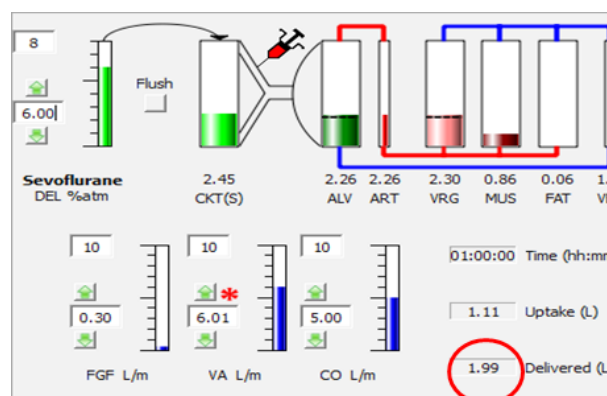
Interest in the atmospheric chemistry of anesthetic gases arises from concerns about their environmental impact on global climate and on stratospheric ozone depletion. In health care clearly patient safety and quality of care come first. After that we can consider environmental impact. To quantify the impact of anesthetic gases on climate and ozone depletion we need to know the infrared spectrum, the atmospheric lifetime and the degradation pathway of the individual compounds. The atmosphere is a giant inhomogeneous photochemical reactor in which temperature, pressure radiation flux and composition vary greatly. The atmospheric chemistry is driven by the solar radiation, light, which is absorbed by various components in the atmosphere. The driving force for most of the chemistry that occurs in the atmosphere is the formation of hydroxyl (OH) radicals via photolysis of ozone to form O (1D) atoms which react with water vapor. $O_3 + h\nu$ ($\lambda < 320 \text{ nm}$) $\rightarrow$ O (1D) + O₂ (1^g) (1) O (1D) + H₂O $\rightarrow$ 2 OH (2) The flux of UV light, O₃, and H₂O vapor combine to give a potent source of OH radicals. OH radicals react with almost everything emitted into the atmosphere. The atmospheric lifetimes of many pollutants are determined by their reactivity towards OH radicals. The generation, reaction with and regeneration of OH radicals is the primary mechanism by which the atmosphere cleanses itself. Only compounds such as CFCs, Halons, and N₂O which are inert towards OH radical attack survive transport through the troposphere into the stratosphere where they are photolysed and can damage the ozone layer. We use a so-called photochemical reactor or smog chamber system coupled with Fourier transform infrared (FTIR) detection to obtain the physical-chemical data necessary to quantify the impact on climate and ozone depletion. The experiments were performed in a 140 L Pyrex reactor interfaced to a Mattson Sirius 100 FTIR spectrometer. The reactor is surrounded by 22 fluorescent blacklamps (GE F40BLB) which were used to photochemically initiate the experiments. OH radicals were generated by UV irradiation of CH₃ONO/NO/air mixtures $CH_3ONO + h\nu$ ($\lambda < 320 \text{ nm}$) $\rightarrow$ CH₃O + NO (3) $CH_3O + O_2 \rightarrow$ HCHO + HO₂ (4) $HO_2 + NO \rightarrow$ OH + NO₂ (5) Reactant and product concentrations were monitored using in situ Fourier transform infrared spectroscopy. IR spectra were derived from 32 co-added interferograms with a spectral resolution of 0.25 cm⁻¹ and an analytical path length of 27.1 m. Infrared spectra were acquired by expanding known volumes of the compounds into the chamber. We have measured the IR-spectra and the rate constants k_{OH} , for reaction of OH radicals with CF₃CHClOCF₃, CF₃CHFOCHF₂ and (CF₃)₂CHOCHF₂. Thus, the values of k_{OH} derived in our work can be used to provide an estimate of the atmospheric lifetime of these three anesthetic gases. Com-

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binning these rate coefficients with the global weighted-average OH concentration of 1.0×10^6 molecules cm^{-3} , leads to estimated atmospheric lifetimes of 3.2, 14, and 1.1 years for $\text{CF}_3\text{CHClOCHF}_2$, $\text{CF}_3\text{CHFOCHF}_2$, and $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$, respectively. From the atmospheric lifetimes and the IR spectra we assess the impact on global climate and ozone depletionⁱⁱⁱ. The results are summarized in table 1.

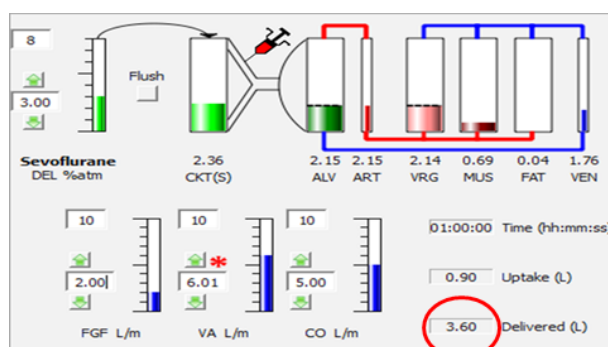
	1%	1.5%	2%	2.5%	3%
500	728	592	456	4.32	5.184
1000	456	184	6.912	8.64	10.368
1500	5.184	7.776	10.368	12.96	15.552
2000	6.912	10.368	13.824	17.28	20.736

Table 1



ONE HOUR SURGERY KEEPING THE LEVEL OF ANESTHESIA CONSTANT
BY ADAPTING BOTH THE FGF AND THE DEL %

PHOTO 1

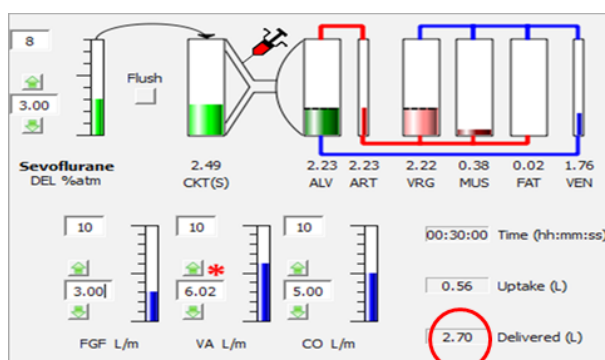


CONSTANT FLOW 2 LPM AND DEL 3% IN ORDER
TO KEEP THE VRG AT 1 ATM

PHOTO 2

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In Figure 1 we show the net upward atmospheric radiance spectrum at the tropopause flanked by the ideal Planck function for a blackbody emissions at 290K (black dashed line). The presence of naturally occurring major greenhouse gases in the atmosphere (CO_2 , H_2O , O_3 , and CH_4) produces attenuation of the outgoing radiation resulting in a non-ideal Planck curve. Infrared spectra for halothane (red trace) and enflurane (blue trace), and isoflurane, desflurane, and sevoflurane (gray traces) are shown. These halogenated organic compounds absorb strongly in the atmospheric window region.



CONSTANT FLOW 3 LPM AND DEL 3% IN ORDER
TO KEEP THE VRG AT 1 ATM

PHOTO 3

From analysis of the product spectra we can deduce the mechanism for degradation of these compounds in the atmosphere. To make the experiment simpler we used Cl atoms to initiate the atmospheric degradation. The mechanism for reaction by Cl atoms H-atom abstraction as is for that of reaction with OH radicals. An example is given in the figure below. The atmospheric fate of the minor products, $\text{CF}_3\text{C}(\text{O})\text{F}$ and $\text{CF}_3\text{C}(\text{O})\text{CF}_3$, is hydrolysis to produce trifluoroacetic acid and HF. $\text{HC}(\text{O})\text{F}$ will hydrolyze to produce $\text{HC}(\text{O})\text{OH}$ and HF. At the levels anticipated in the environment, the atmospheric oxidation products of $\text{CF}_3\text{CHClOCHF}_2$, $\text{CF}_3\text{CHFOCHF}_2$, and $(\text{CF}_3)_2\text{CHOCH}_2\text{F}$ are not of concern. Recently results of measurements of the concentrations of halothane, isoflurane, desflurane and sevoflurane in the atmosphere were published. The concentrations are in the ppq and sub-ppq range. The values and trends confirm what we expect and know about these compounds. From the concentrations and trends the total emissions converted to t CO_2 eq (100 year Global Warming Potential (GWP)) for the four anesthetics in 2014 they calculate so-called top-down total emissions of 3.1 ± 0.6 million t CO_2 eq, with $\approx 80\%$ stemming from desflurane. These total emissions are equivalent to one third of the CO_2 emissions of the Swiss passenger car fleet for that year. It is interesting to compare the top-down number of 3.1 ± 0.6 million t CO_2 eq with our bottom-up estimate. We assume that 200 million anesthetic procedures are performed worldwide on an annual basis. Proceeding on this assumption, we estimate that the annual climate

impact, as measured by the 100 year GWP, of global emissions of inhaled anesthetics, is equivalent to that from the emission of 4.4 million t CO₂ eq. The top-down and the bottom-up number agree within uncertainty. The average coal-fired power plant in the USA emits 3.85 million t of CO₂ per year, while a typical passenger car in the USA emits 5.03 t of CO₂ per year. Hence, we conclude that global emissions of inhalation anesthetics, when measured by the 100 year GWP, have a contribution to the radiative forcing of climate change which is comparable with that of the CO₂ emissions from one coal-fired power plant or approximately 1 million passenger cars.

The inhaled anesthetics released during the approximately 200 million anesthetic procedures performed globally each year globally have a climate impact that is approximately 0.01% of that of the CO₂ released from global fossil fuel combustion. Although we do not want to underestimate the importance of limiting greenhouse gas emissions, the impact of the emission of anesthetics needs to be viewed in perspective. Trapping of used inhaled anesthetics may be warranted, and if the halogenated anesthetics available in the particular therapeutic situation have equal therapeutic worth, doctors could choose the one with the lowest impact on climate. The decision to do so should involve a cost-benefit calculation in which the question is whether switching anesthetics provides the most climate protection in terms of avoided greenhouse gas emissions for the given resources. Assessing the costs is beyond the scope of the present work. The benefits can be assessed using the data provided in Table 1. Exercising care to avoid excessive use of anesthetic gases has the double benefit of reducing health care costs and protecting the environment.

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LOW FLOW ANESTHESIA EVALUATING LOSSES

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The technique of low flow anesthesia is gaining in recent years a new momentum. In its very beginnings this technique has been hampered by the lack of reliable and readily available gas monitoring devices. The theoretical models used were cumbersome and, as a result, this technique remained rather an isolated way of work of several enthusiasts than the mainstream one.

With the advancement of technology anesthesia became safer as more devices entered the clinician's armamentarium. The pulse oximeter is just one example. The LMA is another one.

But low flow anesthesia had to overcome several difficulties. First, a reliable, user friendly and largely spread gas analyzer. Second, the reintroduction and familiarization of the clinicians with basic laws of physics, mathematics and so on. Not an easy task.

For many reasons, most of them being fear of the unknown, many clinicians still use flows of 2 liters per minute and even more. While there is no logical explanation for this practice, the lack of interest in this technique resides also, probably, in the lack of awareness or interest of the multiple implications of higher flows.

This presentation refers only to one of these implications, the financial one.

It is a well-known truth that small but constant losses in the long range summon up and reach very important levels. The psychological aspect is that we do not see these losses and, even more, we do not care as long as another one pays for them.

This presentation will take the reader and the audience through a few simple steps that will help "visualize" how much we waste. Remember that all the calculations you will see here are evaluations done only AFTER the patient has equilibrated with the anesthesia machine and circuit. That is after the brain has reached its MAC value, that is it is SATURATED. Nothing goes in it any more. It is now easy to understand that everything we keep on giving on is, in fact, thrown away. The higher the flow, the more we waste. In the same line of thinking it is easy to understand that if, theoretically, there were no losses at all, after the brain has reached this equilibrium, the vaporizer can be switched off completely.

One more very important aspect: what is the configuration of the breathing circuit? If the sample gas analyzer exhausts the gases to the scavenger, and does

not return them to the breathing circuit, then a constant loss of 150-200 ml/min must be taken into account. If, on the other hand, the exhaust gases are returned (a configuration called CLOSED CIRCUIT) no other losses exist. This is a theoretical concept. Losses exist in any anesthesia machine and very small amounts of anesthetic gases are metabolized. In real life these losses are extremely small, but they need to be compensated for as well. But only for the theoretical basis of this presentation these tiny losses will be not accounted for.

Let's start with a simple example:

AFTER the patient has been equilibrated with the machine, the anesthesiologist keeps the flow at 500 ml /minute and the vaporizer opened at 1%. If the patient weighs, 70 kg, and the oxygen consumption is 3 ml/kg/min, he/she only needs:

$$70 \times 3 = 210 \text{ ml oxygen/min.}$$

Just for the simplicity of the calculation let's "exaggerate" this consumption at 250 ml/min. That means another 250 ml/min are thrown away. But these 250 ml/min are taking away with them 1% of gas.

Let's make the calculation for one hour:

$$250 \times 60 = 15000 \text{ ml/hour}$$

$$15000 \times 0.01 = 150 \text{ ml GAS/hour}$$

There are different correlations between the ml of LIQUID anesthetic and the ml of GAS resulting, but a good approximation is: 1 ml liquid → 200 ml gas.

So, 150 ml gas = 0.75 ml liquid.

Is it much? At the first glance no. But remember the calculation has been done only for one hour and only for a minimal flow over what the patient really needs.

The big numbers appear when many of hours and higher vaporizer openings are used. The table below is just one example. It shows the number of bottles of 250 ml each that are lost in one year per OR if the combinations between flows and vaporizer dials are kept at the presented levels AFTER the patient has already equilibrated only for ONE HOUR (table) (pictures 1, 2 and 3). The pictures were obtained using the computer program GasMan.

One more element must be considered here: since we work with gases, not liquids, a sufficient partial pressure can be reached in the brain with less liquid. This technique used in the very beginning of the anesthesia is called OVERPRESSURE. The name speaks for itself. We deliver a high volume of gas into the lungs, more than it is necessary to keep the MAC at the desired level in the maintenance phase. The lungs are, theoretically, a closed space (until the expiratory valve opens). The pressure of the anesthetic agent within the lungs is transmitted fast to the brain. Unless the flow and or the vaporizer are turned too early low, that pressure remains there until enough gas fills the bloodstream in order to prevent gas returning (exiting) from the brain.

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PERIPHERAL NERVE BLOCKS IN DAY CASE SURGERIES

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In recent years, anaesthesia day-cases have reached approximately 60% in the USA, and in France this rate in orthopaedic cases is approximately 38%. For example, while arthroscopic menisectomy cases can be discharged within the day, cases of arthroscopic shoulder surgery or knee ligament surgery are still hospitalised for 1-2 days. Regional anaesthesia techniques undoubtedly play an important role in the success of early discharge.

Peripheral nerve blocks (PNB) facilitate the recovery process by reducing opioid consumption. Therefore, an increasing number of ambulatory cases are being performed with a combination of local anesthetic nerve blocks and intravenous sedation (so-called monitored anaesthesia care "MAC"). The benefits of PNBs for day-case surgery include reductions in postoperative pain, opioid requirements, and postoperative nausea and vomiting, and possibly decreased time to functional recovery. Recent data indicate that for patients undergoing arthroscopic shoulder surgery in the beach chair position, regional anesthesia with sedation compared to general anesthesia significantly decreases the incidence of critical cerebral deoxygenation events (1).

Just as pain control which is not well managed in day-case surgery may prolong the stay in the postanesthesia care unit, it may also be a reason for re-admission to hospital (2). Other significant reasons for re-admission to hospital are respiratory depression and postoperative nausea and vomiting. In day-case regional anaesthesia, various upper and lower extremity blocks are used together with intra-articular local anaesthetics and intravenous regional anaesthesia (IVRA) techniques. Peri-articular injection+intra-articular catheter application in knee surgery has been reported to be as effective as femoral and sciatic nerve blocks with fewer complications.

The increasingly widespread use of PNB in day-case surgery is not only due to the high success rates, but it is also more preferred because there are few complications. Ultrasonography (USG) has an undoubted place in this development as USG-guided PNB increases the success rate of the block, shortens the application period and reduces the dose of local anaesthetic. During nerve blockage with USG, the spread of local anaesthetic and catheter advancement can be achieved. In addition, while the needle is being advanced, surrounding vascular structures can be protected and even in obese patients, the time taken for peripheral nerve catheter placement is reduced (3).

For many years a successful analgesic standard could not be developed with the multiple mechanisms of postoperative pain. Recently, there have been attempts

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to develop the concept of 'multimodal analgesia' for this purpose. With these techniques, preventive analgesia is provided by the application through different routes of various medication with central and peripheral effects (e. g. Dexamethasone, gabapentin, pregabalin, ketamin, clonidine, dexmedetomidine, acetaminophen, NSAIDs). Incisional local anaesthetic applications (intra-articular, peri-articular) and peripheral nerve blocks applied at the beginning and end of surgery are very important in multimodal analgesia techniques (4). Just as analgesia can be provided for 3-7 days postoperatively with the application of various catheters, so early rehabilitation can also be provided. It has also been reported that with regional anaesthesia techniques, inflammatory reaction in the surgical incision area is reduced by a significant degree. Many studies have also reported multimodal analgesia techniques to be effective in the prevention of chronic postoperative pain.

The advantages of various single-injection peripheral nerve blocks used in day-case anaesthesia are: 1- it provides successful analgesia for 12-24 hours of moderate/ severe postoperative pain, 2- it can be applied in a short time, 3- costs are lower compared to catheter sets and other equipment, 4- the majority can be applied by the anaesthetist, 5- the majority do not require 24-hour monitoring. The disadvantage is the risk of rebound severe pain (midnight syndrome) with a reduction in the effect of the analgesia used.

The advantages of various continuous peripheral nerve blocks used in day-case anaesthesia are: 1- effective analgesia for more than 24 hours, 2- a reduced requirement for opioids in a 24-hour period, 3- increased flexibility perioperatively, 4- rapid surgical anaesthesia can be provided with shorter-effect local anaesthetics such as lidocaine via catheter, 5- pleasing anaesthesia can be provided by repeating short-effect local anaesthetics during the surgical procedure, 6- sensory-motor dissociation is facilitated by more diluted local anaesthetics (e. g. 0.125% bupivacaine). The disadvantages are: 1- the need for special equipment (catheter kits, infusers etc), 2 – a well-trained anaesthesia team is necessary, 3 – for long-term monitoring, it may be necessary to have special units such as acute pain team.

In both single-injection and continuous peripheral nerve applications, USG has now come into routine daily practice.

UPPER EXTREMITY BLOCKS

Interscalene block: An interscalene block refers to the injection of local anesthetic within the interscalene groove between the anterior and middle scalene muscles. It is an indispensable regional technique in shoulder surgery anaesthesia and analgesia. It is applied with blockage of the C5-C7 roots of the brachial plexus. Injection of local anaesthetics at this level often spares the lower roots (C8, T1) making this block less suitable for procedures at or below the elbow. In the postoperative period, effective analgesia can be provided with a catheter placed in the interscalene groove. The most important complications of this blockage are phrenic nerve block and Horner syndrome.

Supraclavicular block: Before the use of USG, this technique was avoided by some anaesthesiologists because of the risk of pneumothorax, but it can now be safely applied under USG guidance. The pleura, 1st costa and adjacent vascular structures can be easily visualised with USG.

Infraclavicular block: This can be successfully used in elbow, forearm, hand and wrist surgery. Anaesthesia of the lateral, medial and posterior cords and their terminal branches can be provided with a single injection with this blockage.

Axillary block: The terminal branches of the brachial plexus going to the forearm, hand and wrist can be blocked with the axillary block technique. Various block approaches have been described in the axillary fossa (landmark, peri-arterial, transarterial) (5). The medial, radial and ulnar nerves which show differences in localisation around the axillary artery can be easily visualised with USG.

Catheter applications in the upper extremity are more effective as an interscalene approach for shoulder surgery and as infraclavicular for the elbow and distal.

Suprascapular and axillary nerve blocks can be easily applied under USG guidance and are effective analgesic block techniques.

LOWER EXTREMITY BLOCKS

Continuous lumbar plexus blocks are most commonly used for hip surgery. Complications described for lumbar plexus block include falls, bilateral and epidural spread, psoas compartment hematoma, neuropathy, and local anesthetic systemic toxicity.

In a study of 213 total hip arthroplasty patients, continuous lumbar plexus block was applied and patients were discharged with a catheter in place. Follow-up in respect of complications determined persistent neurological symptoms in 4 patients (1.9%). 1 patient had a fall, 1 patient was re-admitted for possible bilateral spread from the continuous lumbar plexus block, and 2 patients experienced symptoms of local anesthetic systemic toxicity (LAST). The authors reported complications at <2% following total hip arthroplasty and the continuous lumbar plexus block technique was recommended as a good analgesic alternative (6).

Femoral nerve Block, Adductor Canal Block

Femoral nerve block is a method preferred in knee arthroscopy and total knee prosthesis operations. With a catheter placed after knee operations, good analgesia and early discharge can be provided. However, as cases of falls have been reported after the application of continuous femoral blockage, the Adductor Canal Blockage (ACB) was developed as an alternative technique. The adductor canal is formed of the saphenous nerve, the branch going to the vastus medialis and sometimes branches of the anterior obturator nerve. However, clinical anatomic studies related to the volume and location of the ACB to be applied are still ongoing. The most recent meta-analysis comparing the two techniques

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reported that the quadriceps muscle function is better protected with ACB and this facilitates postoperative ambulation (7).

Sciatic nerve block

The sciatic nerve is most commonly blocked within the popliteal fossa. With USG it is possible to apply blockages of the tibial and common peroneal nerves separately. It has recently been reported that the application of the popliteal sciatic block immediately below the paraneural sheath accelerates the onset of the block and increases the success of the block. Distal foot blocks applied with USG have been reported to be more effective than proximal sciatic blocks and allow earlier ambulation.

Ilioinguinal/Iliohypogastric Nerve Block

This block is performed for abdominal/hernia surgery. The ilioinguinal and iliohypogastric nerves are identified with USG between the internal oblique and transversus abdominis muscles. The use of these blocks has also been of benefit in the pediatric population allowing for decreased side effects and faster recovery.

Transversus Abdominal Plane Block

Transversus Abdominal Plane (TAP) block is performed for the lower portion of the abdomen. TAP blockade is effective for abdominal/inguinal surgery. Catheters can be placed for prolonged analgesia, facilitating outpatient discharge and recovery. TAP blocks also provide improved postoperative pain, with enhanced outcomes and a decrease in postoperative opioid consumption in laparoscopic surgery patients.

Conclusion

The range and frequency of day-case surgeries are constantly increasing. Similarly, there is an increasing range of peripheral nerve block techniques. In addition to the classic techniques, Quadratus Lumborum Block, Serratus Anterior Plane Block, and Thoracolumbar Interfascial Plane Block have recently been described under USG guidance. However, pain after hospital discharge continues to be a significant problem in day-case anaesthesia. It is believed that the application of various agents functioning with different mechanisms may indicate a solution to this complex problem of neuroaxial analgesia techniques. With the route taken in peripheral blocks in the last few decades, current problems can be more easily and quickly resolved.

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DOES PULSOXYMETRY CAN IMPROVE PATIENT'S OUTCOME AFTER THE SURGERY?

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Oxygen is carried around the body attached to hemoglobin in the blood. Light is passing through the skin and revert to a number on the monitor that shows the percent of oxyhemoglobin in the blood. If the level of oxygen in the blood falls below optimal levels of 90%, corresponding to arterial oxygen tension < 7.9 kPa, it is an indicator for hypoxemia.

Hypoxemia is a risk during surgery when patient breathing and ventilation may be affected by anesthetics or other drugs. Medical staff monitor patients during the anesthesia and after surgery in Post Anesthesia Care Unit (PACU) using pulseoximetry.¹

The aim of our study:

Does the use of pulseoximetry is associated with improvement in the detection and treatment of perioperative hypoxemia?

Does early detection of hypoxemia reduce morbidity and mortality after surgery?

Method: We define mild hypoxemia during general anesthesia and postoperative as SpO_2 values 86-90%, severe hypoxemia with SpO_2 values $< 81\%$.

A group of 120 patients ASA 1 and 2 preoperative status were included the study.

Results: Mild hypoxemia (SpO_2 86-90%) in operative room was recorded in 51% of the patients and in Post Anesthesia Care Unit was recorded in 56% of the patients.

Severe hypoxemia with SpO_2 values $< 81\%$ was recorded in 19% of the patients in operating rooms and 12% of the patients in Post Anesthesia Care Unit.

Results indicated that hypoxemia was reduced in the patients monitored by pulseoximetry, both in the operating room and in the Post Anesthesia Care Unit, too. Postoperative cognitive function was independent of perioperative monitoring with pulseoximetry.

Discussion: In the randomized blinded observer study, patients monitored by pulseoximetry available data had a significantly reduced incidence of perioperative hypoxemia when compared to patients where the data were unavailable. Most noteworthy was that in the available group extreme hypoxemia ($SpO_2 < 76\%$) was not encountered in the OR and both severe (SpO_2 76-80%) and extreme hypoxemia were not observed in the PACU. In the randomized evaluation

of pulse oximetry significantly more patients in the oximetry group experienced at least one respiratory event than did control patients in both the OR and in the PACU. This was a result of a 19 fold increase in the incidence of diagnosed hypoxemia in the oximetry group than in the control group. In the OR cardiovascular events were observed in a similar number of patients in both groups, except myocardial ischemia, which was detected in 12 patients in the oximetry group and in 26 patients in the control group ($P < 0.03$). Several changes in PACU care were observed in association with the use of pulseoximetry. These included higher flow rates of supplemental oxygen ($P < 0.00001$), increased use of supplemental oxygen at discharge ($P < 0.00001$) and increased use of naloxone ($P < 0.02$).

One or more postoperative complications occurred in 10% of the patients in the oximetry group and in 9.4% in the control group. No statistically significant differences in cardiovascular, respiratory, neurological or infectious complications were detected in the two groups. The duration of hospital stay was a median of five days in both groups, and equal numbers of in hospital deaths were reported in the two groups. Continuous pulseoximetry has the potential to increase vigilance and decrease pulmonary complications after cardiothoracic surgery.²

Moller and contributors made a study about perioperative events and postoperative complications evaluated by pulseoximetry in 20,802 patients. They demonstrated that pulseoximetry can improve the anesthesiologist's ability to detect hypoxemia and related events in the OR and PACU. The use of the pulseoximetry in their study was associated with a significant decrease in the rate of myocardial ischemia. Although monitoring with pulseoximetry prompted a number of changes in patient care, a reduction in the overall rate of postoperative complications was not observed.³

The conflicting subjective and objective study results in a literature, despite an intense methodical collection of data from a relatively large general surgery population, indicate that the value of perioperative monitoring with pulseoximetry is questionable in relation to improved reliable outcomes, effectiveness and efficiency.⁴

Conclusion

Our study confirmed that pulseoximetry can detect hypoxemia and related events. However, we found no evidence that pulseoximetry affects the outcome of anesthesia for patients.

The primary outcome measures are postoperative complications and mortality from all causes. We have to make additional researches mentioned in the following text.

1. Any serious complications that occurred during anesthesia or in the postoperative period: admittance to postoperative intensive care due to respiratory insufficiency, circulatory

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insufficiency or infection; respiratory insufficiency due to pneumonia (fever, chest x-ray or positive culture), atelectasis (chest x-ray) or pneumothorax (diagnosed on chest x-ray), or

requiring intervention; cardiovascular insufficiency (cardiac arrest, cardiac failure or myocardial infarction); renal and hepatic insufficiency; neurological and cognitive dysfunction (measuring

memory function using the Wechsler memory scale) or serious infection requiring antibiotics.

2. Intraoperative or postoperative mortality.

Secondary outcomes:

1. Events detectable by pulse oximetry in correlation to arterial oxygen tension.

2. Causes of events.

a) patient respiratory causes of hypoxemia (pneumothorax, bronchospasm, air embolus, respiratory depression, apnea, airway obstruction, pneumonia, ventilator failure and pulmonary emboli).

b) patient mechanical causes of hypoxemia (esophageal or main stem intubation, mucus plug or kinked endotracheal tube).

c) delivery system causes of hypoxemia (anesthesia machine and gas supply problems).

3. Interventions that may prevent, attenuate or shorten these events include:

a) airway support;

b) endotracheal intubation;

c) manual or mechanical ventilation;

d) oxygen treatment;

e) inotropes; and

f) fluid treatment.

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VON WILLEBRAND DISEASE – STRATEGY FOR PERIOPERATIVE TREATMENT

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Von Willebrand disease (VWD) was initially described in 1926 by Dr. Erik von Willebrand.

It is genetically and clinically heterogeneous hemorrhagic disorder caused by a deficiency or dysfunction of the protein termed von Willebrand factor (VWF). Consequently, defective VWF interaction between platelets and the vessel wall impairs primary hemostasis.¹

VWF circulates in blood plasma at concentrations of approximately 10 mg/mL. It performs two major roles in hemostasis: mediates the adhesion of platelets to sites of vascular injury; binds and stabilizes the procoagulant protein factor VIII (FVIII). In response to numerous stimuli, VWF is released from storage granules in platelets and endothelial cells.

Von Willebrand's disease is classified into three main phenotypes.

Type 1 (which accounts for 60 to 80 % of cases) is characterized by mild-to-moderate quantitative deficiencies of VWF and FVIII, which are coordinately reduced to 5 to 30% of normal plasma levels (5 to 30 IU/dl). This subtype is typically transmitted as an autosomal dominant trait in the heterozygous state.

Type 2 (which accounts for 10 to 30% of cases) is characterized by qualitative abnormalities of VWF and is further divided into subtypes 2A, 2B, 2M, and 2N. Inheritance is generally autosomal dominant.

Type 3 (which accounts for 1 to 5% of cases) is transmitted as an autosomal recessive trait in homozygous or compound heterozygous persons and is characterized by very low or undetectable levels of VWF in plasma (less than 1% of normal plasma levels), with low but usually detectable levels of factor VIII (1 to 10% of normal plasma levels). It is in these rare cases of type 3 disease (1 in 1 million people) that symptoms are more frequent and severe.

For most affected individuals, VWD is a mild, manageable bleeding disorder in which clinically severe hemorrhage manifests only in the face of trauma or surgical procedures. Significant variability of symptomatology exists among family members.

Levels of VWF normally increase with age, but not in all types of VWD. Sanders and colleagues found that although VWF levels increased with aging in patients

with type I VWD, elderly patients with type I reported no change in their pattern of bleeding did not change. In patients with type II VWD, VWF levels did not increase with aging, elderly patients reported significantly more bleeding symptoms.²

Perioperative preparation for Von Willebrand disease include screening tests.³ Normal screening tests of coagulation, such as measuring the activated partial-thromboplastin time (APTT) and prothrombin time (PT), do not rule out VWD. More specific assays for VWF are: measuring the immunoreactive protein (von Willebrand factor antigen) and its binding to the platelet membrane glycoprotein Iba, mediated by the antibiotic ristocetin (ristocetin cofactor activity) and to collagen fibrils.

Initial laboratory diagnose for VWD include four relatively simple tests that measure bleeding time, levels of factor VIII, von Willebrand factor antigen and ristocetin cofactor activity. Factor VIII binding assay is necessary for distinguishing among the subtypes of the disease for surgical implications.

Preoperative measurement of VWF function should be kept in mind when results are interpreted in the clinical context. The bleeding time is neither specific for nor sensitive to mild deficiencies of VWF. A normal bleeding time does not exclude the possibility of some types of VWD. In vitro alternatives to this test, such as a test performed with a platelet-function analyzer, have variable sensitivity and specificity. Ristocetin cofactor activity and collagen binding activity are artificial surrogates for the platelet-dependent functions of VWF and the adhesion of the protein to subendothelial collagen. The preoperative measurement of von Willebrand factor antigen is of little help in predicting bleeding in patients with type 1 von Willebrand's disease.^{4,5}

There are three general strategies for prevention or control bleeding in surgical patients who have VWD.⁶ First strategy is to increase plasma concentration of VWF by releasing endogenous VWF stores through stimulation of endothelial cells with DDAVP (Desmopressin: 1-desamino-8-D-arginine vasopressin). The second strategy is to replace VWF by using human plasma-derived, viral-inactivated concentrates. The third strategy employs agents that promote hemostasis and wound healing but do not substantially alter the plasma concentration of VWF.

The three treatment options are not mutually exclusive. Patients may receive any one or all three classes of agents at the same time. The appropriateness of therapeutic choice is dependent on the type and severity of VWD, the severity of the hemostatic challenge and the nature of surgical procedure. Infusions of VWF to prevent bleeding episodes, known as prophylaxis, are less frequently required in patients who have severe VWD in contrast to patients who have severe hemophilia.

First treatment strategy is to increase plasma concentration of VWF by releasing endogenous VWF stores through stimulation of endothelial cells with DDAVP

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(Desmopressin: 1-desamino-8-D-arginine vasopressin). It is no replacement therapy.

DDAVP is a synthetic derivative of the antidiuretic hormone, vasopressin. DDAVP stimulates the release of VWF from endothelial cells through its agonist effect on vasopressin V2 receptors. The mechanism by which DDAVP increases plasma concentration of VWF is probably through cyclic AMP-mediated release of VWF from endothelial cell Weibel-Palade bodies. FVIII levels also increase acutely after administration of DDAVP, although the FVIII storage compartment and the mechanism of release by DDAVP have not been fully elucidated to date. DDAVP induces the release of tissue plasminogen activator (tPA). However, the secreted tPA is rapidly inactivated by plasminogen activator inhibitor (PAI-1) and does not appear to promote fibrinolysis or bleeding after DDAVP treatment.

The second approach is to replace VWF by using human plasma-derived, viral-inactivated concentrates. Replacement therapy products that contain FVIII and little or no VWF are generally not useful to treat VWD, but in rare circumstances these products may be used to treat patients who have antibody-mediated AVWS. These products include the plasma-derived concentrates and recombinant products. Standard dosing of DDAVP is 0.3 µ/kg given intravenously in 30-50 mL of normal saline over 30 minutes, with peak increments of FVIII and VWF 30 to 90 minutes after infusion.

Nasal administration of high-dose desmopressin acetate is often effective for minor bleeding, but intravenous administration is the preferred route for surgical bleeding prophylaxis.

Replacement therapy, using a VWF concentrate, is indicated for significant bleeding events or major surgery in patients who have types 2 and 3 VWD as well as in patients who have type 1 VWD and are unresponsive to DDAVP or require a protracted duration of therapy, or where DDAVP is contraindicated. The dose and duration of therapy are dependent on the hemostatic challenge and expected duration required for hemostasis and wound healing. Major surgery requires hemostasis for 7-14 days, whereas minor surgeries can be treated adequately in 1-5 days. Certain procedures can be managed adequately by using a single infusion of 20-40 U/kg VWF: RCo before the procedure.

The most important factor for replacement therapy is the type of the surgical procedures. Suggested durations of VWF replacement for major surgery (cardio-thoracic surgery, craniotomy, hysterectomy, Cesarean section, open cholecystectomy, prostatectomy) is 7-14 days, 1-5 days for minor surgery (breast or cervical biopsy, gingival surgery, dental extractions, laparoscopic procedures, central line placement). Procedures like cardiac catheterization, cataract surgery, and endoscopy without biopsy, liver biopsy, lacerations and uncomplicated dental extractions require single VWF treatment.

Initial dosing for VWF concentrate replacement for prevention or management of bleeding depends on the type of the surgery.

Loading dose (VWF: RCo IU/dL) for major surgery is 40-60 U/kg; maintenance dose is 20-40 U/kg every 8 to 24 hours. Monitoring include VWF: RCo and FVIII trough and peak, at least daily. Therapeutic goal is to reach trough VWF: RCo and FVIII >50 IU/dL for 7-14 days. Safety parameter is not to exceed VWF: RCo 200 IU/dL or FVIII 250-300 IU/dL. This treatment may alternate with DDAVP for latter part of treatment.

Loading dose (VWF: RCo IU/dL) for minor surgery is 30-60 U/kg; maintenance dose is 20-40 U/kg every 12 to 48 hours. Monitoring include VWF: RCo and FVIII trough and peak, at least once. Therapeutic goal is to reach trough VWF: RCo and FVIII >50 IU/dL for 3-5 days. Safety parameter is not to exceed VWF: RCo 200 IU/dL or FVIII 250-300 IU/dL. This treatment may alternate with DDAVP for latter part of treatment, too.

The third strategy employs agents that promote hemostasis and wound healing but do not substantially alter the plasma concentration of VWF.

The antifibrinolytic drugs aminocaproic acid and tranexamic acid are agents that inhibit the conversion of plasminogen to plasmin, inhibiting fibrinolysis and thereby helping to stabilize clots that have formed. Studies in prostatectomy provided the basis for initial trials of antifibrinolytic agents in VWD. The drugs can be used orally or intravenously to treat mild mucocutaneous bleeding in patients who have VWD.

Tranexamic acid given topically in the oral cavity every 6 hours has been used for prophylaxis in dental surgery, in combination with applied pressure, other topical agents, and suturing of surgical sites. Tranexamic acid is given intravenously at a dose of 10 mg/kg every 8 hours.

The evidence for the effectiveness of local application of these agents is based on clinical case series. These agents are effectiveness as adjuncts. The use of antifibrinolytic agents as adjuncts to DDAVP or VWF concentrates has been helpful in controlling bleeding, such as in the oral cavity and in the gastrointestinal and genitourinary tracts.

The usual adult dose of aminocaproic acid is 4-5 g as a loading dose orally or intravenously, 1 hour before the procedure. The dose can be repeated every hour intravenously or orally, (4-6 g every 4-6 hours), until bleeding is controlled, postoperatively. Total daily dose of aminocaproic acid is limited to 24 g per 24 hours to minimize potential side effects. Lower doses, 25 mg/kg, may be effective when gastrointestinal side effects interfere with the therapy. 50-60 mg/kg is weight-based dose for children and adults.

Topical agents like topical bovine thrombin is useful for topical therapy of accessible minor bleeding from capillaries and small venules. Fibrin sealant (consisting of human thrombin, fibrinogen concentrate, and bovine aprotinin) is indicated as an adjunct to hemostasis in certain surgical situations, but it is not effective for the treatment of massive and brisk arterial bleeding. Fibrin sealants have been used with good results as adjunctive therapy for dental surgery in

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patients with VWD. Topical collagen sponges are also approved for control of bleeding wounds.

The added benefit of topical agents when used with single or combination therapies including antifibrinolytic drugs, DDAVP, and VWF/FVIII concentrate is unproven. The topical use of plasma-derived bovine or human proteins imparts a theoretical risk of disease transmission and of potential allergic and other immune reactions. The use of fibrin sealants in addition to drugs and/or concentrates may be viewed as optional adjunctive therapy for dental surgery and for cases in which surface wound bleeding continues despite combined therapy with drugs and concentrates. The safety of these topical agents in therapy for VWD remains to be demonstrated.

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NOTES FOR DIFFICULT AIRWAY MANAGEMENT – WHERE IS MACEDONIA NOW?

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Ten years past from the first workshop for difficult airway management, organized as a part of the third congress of Macedonian anesthesiologists with international participation in Ohrid 2005.

We can say that airway management in Macedonia has progressed over last decade, particularly with the introduction of the new techniques and devices, especially for difficult airway management. Algorithms gave us the frame where we can act solving the problem with airway management, give the safety side of our practice. But, what about the ego? Did we solve the problem with the ego when we start the induction in anesthesia and intubation and our mind is out of the frame? Do we have the necessary degree of awareness about these problems?

Difficult Airway Society published the guidelines for management of the unanticipated difficult intubation in 2004. ¹ Difficult Airway Society 2015 guidelines for the management of unanticipated difficult intubation in adults are in press. ²

Algorithms definitively facilitate decision-making. We adopted our own algorithm for difficult airway management useful in our country. Medical faculty in Skopje, St. Cyril and Methodius University, published a book about anesthesiological aspects of airway management 2013. ³

But now we want to make an accent on the role of the human factor during the process of difficult airway management, because the human factor in difficult airway management is crucial to ensure patient safety.

The aim of this review is to highlight some aspects of difficult airway management, which are very important for patient safety. For that purpose we will define junior and senior anesthetist obligations while difficult airway management. The other nations were studying the human factors through the projects.

The 4th National Audit Project of the Royal College of Anesthetists and Difficult Airway Society (NAP4) project has documented several issues in the non-technical aspects of difficult airway management that have a direct impact on patient safety and outcome. ^{4,5}

Flin and colleagues developed the anesthetists' non-technical skills (ANTS) taxonomy, a behavior-rating tool, which classified human factors in airway management complications as situation awareness, decision-making, task management, and teamwork. Further research into the causes of airway management complications remains an anesthetic priority. ⁶

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The teaching and training is very important, too. Future developments in this field should focus on structured normal and difficult airway training with clear end points and assessment tools. Basic airway skills, including bag-mask ventilation, laryngeal mask insertion, direct laryngoscopy, and urgent infraglottic airway access, should be learnt before trainees are allowed to be on call with remote supervision. Junior trainees should understand the principles and usefulness of the devices in all airway management scenarios.

Senior anesthetic trainees should build on this foundation and supplement it with a systematic diagnostic approach to any difficult airway scenario. They should be able to analyse and identify various types of difficult airways, leading to appropriate management. This may include recognition of devices or techniques that will be successful and avoidance of those that are unlikely to be effective. The coordination of the training program should be allocated to a senior consultant within the department.

Non-technical aspects of difficult airway management should be an integral part of crisis management. Leadership is an important aspect. Junior consultants need to train and practice in simulators with a view to improving the non-technical aspects of their professional role.

The role of the senior consultant or 'airway expert' may be based on the Japanese aesthetic concept called 'Ma'. This idea embraces simplicity of the form.⁷

Senior anesthetic consultants should look to streamline teaching of airway management by providing clear goals and a simple framework within which staff can work confidently. Egos and one-upmanship should be eliminated from the senior ranks. The leader should quietly support the least skilled in the department, with a view to providing a clear path toward mastering this area of our profession.

Selection of airway devices is very complex, too, because there are many devices for difficult airway management. We propose the principles for difficult airway devices selection, published 2015 in British Journal of anesthesiology.

The basis of a selection process for difficult airway devices:

1. Oxygenation, not intubation, is the priority at all times.
2. Airway equipment should be purchased with the least experienced potential user in mind, and not the most experienced (i. e. ideally, devices should be intuitive and user-friendly, with a short training period).
3. Devices should have sufficient reliable research to support their clinical role
4. Ideally, rescue devices should have a close to 100% success rate to ensure the minimal number of steps when securing the airway. A device with a high success rate in routine use may have a lower success rate when used as a rescue maneuver, especially when the difficult airway is unexpected. The

urgency and the possibility of morbidity or mortality are likely to hinder the success of any device.

5. Devices should be trialed over an adequate period of time (several weeks or months in most instances) to ensure that the device is used for a variety of airway problems and by an adequate cross-section of staff.
6. Successful intubation should be followed by successful extubation. Similar to the diagnosis and management of a difficult intubation, extubation techniques should be carefully planned. Reintubation planning is an essential part of extubation management, with clearly defined end points for intervention.
7. Provision of devices for oxygenation and technical and non-technical training for staff are mandatory for all areas where anesthesia is conducted.

In conclusion, simple algorithms and airway devices provide the infrastructure for good airway management. It is our professional responsibility to put them into our everyday anesthesiological practice. Clinically relevant algorithms can be useful in emergency medicine and intensive care medicine, as well. But we cannot ignore continuous medical education. Teaching is a long process in which junior and senior anesthesiologists have to be involved, too.

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RIB FRACTURES EVALUATION IN 37 PATIENTS

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INTRODUCTION

Blunt trauma to thoracic wall is the major form of traumas and rib fractures are their most common results. Rib fractures are often overlooked in the presence of other traumatic injuries. Approximately 10% of all patients admitted for blunt chest trauma have one or more rib fractures. Patients with advanced age, osteoporosis or osteopenia have an increased risk of number and severity of fractures.

An intact chest wall is necessary for normal respiration. Rib fractures may compromise ventilation potentially causing ventilatory insufficiency.

Overall patients with rib fractures are at greater risk for prolonged mechanical ventilation and accompany to the higher mortality rate in every ICU. The risk of mortality increases with the number of rib fractures, advanced age, a higher number of rib fractures, complications and associated chest injuries.

The aim of this study was to determine the relationship between number of rib fractures, need for mechanical ventilation and length of ICU in blunt chest trauma patients.

MATERIALS AND METHOD

In retrospective study we evaluated data from Intensive Care Unit (ICU) records for 150 consecutive patients admitted to the Clinic for Anesthesia Reanimation and Intensive Care Unit, Skopje.

This study included 37 patients with rib fractures. All patients with rib fractures were divided in three groups. Group I- were patients with less than two fractured ribs, group II- were patients with 2-5 fractured ribs and group III- were patients with more than 5 fractured ribs. Patients' demographic data, need for IPPV (<3 days or > 3 days) and length of ICU was evaluated.

Data was collected with the help of Windows 2007 and Microsoft Excel computer programs. Paired t-test was done and significance is found for every level below 0.05.

RESULTS

From 150 records evaluated 37 patients had fractured ribs. 14 patients had less than 2 fractured ribs (Group I), 10 patients had from two to 5 rib fractured (Group II) and 13 patients had more than five rib fractured (group III).

Mean age of the patients in all group was 54. 6 vs 23. 9 vs 43. 8 years old. Mechanical ventilation was averagely needed for 4. 8 vs 2. 8 vs 7 days in all groups. ICU stay was on average 9. 6 days in the patients from group I, 2. 5 days for the patients in group II and 10. 8 days in patients in group III. (Table1.)

	I group (n=14) Mean $\pm$ SD (min, max)	II group (n=10) Mean $\pm$ SD	III group (n=13) Mean $\pm$ SD
Age	54.6 $\pm$ 19 (18, 87)	23.9 $\pm$ 24.9 (16, 84)	43.8 $\pm$ 15.8 (22, 67)
IPPV (days)	4.86 $\pm$ 9.3 (0, 34)	2.8 $\pm$ 3.2 (0, 9)	7 $\pm$ 5.9 (0, 21)
ICU stay (days)	9.6 $\pm$ 8.9 (1, 34)	2.5 $\pm$ 2.7 (1, 9)	10.8 $\pm$ 7.8 (1, 32)

Table 1.

Between the groups statistical significance was not found. Mechanically ventilation and ICU stay showed statistical significance between the groups ($p < 0.05$). Patients in group II stayed significantly shorter in the ICU.

In all groups age over 60 was found in 4 (28. 6%) vs 3 (30%) vs 2 (15. 4%) of the patients. patients. IPPV longer than three days was needed in 1% (group II) in 28. 6% (group I) and in 69. 2% (group III). Majority of the patient with less than two and more than five fractured ribs needed longer ICU stay than three days. (Table 2.)

	I group	II group	III group
Gender M/F	71.4%/28.6% (10/4)	70%/30% (7/3)	84.6%15.4% (11/2)
>60 years	28.6% (4)	30% (3)	15.4% (2)
IPPV>3 days	28.6% (4)	1% (1)	69.2% (9)
ICU >3 days	28.6% (4)	40% (4)	93.3% (12)

Table 2.

DISCUSSION

Results from our study showed that patients with less than two and more than five fractured ribs have need for longer mechanical ventilation and ICU stay.

Our results are opposite of the results that are reported from Sirmali M. and Lien YC. when discussing the patients in group I. They suggest that increased morbidity rate and prolonged ICU stay is needed proportionally to the number of rib fractures.

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Some other authors argue that the number of rib fractures, is determinacy for mechanically ventilation and ICU stay in and only in correlation to the magnitude of injurie score and to the other systems trauma involved. Unfortunately, in our study we didn't analyzed coexisting traumatic injuries and this may be truth.

Bulger EM and Shorr RM reported that rib fractures are the most common injury in elderly blunt chest trauma patients, and each additional rib fractures increases the odds of dying and of developing pneumonia.

However, Ziegler DW. and coworkers did not find correlation between the rib fractures and pulmonary complications but found correlations in rib fractures and advanced age. Results from his study are similar to our results regarding the age and longer mechanical ventilation. In our study larger percentage of the patients in the group II (30%) were older than 60 years compared to the patients in the other groups.

Conclusion: Need for longer mechanical ventilation and ICU stay in patients with rib fractures are in correlation to the age over 60 and not with the number of fractured ribs.

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ANESTHESIA FOR SEVERE PREECLAMPSIA AT UNIVERSITY CLINIC FOR GYNECOLOGY AND OBSTETRICS

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Introduction:

Preeclampsia is a multisystemic disorder unique to human pregnancy. It is characterized with new onset of hypertension (systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg) and proteinuria arising after 20 weeks of gestation in a previously normotensive woman. Initial pathogenic mechanisms start when cytotrophoblast fails to remodel spiral arteries, leading to hypoperfusion and ischemia of the placenta, fetal growth restriction and generalized maternal endothelial dysfunction which is responsible for the symptoms and complications of preeclampsia¹.

Very important is the assessment of the severity of the preeclampsia. Hypertension (SBP ≥ 160 mm Hg and/or DBP ≥ 110 mmHg), thrombocytopenia $< 100.000/\mu\text{L}$, HELLP syndrome, renal failure, persistent epigastric or right upper quadrant pain, visual or neurologic symptoms, and acute pulmonary edema are all criteria for severe preeclampsia².

Preeclampsia occurs in 5-14% of all pregnancies. It is much more common in the developing countries. In University Clinic for Gynecology and Obstetrics in Skopje that number is around 12%. The number is high because our clinic is tertiary care hospital (the only one in the country) and the most serious cases are sent to our clinic. On the other hand, 10-20% of all preeclamptic women will develop severe preeclampsia.

The choice of anesthesia for mothers undergoing cesarean section has been debating for many years. It was traditionally believed that epidural is safer than spinal anesthesia in the cases of severe preeclampsia, mainly because of the lower risk for hypotension. But many studies especially the one by Visalyaputra et al. ³, concluded that although severely preeclamptic patients did experience more severe hypotension after spinal anesthesia than after epidural anesthesia this hypotension is easily treated, short lived and without clinically significant differences in outcomes.

Risk-benefit considerations strongly favor neuraxial techniques over general anesthesia for cesarean delivery in the cases of severe preeclampsia. But many times there is a need for general anesthesia- cases when neuroaxial anesthesia

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is contraindicated, patient refuse neuroaxial or there is need for very urgent cesarean section. In these patients always consider difficult airway management and tracheal intubation-induced elevation in blood pressure which may precipitate hemorrhagic stroke who was the leading direct cause of mortality in patients with severe preeclampsia.

Based on all recent studies^{4, 5, 6} spinal anesthesia is strongly considered as first line anesthetic technique in severely preeclamptic patients. It is easy for administration, there is a rapid onset of the blockage, better quality of anesthesia; the only fear remains with the hypotension and the use of vasopressors. As we mentioned many studies have shown that patients with severe preeclampsia experience less frequent, less severe hypotension than healthy patients, hypotension is easily treated, short and without significant differences in outcomes.

Methods:

We performed a retrospective study of all severely preeclamptic women who had cesarean section in Clinic for Gynecology and Obstetrics, Skopje in the period between 01 of January 2015 till 31 of December 2015. Study included both elective and emergency cases. We analyzed all information from the patient records that were relevant to our study. Patients with eclamptic seizures, pre-existent cardiology disease, neurological disease and patients with gestational age smaller than 32 weeks were excluded from the study.

For spinal anesthesia 10-12 mg Bupivacaine with 20 µg Fentanyl was used. Spinal puncture was performed on L3-L4 level in sitting position with 26 or 27G spinal needle.

Induction of general anesthesia was performed with 2-3 mg/kg Propofol and 1-1.5 mg/kg Suxamethonium for rapid sequence intubation and maintained with isoflurane 0.3 to 1.0 MAC and 0.003 mg/kg Fentanyl (after delivering the baby). It is our team policy to avoid muscle relaxants whenever it is possible because treatment with magnesium sulphate (MgSO₄) prolong their effect. If it was necessary 0.3 mg/kg Rocuronium was given.

We analyze perioperative use of urapidil for the treatment of hypertension and use of ephedrine for the treatment of hypotension. We observe patient's blood pressure, heart rate, saturation with oxygen starting preoperatively and then at every 10 minutes during the cesarean section.

Results:

72 patients ASA II and III classification, aged between 19 and 38 years (mean ± 27, 3) were included in our study. In 62 patients (86.1%) spinal anesthesia was applied, while 10 patients (13.9%) were in general anesthesia. We observe the period one hour before the cesarean section and period during the cesarean section in exact period intervals (10, 20, 30 min after the induction of anesthesia).

According to our hospital protocol all patients with severe preeclampsia are stationed on recovery room in peripartal intensive care unit. They all received intra-

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venous MgSO₄ 4 g given initially, followed by 1 g/h for seizure prophylaxis. For controlling blood pressure, patients were given methyldopa regularly 500 mg four times a day and Nifedipine 20 mg twice a day if needed. However, additional drugs were necessary in some cases: patients with still not controlled blood pressure or emergency, unprepared cases. Intravenous urapidil 25-50 mg was used in these cases.

Blood pressure (systolic and diastolic), heart rate and oxygen saturation were measured every 5 minutes during the intraoperative period, the first measurement starting before the start of anesthesia procedures.

Table 1 give insight look of the values of the blood pressure measured 5 minutes before the induction in anesthesia and 10, 20 and 30 minutes after the start of anesthesia. According to our observation, in the spinal group both systolic and diastolic blood pressure significantly dropped within the initial 10 minutes of spinal anesthesia and after that blood pressure followed one constant flow. In 22 patients blood pressure dropped significantly and ephedrine was used to correct the hypotension. We tolerated the drop of systolic blood pressure up to 110, if it went less we corrected it with ephedrine. In all cases hypotension was short and easily treated.

On the other hand we observed in the GA group small decline in the blood pressure after the induction in general anesthesia. 80% of the patient needed additional urapidil to control the blood pressure (tab1).

Blood pressure (BP) and use of ephedrine and urapidil	Spinal anesthesia group (62)	General anesthesia group (10) ±sd	p-value
Preoperative BP (5 min before) Systolic blood pressure (SBP) Diastolic blood pressure (DBP)	172±20 106±14	178±22 108±15	
BP 10 minutes after the start of anesthesia SBP DBP	128±14 74±12	158±19 96±14	(p<0.05)
BP 20 minutes after the start of anesthesia SBP DBP	126±14 68±12	150±18 92±16	(p<0.05)
BP 30 minutes after the start of anesthesia SBP DBP	122±12 70±14	152±16 88±14	(p<0.05)
IV use of ephedrine Number of patients Total use of ephedrine per patient (mg)	22 (35.5%) 10 (5-20)	0	(p<0.001)
IV use of urapidil perioperatively Number of patients Total use of urapidil per patient (mg)	2 (3.2%) 10 (5-15)	8 (80%) 25 (10-50)	(p<0.001)

Table 1: Blood pressure change and perioperative use of drugs

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According to observation heart rate fluctuation was minimal in GA group, while in SA group there was initial drop in the first 10 minutes after the start of anesthesia and then constant flow till the end of the cesarean section; $p < 0.05$ (table 2).

Similarly, SpO₂ maintained constant during the cesarean section in the GA group, while in the SA group it showed a small decline within 15 minutes of spinal anesthesia and then remained constant till the end of cesarean section. Oxygen was given to all patients continuously (table 2).

Heart rate and SpO ₂ change	Spinal anesthesia group (62)	General anesthesia group (10)	p-value
Heart rate (beats/min)			
Preoperative (5 minutes before)	106±14	108±16	
10 minutes after the start of anesthesia	90±12	102±14	p<0.05
20 minutes after the start of anesthesia	88±12	98±12	
30 minutes after the start of anesthesia	86±10	100±12	
Saturation with oxygen %			
Preoperative	98% (96-99)	98% (98-99)	
10 minutes after the start of anesthesia	97% (94-99)	99% (99-100)	
20 minutes after the start of anesthesia	96% (92-98)	98% (96-99)	
30 minutes after the start of anesthesia	97% (95-98)	98% (97-100)	

Table 2: Heart rate and SpO₂ change

Discussion:

Severe preeclampsia can seriously endanger the life of both mother and fetus and may account for up to big percentage of maternal deaths especially in some parts of the developing world. Severe preeclampsia remains among the most rewarding challenges for obstetric anesthesiologist because a wide range of pathophysiological changes require an individualized approach to each case. Medical treatment depends on the severity of preeclampsia and is based on antihypertensive drugs and magnesium sulfate which are the most important in prevention of the occurrence of intracranial hemorrhages and seizures.

Our study shows the hemodynamic response to either spinal or general anesthesia in severely preeclamptic patients. In the SA group blood pressure dropped significantly in the first 10 minutes and then till the end of surgery it remained constant. Hypotension lasted shortly and was easily corrected with small doses of ephedrine. Heart rate and saturation with oxygen in SA group initially dropped in the first 10-15 minutes and then hold stable till the end of surgery.

It is already known that patients with severe preeclampsia experience less frequent, less severe hypotension than healthy ones. The reasons are multifactorial: smaller vasodilatory response to sympathetic blockage, smaller gestational age, smaller fetal weight⁷. Use of ephedrine is also connected with fetal acidosis in newborn but usually with use of bigger doses. Many studies that explore neo-

natal outcome found out no significant differences in neonatal outcome comparing different anesthetic neuroaxial techniques. And what is most important all newborns who were born with the biggest duration of hypotension had 5-min Apgar scores and umbilical arterial blood pH within normal ranges³.

GA group in our study had a small decline in the blood pressure after the induction of anesthesia, but almost all patients needed perioperative treatment with urapidil to control the BP. Heart rate and saturation with oxygen was stable and constant the whole time during the surgery.

Many studies in the last 10 years have shown that severe preeclamptic mothers receiving general anesthesia and their babies required more critical care support. Maternal as well as neonatal mortality was significantly higher with general anesthesia^{4, 6}.

The limitation of our study was the small number of patients in GA group, sometimes insufficient data from the records and most importantly follow up of neonatal outcome. But that give us a field for future research.

Spinal anesthesia is a safer alternative to general anesthesia in severe pre-eclampsia with less postoperative morbidity and mortality. We can conclude that SA could be a preferred choice of anesthesia when compared with GA, which offer optimal hemodynamic stability for cesarean delivery.

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EVALUATION OF THORACIC TRAUMA INJURIES IN PATIENTS ADMITTED IN THE INTENSIVE CARE UNIT

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INTRODUCTION

Traumatic injuries and their impact on life fulfill criteria for a global pandemic. For instance, trauma is being a recurrent and significant cause of morbidity and mortality over time across all continents. Worldwide, every day about 16, 000 people die as a result of injury (5. 8 million deaths per year). Future projections, show that 8. 4 million deaths per year are expected for the year 2020 (1, 2).

Even global burden of injury shows that every country across the world develop its own efforts for controlling the impact of injuries, medical trauma audits, major surgical and trauma centers report different degree of ICU admissions and deaths due to traumatic injuries. Causes of trauma vary in different regions and may be influenced by the lifestyle, temper and socio economical status of the population (2).

Most of the studies using different taxonomy, argue that advanced age, presence of more than one system traumatic injuries especially the presence of thoracic injuries in correlation to rib fractures, the number and magnitude of pulmonary complications as well as the mechanical ventilation increase in hospital mortality and morbidity in all trauma. (3, 4).

On the other hand, thoracic trauma isolated or in combination with other traumatic injuries attribute as one of the leading cause of deaths in the ICUs. Out of all ICUs deaths up to 50% will be due to thoracic injury (3).

In this study we investigated the incidence of ICU admissions due to thoracic traumatic injuries, whether isolated or in co-existing with other system traumatic injuries and their correlation to mechanical ventilation and ICU stay.

MATERIAL AND METHOD

In a single institution analysis, we respectively evaluated data records from patients who were admitted in the Intensive Care Unit (ICU) at the Clinic for Anes-

thetia Reanimation and Intensive Care (CARIC), Skopje, Republic of Macedonia, for six months' period (from January to June 2015).

ICU at the CARIC is mixed type of ICU, where patients who need post surgical intensive care, patients with traumatic injuries and patients from other profile specialties who need ventilator support are admitted.

Only patients with traumatic injuries were further analyzed and divided into three groups. Group A included patient with isolated thoracic traumatic injuries, Group B included patients who had thoracic and co-existing other system traumatic injuries and Group C included patients with traumatic injuries to other systems.

Patients age, gender, duration of mechanical ventilation, duration of ICU stay and outcome were analyzed. For the groups with thoracic traumatic injuries (Group A and Group B) the presence of rib fractures, pneumothorax/haemothorax, or combination of both was further recorded. On the other hand, for the groups where other system trauma was present (Group B and Group C), analyzes of the co-existing system (head or neck, extremities, vertebra, vascular or other) was done.

Data were collected and analyzed using the Microsoft Excel, version XP/2007.

The paired t-test and logarithmic regression were employed in the statistical analysis with alfa error of 5% being considered acceptable (P-value <0.05).

RESULTS

Out of 687 patients total of 144 patients had traumatic injuries and were analyzed. Majority of the patients were male (n=119, 82.4%) and majority of the traumatic injuries were due to traffic accidents (n=100, 69.4%).

Age	Mean±sd	Mean±sd	Mean±sd
Gender/male	42.9±22.9	41.6±19.4	40.8±21.8
ICU stay	17.4% (n=25)	18.5% (n=27)	46.5% (n=67)
(days)	11.3±10.9	7.53±10.5	6.4±7.8
Need for MV*	16.7% (n=24)	13.8% (n=20)	25.7% (n=37)
MV (days)	11.7±12.1	6.1±8.3	6.3±8.1
Exitus letalis	4.8% (n=7)	4.8% (n=7)	12.5% (n=18)
	*MV-mechanical ventilation		

Table 1. Patient demographic and clinical data

Isolated thoracic trauma (Group A) was found in 23.6% (n=34) of the patients admitted to the ICU where as thoracic and co-existing other system traumatic injuries (Group B) was found in 24.3% (n=35) and traumatic injuries without thoracic trauma (group C) was found in 52.1% (n=75) of the patients. Patients demographic and clinical data are shown in Table 1.

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Between the groups average mechanical ventilations (in days) showed no statistical significance while the ICU stay was significantly longer in group A compared to other groups ($p=0.02$; $p=0.00$).

In group A, thoracic traumatic injuries such as pneumothorax/haematotorax was found in 7pts (20.6%), rib fractures were found in 14 patients (41.2%) and combination of pulmonary contusion with rib fractures was found in 13 patients (38.2%) (Table 2). In this group mechanical ventilation longer than ten days was needed in 29.41% ($n=10$) of the patients, while the same number of patients were not mechanically ventilated at any time. (Table 3).

Group A	7pts	14pts	13pts	34
Group B	10pts	13pt	12pts	35

Table 2. Presence of thoracic traumatic injuries.

In group B, pneumothorax/haematotorax was present in 31.4%, rib fracture was present in 37.2% and combination of both was found in 34.2% of the patients (Table 2). Fractures of the extremities (34.3%; $n=12$) and fractures of vertebra (22.8%; $n=22.8$) were most frequent co-existing injuries found in this group (Table 4). ICU stay longer than five days was need in 10 patients from this group (Table 3).

	Group A ($n=34$)	Group B ($n=35$)	Group C ($n=75$)
Male/female	25/9	27/8	67/9
MV>10 days	29.4% (10pts)	14.3% (5pts)	6.7% (6.7pts)
MV<10 days	41.2% (14pts)	31.4% (11pts)	42.7% (32pts)
ICU>5 days	67.6% (23pts)	37.2% (13 pts)	46.7% (35pts)
ICU<5 days	32.4% (11pts)	62.8% (22 pts)	53.3% (40pts)
Exitus letalis	20.5% (7pts)	20% (7pts)	24% (18pts)

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Table 3. Distribution of clinical features of the patients in the groups

Group C (patients who didn't have thoracic trauma) accompanied the largest number of patients. Significantly more patients in Group C had fractures of extremities and head traumatic injuries compared to other system injuries. (Table 4.)

Between the groups, significantly larger number of patients in Group A needed longer mechanical ventilation while the largest number of patients who needed longer ICU stay where in the group C.

Fracture of vertebra	8pts (22.8/5)	8pts (10.7%)
Fracture of extremities	12pts (34.3%)	22pts (29.3%)
Head trauma	5pts (14.3%)	23pts (30.7%)
Vascular trauma	6pts (17.3%)	4pts (5.3%)
Others	4pts (11.4%)	18pts (24%)
total	35	75

Table 4. Co-existing traumatic injuries in Group B and group C

DISCUSSION

Our study results show that most of the patients admitted in the ICU of CARIC were male individuals with the mean between 40-42 years old. This results are in correspondence with results of trauma audits world wide (4).

Cohn et al. (5) and Rao et al. (6) suggest that mechanical ventilation longer than 10 days is needed in patients who have polytraumatic injuries in whom thoracic wall integrity as well as tissue is diminished (from different reasons). The presence of pulmonary contusion with or without flail chest is usually associated with a high incidence of ventilator support requirements(5); however, there is often no clear correlation between the affected lung volume and the severity and duration of hypoxemia. In our study this seems to be true for the patients who had isolated thoracic trauma. Patients who had coexisting traumatic injury additional to thoracic trauma or patients without thoracic trauma needed mechanical ventilation shorter than 10 days in terms of day as well as in terms of percentages. The same pattern was found for the ICU stay.

Similarly, many studies have reported that the presence of thoracic trauma and rib fractures are positively correlated with the higher mortality. Results of different incidence of isolated thoracic trauma while the referred results for the lethality of isolated chest traumas ranges between 5% to 8% {3, 7}. Results from this study show lower incidence of death (4. 8%) in patients who who had isolated thoracic trauma (group A) as well as in the patients' with coexisting other system traumatic results (group B).

Differences of the results in our study to the other studies might be due to several factors. Firstly, in our study the number of studied patients is relatively lower then the number of patients in the other studies. Secondly in our study pulmonic complications were not evaluated in either of the groups in terms of independent factors. And at last in our study different taxonomy was used compared to other studies.

This study has several limitations. We didn't used taxonomy and scores like Abbreviated Injury Score (AIS) or Injury Severity Score (ISS) which will explain that the patients who didn't have thoracic injury most likely had higher ISS and AIS scores. From the global perspectives view this study was a single institution study so we can not conclude for correlation of traumatic injuries in the Republic of Macedonia.

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Conclusion: Patients with thoracic trauma injuries need longer mechanical ventilation and ICU stay where as lethality is higher in patients with other system traumatic injuries.

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NEW CLINICAL PATHWAY FOR PERIOPERATIVE TREATMENT OF TOTAL JOINT ARTHROPLASTY

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Introduction:

Clinical pathways for fast track surgery are formed in order to achieve clinically and fiscally important outcomes such as earlier discharge from hospital. Fast track models are based on the coordination of multiple individual elements of patient care into an optimized multimodal approach, including targeted patient selection, enhanced patient education, a multimodal approach to postoperative analgesia, and early patient mobilization and rehabilitation¹. In orthopedics, this model has been applied successfully to total joint arthroplasty where fast track programs have been associated with reduced surgical wait times, length of hospital stay and costs of care². Importantly studies suggest that patient safety remains high and satisfaction is equal or improved. Still the implementation of these protocols is always faced with many difficulties, starting with the medical personnel itself, because these programs are associated with more work and engagement from the personnel. Every change is usually hard, even if it brings positive things. The patients usually feel very safe in the hospital, and leaving the hospital is sometimes disturbing for them. And sometimes there are realistic problems, such as having no help at home, architectural issues (stairs, floors, no elevator, bathroom on different level), and bad preoperative patient condition with many comorbidities. It is showed that increasing age, American Society of Anesthesiologists (ASA) physical status, preoperative use of walking aids, low preoperative hemoglobin, and patients living alone were associated with an increased length of stay.

Patients and methods:

In September 2015, we started the implementation of the new multidisciplinary protocol, for the patients with total hip or knee endoprosthesis in our hospital. We set up patient criteria for enrolment in this program, which are listed in Table 1.

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Primary hip or knee replacement
Age $\leq$ 85
ASA I –III
BMI $\leq$ 45
Normal hematocrit
No rheumatoid arthritis
No history of pulmonary embolism or DVT within the last six months
Functional strength of upper extremity
Suitable home layout and design
Adequate home support (responsible adult to assist the patient at home)

Table 1: New joint program patient eligibility criteria

ASA- American society of Anesthesiologists; BMI- Body Mass Index DVT–deep venous thrombosis

One of the reviewers analyzed 61 medical charts retrospectively, before the implementation of the new protocol from the patients who met the same eligibility criteria as the patients for the new protocol. The data that were abstracted were demographic and clinical variables including age, sex, body mass index (BMI), ASA status, comorbidities, surgical procedure, type of anesthesia, intraoperative and postoperative blood transfusion, nausea and vomiting, other complications, length of hospital stay and pain scores with Visual Analogue Scale.

New protocol

The new protocol was designed as an evidence based approach to perioperative care by a multidisciplinary team. The preparation of the patient started as soon as we saw that he met the enrolment criteria with an enhanced preoperative education (oral and written). The education was about the surgery, anesthesia, hospital stay and what is expected from the patient perioperatively, with a single purpose to familiarize the patient with the procedure so he can receive true and realistic information about it. The type of anesthesia was left to the discretion of the attending anesthesiologist, but the postoperative analgesia was determined. It included Ketonal 100mg. two times 24 hoursi. v and Tramadol 50 or 100 mg. i. v. 3 times 24 hours for the first two postoperative days, and after that Ibuprofen 400 mg. 2 times 24 hours per os and Paracetamol 500 mg. 4 times 24 hours per os. The decision to place a urinary catheter was left to the surgeon and the anesthesiologist in the operating room, but even if it was placed, it was taken out the next day. Perioperatively we used the antifibrinolytic tranexemic acid 1, 0 gr. 30 min. before surgery and 1, 0 gr. 3 hours after surgery. Physical therapy was started on postoperative day 0 with a verticalization of the patients, sitting to standing position, with a progressive walking 5 to 10 m. on the next day with the help of a physiotherapist and walking aid. The patients were counseled to breathe deeply every 30 min. , ankle pumping, static quadriceps and buttock exercises. Patients were encouraged to eat and take fluids regularly. Patients were discharged home when they met the following criteria: pain managed with oral medication, normal vital signs, no sign of infection or bleeding, appropriate

oral intake without nausea and vomiting, stable hemoglobin, able to perform self care, independent in bed mobility and transfers, walking 20 m. with walking aid and patient readiness to leave the hospital.

Standard protocol

The standard protocol included limited preoperative education, no standardized postoperative multimodal analgesia, placed urinary catheter in every patient, no antifibrinolytic and no standard physical therapy.

Results:

	Standard protocol	New protocol	p value
Age, mean (SD)	63.49±10.62	61.68±10.12	p=0.34
Gender, %			p=0.58
male	22 (36.23%)	26 (42.6%)	
female	39 (63.77%)	35 (57.4%)	
ASA status, %			p= 0.21
I	2 (3.28%)	3 (4.92%)	
II	40 (65.57%)	38 (62.29%)	
III	19 (31.19%)	20 (32.79%)	
Weight, mean (SD)	82.79±16.45	85.15±16.96	p= 0.43
Height, mean (SD)	166.25±12.04	167.49±9.05	p= 0.52
BMI, mean (SD)	29.91±5.27	29.98±5.52	p= 0.07
Type of surgery			p= 0.55
Hip arthroplasty	45 (73.77%)	41 (67.21%)	
Knee arthroplasty	16 (26.23%)	20 (32.79%)	

Table 2 Patient characteristics

SD- standard deviation, ASA- American Society of Anesthesiologists, BMI-Body Mass Index

	Standard protocol	New protocol	p value
Cardiac disease	11 (18.03%)	12 (19.67%)	p=0.82
Hypertension	44 (72.13%)	46 (75.41%)	p=0.84
COPD	6 (9.84%)	7 (11.4%)	p=0.77
DM insulin dependent	5 (8.2%)	1 (1.64%)	p=0.21
DM insulin independent	1 (1.64%)	3 (4.92%)	p=0.62
Renal disease	0	0	

Table 3 Patient comorbidities

COPD-chronic obstructive pulmonary disease; DM- diabetes mellitus

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	Standard protocol	New protocol	p value
General anesthesia	15 (24.59%)	20 (32.79%)	p=0.42
Spinal anesthesia	46 (75.41%)	41 (67.21%)	

Table 4 Type of anesthesia

Table 2, 3 and 4 are showing demographic characteristics, comorbidities and type of anesthesia, where no significant difference was found between the two groups.

	Standard protocol	New protocol	p value
Blood transfusion			
intraoperative	8 (13.12%)	1 (1.64%)	p = 0.032
postoperative	10 (16.39%)	1 (1.64%)	p = 0.008
Nausea and vomiting			
Operative day	7 (11.47%)	9 (14.75%)	p= 0.79
First postoperative day	1 (1.64%)		
Second postoperative day			

Table 5 Transfusion of blood, nausea and vomiting

Table 5 shows that there is a statistically significant higher rate of blood transfusion among the patients who did not receive tranexemic acid compared to the patients in the new protocol. The second part shows that there is no difference between the groups considering the incidence of nausea and vomiting.

Standard protocol	New protocol	p value
9.19±1.99	7.065±3.51	p<0.01

Table 6 Length of hospital stay (number of days)

Table 6 shows the primary outcome of this study, where we can see that there is a statistically significant earlier discharge home (2days) in the new protocol patient group.

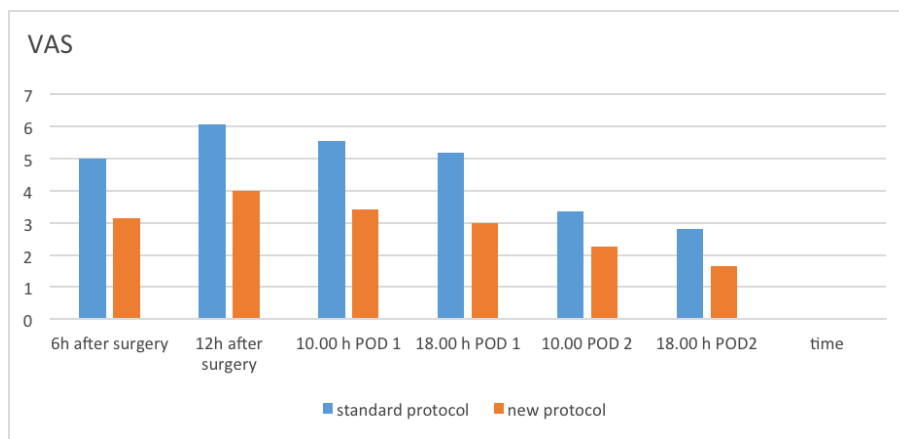


Figure 1 Pain scores according to Visual Analogue Scale (VAS)
POD 1 (first postoperative day); POD 2 (second postoperative day)

Figure 1 shows that there are lower pain scores in the new protocol group with a multimodal analgesia program compared to the standard one.

Discussion:

The development of this new program was a novel thing for our hospital, so we decided not to bring many new and drastically different principals of work, because it is important to change things, but maybe more important is to sustain these changes if they show good results. Preoperative education of the patient has an influence on the psychological state of the patient, getting to know the real aspects of the operation itself, as well as the postoperative time. Patients need to know that they will have certain level of pain, but this should not stop them from actively having part in mobilization and rehabilitation, taking care of themselves and taking food and liquids. That means they should have an active role in the healing process. One review study showed that preoperative education decreases the level of anxiousness among patients, but does not reduce hospital length of stay.³

There are many modalities of postoperative analgesia. There is multimodal systemic analgesia, intrathecal opioids, local infiltration analgesia, single shot or continues peripheral nerve blocks and epidural analgesia^{4, 5}. What is used depends on drugs availability, education of the anesthesiologist for the technique, tradition in the hospital, the patient itself and the preferences of the surgeon also. That is why we decided to use multimodal systemic analgesia with medicine we use in our every day practise. One metaanalysis shows safety and effectiveness in intravenous tranexemic acid in decreasing intraoperative and postoperative bleeding in orthopedic patients⁶. In our study we also saw significant decrease of blood transfusion with the use of tranexemic acid. Placing a urinary catheter is an old habit that needs to be changed. Increased risk of intrahospital infections and decreased mobility of the patients are one of the reasons for that. The study of Loftus showed the connection of decreasing length of hospital stay with avoiding the use of urinary catheter in patients⁷. Out of 122 patients, only

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one had a serious complication, luxation of the femoral part hip endoprothesis and that patient belonged to the standard protocol group.

Our study has several limitations which are important to recognize. The retrospective nature of this study relies both on the completeness of the patient chart as well as on the legibility of the handwritten records, not to mention consistency across nurses with regard to documentation of an event. When we collected the data retrospectively, we looked for patients who would have met the new protocol criteria, but sometimes we could not get all the information from the data (for example, did they have help home). We did not do the discharge according to criteria, we just made a note whether the patient fulfilled the criteria. In all 61 patient they were fulfilled on the day of discharge, and sometimes even earlier. But we did not want to force the surgeon to discharge them in order to receive better results. This way we thought we would make more realistic comparison with the patients in the standard protocol when we did not have the discharge criteria.

The decrease from 9 to 7 days, compared to world experience is not a lot, but maybe more important is the development of closer relationship between the different profiles of medical personnel (anesthesiologist, surgeon, physiatrist, nutritionist, nurse etc.) and more important that this multidisciplinary approach brings results and opens a door for further improvement.

Conclusion

Multimodal multidisciplinary protocol shows success in the patient results (decrease in hospital length of stay, lower pain scores, lower number of blood transfusion) as well as in its applicability and practical implementation for a long run. Of course there is a need for further improvement in every aspect of the protocol in the future.

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COMPRING ANATOMICAL “BLIND” TECHNIQUE AND ULTRASOUND-GUIDED TECHNIQUE OF SETTING CENTRAL VENOUS CATETHER IN V. JUGULARIS INTERNA

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INTRODUCTION: Placing a central venous catheter is an invasive procedure usually performed by anesthesiologists, nephrologists, cardiologists and oncologists. Catheterization of central veins is performed because of hemodynamic monitoring, parenteral nutrition, administration of vasoactive drugs, dialysis, severe peripheral intravenous access, longterm intravenous administration of drugs (eg. Antibiotics) giving fluids to treat the state of shock, application of prolonged chemotherapy and often taking blood for analysis. Although these catheters can be lifesaving, they are associated with certain percentage of risk. Traditional anatomical or “blind” technique of placing CVC is based on superficial anatomical points. In the literature, the failure in setting CVC with this method is between 2% and 15% (1). This greatly depends on the experience of the doctor and the patient’s condition. The most common complications of placing CVC by using the anatomical technique are: pneumothorax (0. 6-6%), puncture of the carotid artery (6%), puncture of a. subclavia (0. 5% -4%), hemotorax (1%), injury of nerves, damage to plexus brachialis, chylothorax, arrhythmias, air embolism, wrong position of the catheter and forming arteriovenous fistula. Other complications associated with placing a CVC as infection, thrombosis, arterial-venous fistula, vascular or cardiac erosion usually aren’t associated with the placement of the needle, but occur after placing the catheter. The risk for the occurrence of the complications increases by several factors such as: patient characteristics (specific anatomy: obesity, short neck, cachexia, scars from previous operations or radiation therapy), repeated catheterization (increased risk of forming thrombes), comorbidities (coagulopathy or bullous emphysema), patients who are on mechanical ventilation or during emergency situations (such as cardiac arrest), the experience of the performer of this procedure, the method of setting CVC (eg. Percutaneous placing of CVC often is performed “blind” and is based on anatomical points).

To place central venous catheter we often use: v. jugularis interna, v. subclavia, v. femoralis. For many anesthesiologists first choice is v. jugularis interna. In the past placing the CVC in VJI was performed by visualization and palpation of certain anatomical points. Additional techniques include: use of pin with smaller hole called “finding” needle that firstly will find VJI, before cannulation of the vein

with a needle with a bigger hole; indirect ultrasound technique - which marked the path of the vein before cannulation and direct ultrasound technique - where the vein is visualized using ultrasound during the cannulation. V. jugularis interna exits the outer jugular hole from the base of the skull behind a. carotis interna, in the anterior-lateral position (going caudally down near the a. carotis). VJI anatomy varies widely between patients, thus the vascular access is complicated in "blind" anatomical method for setting CVC. Traditional or anatomical approach uses the external anatomical structures to determine the exact location of the vein. The most common used approach is to identify the triangle between the two heads of m. sternocleidomastoideus and clavicle. If the needle is placed on the top of the triangle and headed straight to the nipple of the breast should get into VJI 1- 1.5 cm under the skin. The percentage of unsuccessful pins is ranging from 7 - 19.4% and occurs because of the inability to match external markers with the actual location of blood vessel. There is a strong connection between the number of attempts of cannulation of v. jugularis interna and complications, which increases the anxiety and discomfort in patients, giving fluids or drugs is delayed and the monitoring itself.

In 1978 was described the first use of ultrasound cannulation of central veins by Ullman and Stoelting. They used Doppler marking the site of skin over the v. jugularis interna. They reported that using Doppler ultrasound allows precise localisation of VJI on the neck. According to the authors this new technique will increase the success of catheterisation of VJI and reduce unwanted puncture of a. carotis, compared to traditional "blind" technique where you use only anatomical points (2). Several studies showed that use of ultrasound can increase the success rate in placing CVC and can reduce the occurrence of traumatic complications and through monitor can follow the setting of the catheter in the central vein (3). Ultrasonography provides "live" image, e. g. needle can be visualized entering the drain and can be visualized surrounding structures while the catheter is placed.

The advantages of setting CVC under ultrasound are: detection of anatomical variations, accurate location and identification of the vein (for eg. a. carotis is located anteriorly of VJI in 3-9% of patients), recognition of intravascular thrombus (avoid if central veins have already existing thrombosis) and avoiding unwanted puncture of an artery. The main differences between arteries and veins should be known seen under ultrasound. Arteries have thick walls and have round form on ultrasound, they are hardly compromised under pressure and can be seen arterial pulses on ultrasound. Veins have thin walls, oval shape, easily compressed under pressure and no pulses can be seen (there is a cyclic rise and fall of venous flow that varies with respiration).

AIM OF THE STUDY: To observe the incidence of complications and the number of successfully placed central venous catheter in v. jugularis interna between ultrasound-guided technique and "blind" anatomical technique.

MATERIALS AND METHODS: This observational study included 100 patients who had need of placing central venous catheter in v. jugularis interna. From this

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study were excluded patients who had CVC in the previous 15 days, those with anatomical deformities (for e. g. operation of the neck, malignancy), burns on the place of placing CVC, infection on the puncture place, suspected pathological conditions that affect VJI or vena cava superior and disorders in hemostasis. The study was performed at the University Clinic for TOARILUC - KARIL from January 2014 to July 2015. Patients were divided in two groups: the first group consisted of patients on which CVC was placed in VJI by ultrasound-guided technique and the second group CVC was placed using traditional anatomic or "blind" technique. Patients were placed in supine position and were on standardized monitoring. Before the procedure started, all patients had the obligatory peripheral venous line. Cleaning and sealing the area under aseptic conditions was also obligatory. In the first (ultrasound) group, patients were placed in supine position. Ultrasound apparatus Siemens Acuson X300 system (Siemens, Germany) is placed on the opposite side from the one where the contractor stands that it will be easily looking directly at the monitor, which will facilitate insertion of the needle. After the aseptic preparation of the field, linear high-frequency ultrasound probe (6-13 MHz) and cable are isolated with sterile plastic sheath on which is placed a sterile gel. Standard two-dimensional echo is used to calculate the caliber and depth of which lies VJI, assessing the conductivity and compressibility and to see if there are any anatomical variations in VJI. Catheterization is performed using ultrasound continuous "live" image, with "in-plane" approach, by placing ultrasonic probe parallel and above the clavicle, over the triangle formed by the sternal and the clavicular head of m. sternocleidomastoideus. Blood vessels are visualized in cross-section. A. carotis interna has been seen as round structure that pulses while v. jugularis interna has been seen laterally to the artery as oval structure with no pulses. Pressing the ultrasound probe down, VJI is easily pressed and changes the form, while ACI remains the same and does not change the form. The needle is inserted vertically under the skin and is visualized on the ultrasound monitor. After successful aspiration of blood, guide wire is placed through the needle and dilator should pass through guidewire and through it the CVC is placed. Guidewire is removed and all ports of the central access are checked whether through them can freely aspirates blood. After sewing the central line, on the place of CVC puts transparent dressing.



Fig. 1



Fig. 2

Figures 1 and 2: Placing the CVC in the right v. jugularis interna using ultrasound. On the right side you can see how needle is getting into v. jugularis interna and the technique of placing the needle transversely in relation to the ultrasound beam ("cross-sectional (short-axis) technique").

In the second (anatomical) group, patients are in supine position upside down, 15° Trendelenburg position, with a small rotation of the head of the contralateral side. After aseptic field preparation, top of the triangle formed by the two heads of m. sternocleidomastoideus is palpated to feel pulsing of a. carotis interna. Local anesthetic has been used 2% lidocaine with a needle of 24 G locally at the site of puncture. Once the a. carotis interna has been palpated, press slightly towards medially with the fingers of the left hand and the artery will not lie over VJI. CVC heparinized needle is connected on a syringe filled with 10 ml heparinized saline, and placed laterally to the point where the pulses are of the ACI, and is directed towards the same side nipple at the angle of 20 – 30° of the skin. While the vein is punctured, repeatedly is aspirated with the syringe and the return of venous blood into the syringe confirms that the needle is in the vein. Guidewire was placed through the needle, dilator passes through guidewire and finally through it was placed CVC, which is fixed with the skin.



Fig. 3

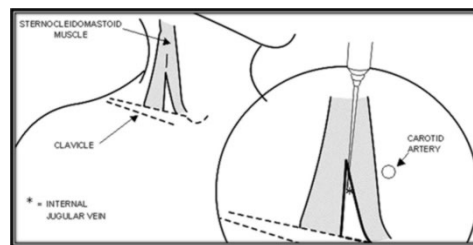


Fig. 4

Figure 3 and 4: Orientation anatomical points during puncture of VJI using anatomical technique. After the procedure, to all patients routinely has been done chest x-ray, to make exclusion of pneumothorax and verify the position of the top of the central venous catheter. All complications that will be done during the placing of CVC will be noted.

RESULTS: The results between the two groups are compared in Table 1.

FINAL RESULTS	ULTRASOUND GROUP (50)	ANATOMICAL GROUP (50)
Percentage of successfully placed CVC	50 (100%)	40 (80%)
Puncture of a.carotis	1 (2%)	2 (4%)
Haematoma at the place of puncture	0 (0%)	1 (2%)
Haemothorax	0 (0%)	2 (4%)
Pneumothorax	0 (0%)	4 (8%)
Air embolus	0 (0%)	1 (2%)

Table 1: Final results in both groups

The percentage of success in the ultrasound-guided group was 100% and anatomical group was 80%. The ultrasound-guided group had no complications

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such as hematoma at the puncture site, haemotorax, pneumothorax, air embolism, and no wrong placement of the catheter. Only one patient had a puncture of a. carotis because VJI is usually located above the artery than it is laterally placed (to prevent puncture of the carotid artery is better to use perpendicular approach). In anatomical palpation group there was a higher percentage of complications, including: puncture a. carotis 4%, haemathoma at the site of puncture 2%, haemotorax 4%, pneumothorax 8%, and air embolism 2%.

DISCUSSION: The mechanical complications usually occur in 0-6. 6% of patients, infectious complications are ranging from 5-26% and thrombotic complications of 2-26%. Cannulation of VJI using ultrasound "live" image is more efficient and reduces complications from puncture. Our study demonstrates the effectiveness of using ultrasound while cannulating VJI, thus reducing mechanical complications. Using anatomical palpation technique we had success in cannulation in 80% of patients, which compared with other studies this percentage is accounted for 95. 25%. In ultrasound-guided group we have success in cannulation of 100%, which is similar to other studies. In the same study of Karakitsos et al. , The frequency of mechanical complications was 5-19% of anatomical or "blind" technique, while the incidence in the ultrasound-guided group was less than 1% (4). Repeated attempts to puncture lead to increased likelihood of colonization of microorganisms and therefore VJI has a higher rate of infection compared to cannulation of v. subclavia or v. femoralis. In 2002 NICE (National Institute of Clinical Excellence) recommends that installing of CVC in v. jugularis interna under ultrasound is a method that is preferred and recommended all those involved in this procedure to be appropriate and well trained (1). In 2011 CDC recommended the use of ultrasound for placing CVC to reduce the number of attempts of puncture and mechanical complications. They reported that the placing of CVC under ultrasound should be used only by clinicians who are well trained in this technique (5). Troianos et al. , In their study found that 2/3 of elderly patients (aged over 60) have over 75% crossing of a. carotis with v. jugularis interna, which increases the possibility of accidental puncture of an artery (6). An ultrasound can be used to change the approach angle to avoid the puncture of a. carotis, which will direct the setting of the needle beyond a. carotis. Shah and Bhavsar in their study described success in the ultrasound-guided group of 100%, while the anatomical group with success of 95%. The study was performed in 400 patients. In the ultrasound-guided group all patients except 3 had a successful catheterization. Apart from these, in other 3 patients with prior or previous difficult catheterization found a clot on ultrasound. That's why in these patients CVC was placed under ultrasound at the opposite site. Three patients from the anatomical group were included in the ultrasound-guided group because in 1 patient was noticed thrombus under ultrasound, 1 patient had anatomic variations and 1 patient had persistent vena cava superior (anatomical condition is the most common variation of the thoracic venous system, occurs in 0. 3 % of the population). For this reason it could not derive anatomical or "blind" approach to placing CVC (2). Tokumine et al. described a new technique of setting CVC under ultrasound in the line of ultrasound beam (long-axis view) in the "in-plane" approach, which is a lot easier and safer to carry and has good results in clinical practice (7).

CONCLUSION: Ultrasound-guided Cannulation of v. jugularis interna reduces complications and helps to identify any clots compared with anatomical (palpation) technique. The time is reduced and number of attempts of cannulation. Recommendations clearly indicate that it is necessary training for placing CVC ultrasound-guided which is of great benefit to the safety and comfort of the patient.

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ULTRASOUND-GUIDED TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK AS A PART OF MULTIMODAL ANALGESIA FOR OPEN UNILATERAL INGUINAL HERNIA REPAIR

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INTRODUCTION: Open unilateral inguinal hernia repair is commonly performed with spinal anesthesia, with sedation or general anesthesia with combination of ilioinguinal/iliohypogastric nerve block or infiltrative anesthesia performed by surgeon with long-acting local anesthetic. This is a common surgical procedure that may be associated with acute or chronic pain. The most common complication after open surgery of inguinal hernia is the appearance of postoperative and chronic pain. Pain after open surgery for inguinal hernia can be moderate to severe and can result in prolonged hospital stay, unanticipated hospital admission and delayed return to normal daily activities. There are some opinions that the inadequate treatment of postoperative pain can be a risk factor for persistent pain after surgery of inguinal hernia. Preoperative and postoperative pain following an operation are mostly accompanied by the appearance of chronic pain, and ranges from 0 to 54% of cases. The study of Nienhuijs et al. indicates that 11% of patients suffer mostly from chronic pain after surgery of inguinal hernia with a mesh and almost 1/3 of the patients have limitations in performing daily activities due to chronic pain (1). Another study suggests that regional anesthesia techniques are superior compared to general anesthesia to reduce acute postoperative pain (2).

Transversus abdominis plane (TAP) block is a (new) regional anesthetic technique which provides analgesia to the parietal peritoneum, skin and muscles of the anterior abdominal wall. It was first described in 2001 by Rafi as an analgesic technique for abdominal incisions by using the technique of “loss of resistance” in the lumbar triangle of Petit. TAP-block technique is a regional anesthesia technique in which a local anesthetic is applied in the space between m. obliquus internus and m. transversus abdominis. The pain of the anterior abdominal wall is transmitted by the anterior branches of thoracolumbar nerves from Th7 to L1 (3).

AIM OF THE STUDY: The aim of this study is to determine the effect of TAP block on postoperative analgesia by monitoring scores for pain; whether ultrasound-guided TAP block provides better pain control compared with systemic opioids given after open surgery of inguinal hernia; does TAP block affect the intensity of postoperative nausea and vomiting.

MATERIAL AND METHODS: In this prospective, randomized and controlled study were examined 60 patients aged 20-60 years, scheduled to open surgery of uni-lateral inguinal hernia and ASA classification 1-2. Patients were excluded if there was a history of allergy to bupivacaine, ketonal and tramadol, coagulopathy, infection at the needle insertion site and patients with ASA classification 3-5. The study was performed at the University Clinic of TOARILUC - KARIL, Clinical Campus "Mother Teresa" - Skopje, from April to December 2015. TAP block was performed by one investigator and surgery was performed by one surgeon. Patients were divided into two groups of 30 patients: one group to undergo US-TAP block with 20 ml 0.25% bupivacaine (TAP block or N1 group) and the other group to receive standard care (control or N2 group). All patients received a standard general anesthesia with standard monitoring. Anesthesia was induced with midazolam 0.04 mg/kg, fentanyl 0.002 mg/kg, propofol 1-2 mg/kg and rocuronium 0.6 mg/kg. Anesthesia was maintained with oxygen, air and propofol 50-200 microgr/kg/min. Standard monitoring include continuous electrocardiography, noninvasive blood pressure every 5 minutes, pulse oxymetry, heart rate and capnometry. Additionally fentanyl 0.5-1 microgr/kg was injected to control blood pressure and heart rate within 20% of baseline. End-tidal carbon dioxide (CO₂) was maintained at 30-35 mmHg. During the study prophylactic antiemetics were not given. All the patients were positioned in a supine position.

After induction of anesthesia, the patients from the first group had the TAP block performed under ultrasound guidance on the right or left side (depends on the side of the surgery), using Siemens Acuson X300 system (Siemens, Germany) ultrasound device and high-frequency (6-13 MHz) linear transducer, covered with sterile plastic sheath. The skin was prepared with 10% betadine solution. After draping the needle insertion site, the probe was placed on the anterolateral abdominal wall between the iliac crest and the subcostal margine. The three muscles (external oblique, internal oblique and transverses abdominis) on the anterior abdominal wall were identified. After identification of the neuro-fascial plane between the internal oblique and the transversus abdominis muscle, a 22G x 4" 50 mm needle mm (B. Braun, Stimuplex, Germany) was introduced anteromedial to the probe in the plane of the ultrasound beam and advanced in a posterolateral direction, by the "in-plane" technique. When tip of the needle reached the TAP between the internal oblique and transverses abdominis muscles, 1 ml of 0.25% bupivacaine was injected into the patients of the TAP block (N1 group). After negative aspiration the entire amount of the syringe was given with occasional aspiration. By giving local anesthetic on the US-monitor was seen the spread of the local anesthetic in TAP space, as a dark oval-shaped hypoechoic fluid pocked at TAP.

After the operation, patients were transferred to the postanesthesia care unit (PACU) and stayed there for 2 hours. There, the patients were monitored. If the VAS score was over 3, then 100 mg of ketonal was administered, whereas if the VAS score was over 6, then 100 mg tramadol was administered. The presence and severity of pain and postoperative nausea and vomiting were assessed by an investigator blinded to group allocation. These assessments were performed in the recovery suite 2, 6, 12 and 24 hrs after operation. All the patients were

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asked to give scores for their pain at rest and on moving, and for the nausea and vomiting at each time point. Pain severity was measured using a visual analogue scale (VAS). Rescue antiemetics were offered to any patient who had complained of nausea or vomiting.

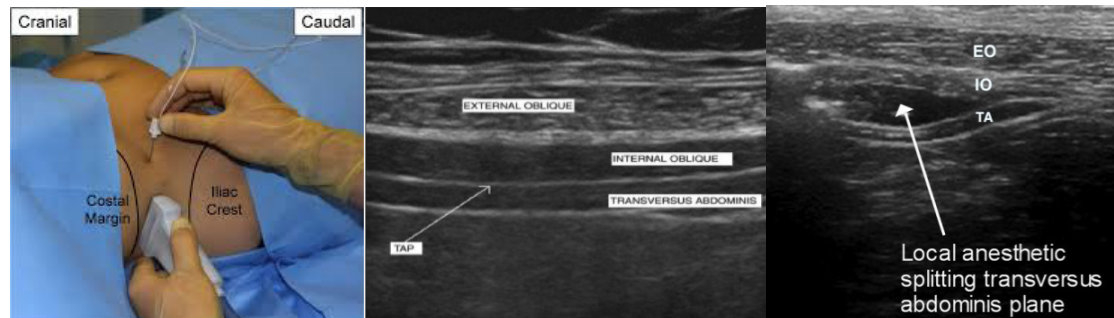


Fig. 1: TAP block as seen via ultrasound: we can see the three muscle layers under ultrasound and spreading of the local anesthetic into the TAP between MOI and MTA.

The primary outcome measure in this study was the VAS pain scores at rest and on moving 2, 6, 12 and 24 hrs after the operation. The secondary outcome measure included the postoperative opioid consumption. The third outcome measure included the incidence of postoperative nausea and vomiting (PONV). All these outcomes were systematically assessed by a member of the research team blinded to the group allocation.

RESULTS: Sixty patients entered this study. Thirty patients were randomized to receive general anesthesia and unilateral USG-TAP block with 0.25% bupivacaine (N1) and other thirty were randomized to receive standard care (N2). TAP block was easily visualized and successfully done, without any complications or failure of the block, performed by one investigator.

In Table 1 average values of VAS score are given in patients who received general anesthesia with and without one-sided TAP block, at rest 2, 6, 12 and 24 hrs after the operation. In Table 2 mean values of VAS score are given in two examined groups on movement after 2, 6, 12 and 24 hrs after the surgery. Analysis showed that VAS score is significantly higher in patients who received only general anesthesia at rest and on movement, as well as after 2, 6, 12 and 24 hrs after operation, versus patients who received general anesthesia+one-sided TAP block.

There is a significant difference between two examined groups (Mann-Whitney U Test: $Z = -4.435$ $p = 0.00009$) in the need for opioids postoperatively. The patients who received general anesthesia had more need for opioids (66.67%) versus patients who received general anesthesia+one-sided TAP block (they had no need for opioids after surgery).

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TIME	GA + ONE-SIDED TAP BLOCK (N1)				GENERAL ANESTHESIA (GA) (N2-CG)			
	AVERAGE	SD	MIN	MAX	AVERAGE	SD	MIN	MAX
After 2 h	0,36	0,30	0	1	4,07	0,78	3	5
After 6 h	0,67	0,57	0	2	3,50	0,77	3	5
After 12h	0,49	0,47	0	2	3,56	0,62	3	5
After 24h	0,53	0,51	0	1	4,36	1,24	3	6

Table 1: Mean values of VAS score in patients who received GA + one-sided TAP block and only GA at rest 2, 6, 12 and 24 hours after surgery

TIME	GA + ONE-SIDED TAP BLOCK (N1)				GENERAL ANESTHESIA (GA) (N2-CG)			
	AVERAGE	SD	MIN	MAX	AVERAGE	SD	MIN	MAX
After 2 h	0,67	0,60	0	2	4,03	0,85	3	6
After 6 h	0,61	1,67	0	2	4,06	1,11	3	6
After 12h	0,81	0,96	0	3	4,17	1,02	3	6
After 24h	0,60	0,72	0	2	5,03	0,76	4	6

Table 2: Mean values of TAP block in patients who received GA + one-sided TAP block and only GA on movement 2, 6, 12 and 24 hours after surgery

OPIOIDES POSTOPERATIVELY	GA + ONE-SIDED TAP BLOCK (N1)	GA (N2 - CG)	TOTAL
NO	30 (100, 0%)	10 (33, 33%)	40
YES	0 (0%)	20 (66, 67%)	20
TOTAL	30 (100, 0%)	30 (100, 0%)	60

Table 3: Distribution of examiners of two examined groups according to the need of opioids postoperatively

There is a significant difference between two examined groups (Mann-Whitney U Test: $Z = -3,418$ $p = 0,0063$) compared to the nausea postoperatively. The patients who received general anesthesia had significantly larger feeling of occurrence/nausea versus patients who received general anesthesia+one-sided TAP block. Nausea was registered only in one patient in GA+one-sided TAP block group.

There is a significant difference between two examined groups (Mann-Whitney U Test: $Z = -3,226$ $p = 0,0012$) compared to the vomiting postoperatively. Pa-

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tients who received general anesthesia were more significant outbreak of vomiting versus patients who received GA+one-sided TAP block. Vomiting was not registered in patients who received GA+one-sided TAP block.

VAS pain scores at rest and on moving were significantly lower in the TAP group. Postoperative ketonal and tramadol consumption was lower in patients who received unilateral TAP block.

DISCUSSION: The use of peripheral nerve blocks has become quite popular over the last twenty years. The use of ultrasound-guided sensory block of the anterior abdominal wall with local anesthesia for postoperative pain relief is an attractive method because of its simplicity and safety. Effective analgesia has shown to reduce postoperative stress response, reduce postoperative morbidity and accelerate recovery from surgery. Another benefit of effective regional analgesic technique is reducing the intensity of pain, reduces incidence of side effects of analgesics and patients feel comfortable. Pain that occurs after open unilateral inguinal hernia repair is quite underestimated, and its untimely and inadequate treatment often leads to prolonged and chronic pain that limits daily activities. TAP block is peripheral nerve block that provides analgesia by blocking sensory nerves of Th7 to L1 (3). It is a very promising technique and has a major role in the management of postoperative pain as part of a multimodal analgesic strategy. TAP block provides effective analgesia during the first 24 hours after surgery operation in the lower abdomen or pelvis (3).

In our study we examined the effect of unilateral ultrasound-guided TAP block performed under in open unilateral inguinal hernia repair. We got a statistically significant reduction in the values of VAS scale at rest and in moving in the TAP group compared with the control group. In the TAP group (N1) patients had no need for opioids after surgery (0% of the patients), postoperative nausea is minimized (only 1 patient had nausea or 3.33% of the patients) and none of the patients had no vomiting (0%) during the first 24 hours postoperative. In the control group (N2), 66.67% of patients had needs for opioids in the postoperative period, 40% of them had nausea and 30% had vomiting in the first 24 hours postoperatively. TAP block reduces the need for intravenous ketonal and tramadol in the postoperative period. This reduction in the need for opioids is resulting in reducing the number of side effects of opioids.

Aveline et al. , in their study included 273 patients for unilateral open inguinal hernia repair with mesh. Half of them received unilateral USG-TAP block and the other half received "blind" ilioinguinal/ iliohypogastric block with 0.5% levobupivacaine 1.5 mg/kg, 30 minutes before surgery. The results showed that patients with TAP block had significantly less pain at rest on the VAS scale 4, 12 and 24 hours after surgery and required a less morphine during both postoperative day, results similar to those of our study. TAP block provides better pain control compared with "blind" ilioinguinal/iliohypogastric nerve (4).

In the study by Petersen et al. , 90 patients were involved in open inguinal hernia operation and were divided into three groups: TAP group, infiltration group (ilioinguinal block + wound infiltration with a local anesthetic) and the placebo

group. The results showed that the VAS scale at rest and cough was lower in the infiltration group compared to the TAP group. The need for morphine was greater in the TAP group compared with infiltration group. The conclusion was that the TAP block performed under ultrasound does not reduce postoperative pain after open unilateral inguinal hernia repair (5).

Manatakis et al. , included 20 patients for open surgery of unilateral inguinal hernia repair. All patients received USG-TAP block with 25 ml of 0. 5% ropivacaine 30 minutes before surgery and during the intraoperative period were sedated with propofol and received paracetamol + diclofenac. They followed the scores for pain in the postoperative period, 30 minutes, 2 and 8 hours after surgery. Their conclusion was that the TAP block provides adequate intraoperative anesthesia, reduces pain scores in the postoperative period, reduces the need for opioids, allows early motion immediately after surgery and faster discharge from hospital (6).

Barisin et al. , described the display case of high risk cardiac patient, ASA 4 status, with severe CAD and prior LAD PTCA, AVR, severe MR and TR 3+, hypertension, diabetes mellitus and severe stenosis of both femoral arteries, to whom should be done unilateral inguinal hernia repair. General anesthesia in such patient is highly risky. The patient received TAP block and a block of n. ilioinguinalis and n. iliohypogastricus performed under ultrasound. As a local anesthetic was used 25 ml 0. 5% levobupivacaine. The operation was successfully performed, the patient was pleased and happy and postoperative sensory block lasted for 18 hours (7).

CONCLUSION: TAP block is a new regional anesthetic technique that provides analgesia of the skin, muscles and the parietal peritoneum of the anterior abdominal wall. It is becoming quite popular because of its relative simplicity and efficiency. In this technique there is a single bolus injection of local anesthetic into the TAP space that provides very effective postoperative analgesia in the first 24 to 48 hours. As a component of multimodal analgesia, the TAP block reduces the needs for intravenous given opioids for more than 70% and subsequently reduces the opioid-related side effects. It is used in cases where epidural analgesia is contraindicated or can not be used. TAP block provides great promise about its efficacy, low rate of complications and simplicity.

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IS THE BEACH CHAIR AND PRONE POSITION SAFE FOR MY PATIENTS?

Sennur Uzun, Assoc Prof. MD

Arthroscopic and open shoulder surgery are performed commonly in the beach-chair position (BCP). This position maintains the shoulder in an anatomical upright position, facilitating shoulder access and visualization. BCP also improves airway access, reduces bleeding, and lessens the risk for brachial plexus injury. Whereas the safety issue should be questioned.

There are multiple reports about its association with neurocognitive complications caused by cerebral ischemia. The etiology of these complications remains unclear, but increased risk for cerebral hypoperfusion at this position seems to be the reason. Reduction of cerebral perfusion pressure below critical thresholds may result in permanent neurologic injury. Therefore, monitoring of cerebral perfusion and optimization of intraoperative cerebral oxygenation have been recommended to help avoid potential neurologic complications. According to Salazar et al, postoperative permanent neurocognitive complications in the BCP is as low as 0.004%. The exact etiology of such complications is not clear. Haemodynamic changes in the BCP, include diminished cardiac index, stroke volume, and arterial pressure leading to decreased cerebral perfusion pressure.

Prone position (PP) provide operative access for a wide variety of surgical procedures. It is associated with predictable changes in physiology but also with a number of complications, and safe use of the prone position requires an understanding of both issues.

Changes in cardiovascular physiology depend on the specific prone position used; reduced cardiac index which is due to reduced venous return, direct effects on arterial filling, and reduced left ventricular compliance secondary to increased thoracic pressure. Obstruction of the inferior vena cava is a well-known complication of PP which is caused by any degree of abdominal compression, leading to decreased cardiac output and increased bleeding, venous stasis, and consequent thrombotic complications. Careful positioning is therefore essential to minimize these risks.

Changes in respiratory physiology are generally advantageous; improving oxygenation, increase in functional residual capacity (FRC), improved ventilation/perfusion matching and consequently improved oxygenation.

Injury can occur to all organ systems, due to direct or indirect pressure effects;

- Endotracheal tube kinking or dislodgement,
- Edema of upper airway in prolonged cases,
- Arterial or venous occlusion of the upper extremity,

Orthopedic Anaesthesia and Intensive Care

- Kinking of femoral vein with marked flexion of the hips,
- Increased abdominal pressure,
- Increased epidural venous pressure,
- Pressure necrosis of the nose, ear, forehead, breast, and genitalis (male), care should be taken
- Monitor disconnection,
- Brachial plexus stretch or compression
- Ulnar nerve, peroneal nerve or lateral femoral cutaneous nerve compression
- External pressure over the eyes, retinal injury or corneal abrasion,
- Excessive rotation of the neck-brachial plexus problem or kinking of the vertebral artery
- Venous gas embolism

An understanding of physiology, complications of prone position and absolute care while positioning can make this position safer for the patients.

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Sevoflurane Baxter

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Во операционата сала и во аптеката, **Sevoflurane Baxter**, е спакуван во нескршливо, лесно, ергономско алуминиумско шише¹:

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Baxter има искуство на пазарот со Sevoflurane повеќе од 8 години², со над 80 милиони ординирани општи анестезии на пациенти во светот³.

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Препознатливото алуминиумско шише, етикетата едноставна за читање и жолтите капачиња кои не подлежат на промени во обликот ја минимизираат можноста од грешки.

Sevoflurane Baxter е достапен со адаптери за полнење на вапоризери, отпорни на истекување, кои можат да се вадат и повеќекратно да се употребуваат^{4,5}.

Адаптерите на Sevoflurane Baxter за повеќекратна употреба овозможуваат лесно чистење доколку случајно се извалкаат за време на операција, без нарушување на интегритетот на производот, за разлика од производите кај кои адаптерот е поврзан за шишето.

1. Data on file at Baxter Healthcare Corp.

2. Launched in December 2005

3. Data on file at Baxter Healthcare Corp. (based on avg. 12 patients per bottle)

4. GE Healthcare Quality Department correspondence December 2008

5. Dräger « to whom it may concern » letter April 2009

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“ULTRASOUND GUIDED CENTRAL VENOUS CATHETERISATION IN THE ONSET OF ICU – is it a method of choice for emergency cases?”

Darko Sazdov, Nikola Sikov, Pande Cukalevski, Natalija Georgievska, Ivica Dimitrov, Igor Isjanovski, Zorka Nikolova-Todorova

General Intensive Care Unit, Clinical Hospital Acibadem-Sistina, Skopje

Introduction: CVK is a part of the daily medicine routine . In USA there are more than 5milions CVK placed yearly. It is conducted daily in intensive care units, and in the emergency room, operating theater, medical and surgical wards as elective and emergency situations. It is indicated when placing a peripheral venous line is impossible to administer inotropic and vasoactive drugs, chemotherapy, parenteral nutrition, fluid therapy and hypertonic solutions, monitoring of CVP, central oxygen saturation, providing access for renal replacement therapy. However, while routine in daily practice it is accompanied by serious complications and even death. The literature describes 35 different complications of central venous catheterization. Complications are divided into mechanical, thrombotic and infectious. Their incidence reached 26%. The most common complications are arterial puncture, hematoma, pneumothorax, hemothorax, air embolism, thrombosis, arrhythmia, infection, damage to the brachial plexus, malposition of the catheter. Typically percutaneous central venous catheterization is carried out with external palpable or visible anatomical structures that have a known proportion to the targeted vessels or so called “landmark” or blind method. Recommendations for use of ultrasound vascular cannulation are from several associations of doctors of various specialties as well as government agencies such as the National Institute for Health and Clinical excellence and the Agency for Research and Quality in Health, the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. (Troianos CA H. G., 2011).

In this study comparing landmark method CVKs with ultrasound guided CVKs in terms of the success of the procedure, the number of attempts, time and the occurrence of complications of the catheterization.

Material and Methods: This is a prospective study conducted during 2015 and 2016 in the ICU in Acibadem Sistina Hospital. The study was conducted after prior approval from the ethics committee of the hospital. 400 adult patients over 18 admitted to ICU were included in the study with indication for cannulation of central vein and consent from the patient or his relatives to participate in the study. Patients were divided in two groups of blind and ultrasound guided. Patients admitted to the steam date were catheterized with blind method while patients received an odd date CVKs was placed using ultrasound. During the procedure a data collecting form was filled for every patient. The doctor who performed the catheterization made the selection of the targeted blood vessel depending on the clinical characteristics of the patient, his experience, and the

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indication for which the CVK was put. In our institution it is normally the internal jugular vein, subclavian vein and femoral vein in that order. After three unsuccessful attempts the procedure was considered as failed. An unsuccessful attempt was recorded when the needle exited the skin. In that case the patient was assigned to the ultrasound group. The choice of vessel with ultrasonic catheterization was made after a preliminary screening of the commonly used approaches. A vessel diameter of less than 0,7cm despite the use of maneuvers to increase the size of the vessel was a contraindication to catheterization. These patients were not included in the study. Patients with a BMI above 30 or below 20, anatomical deformity in the region of interest, emphysema, prior-catheterization in another localization, hypotension, tachycardia, respiratory distress, coagulopathy, patients defined as urgent were labeled "risky for catheterization".

All the doctors involved in the study had more than 25 ultrasound guided catheterization before the start of the study. A portable ultrasound device General Electric e-Logic and linear probe with a frequency of 5 to 10 MHz were used for the study. The probe was covered with sterile foil and a sterile gel was used. During ultrasound catheterization a combination of „out of plane“ technique to determine the correct direction and placement of the needle over the targeted vessel and „in plane“ technique during penetration of the vessel wall was used. The time from skin contact to return of blood in the syringe was recorded. After the return of blood the catheterization was conducted with a standard Seldinger technique. For both methods complete protection with sterile cap, mask, coat and gloves were mandatory. The time for setting the ultrasound machine was not taken into consideration.

Results: The average age of the patients (total, 200) that are in the first group (landmark method) was 59.2 years, while in the second group (total, 200) is 59.3 years. The difference which was registered is statistically insignificant for $p = 0.946382$. Both groups were homogeneous in terms of age and gender. Cannulation using the landmark method was successful in 90.5% of patients and in 60.5% in the first attempt, while the success of cannulation using ultrasound guided method was 98% and 77% in the first attempt.

Successful number of attempts	Count	Percent
First group		
0	19	9.5
1	121	60.5
2	24	12.0
3	36	18.0
Second group		
0	4	2.0
1	154	77.0
2	35	17.5
3	7	3.5

Table 1. View performance by number of attempts in the first (landmark method) and second (ultrasound guided) patient group

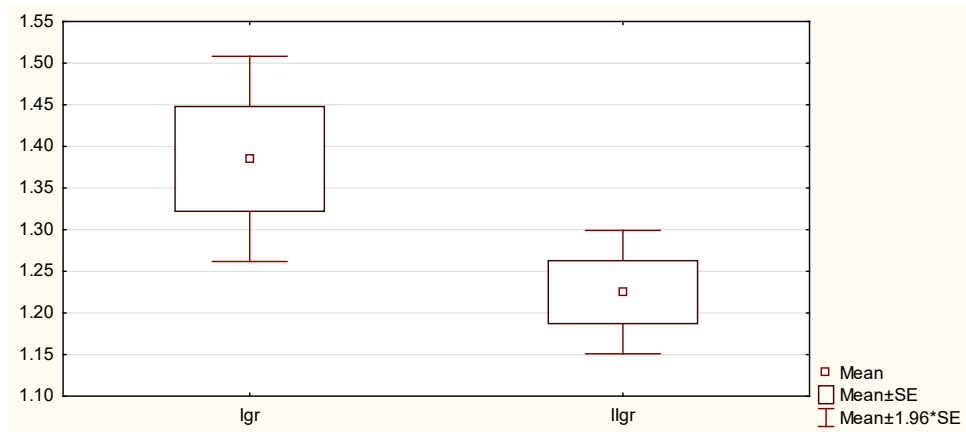


Table 2. A graphical representation of the average number of successful attempts in the first (landmark) versus the second (ultrasound guided) patient group.

The average number of successful attempts in the first group was 1.4 ± 0.9 , and in the the second group was 1.2 ± 0.5 attempts. The difference between the average number of attempts was statistically significant for $p < 0.05$ (t test = 2.180828 and $p = 0.029$)

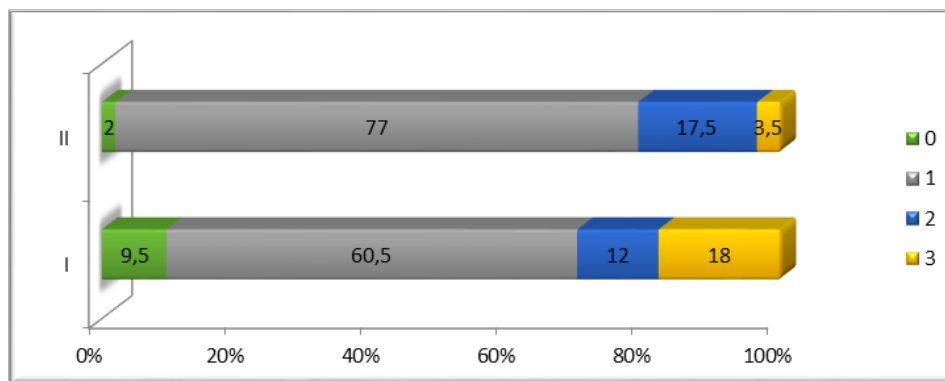


Table3. Graphic presentation of the success / failure of the procedure in the first vs second group of patients according to the number of attempts. Failure of the procedure in the first group was recorded in 9.5%, while in the second group in 2.0%, the difference registered with the diferens test between the two groups is statistically significant for $p < 0.05$ ($p = 0.0013$) . Success in the first attempt is recorded at 60.5% in the first group, and 77.0% in the second group, the difference registered with diferens test between the two groups is statistically significant for $p < 0.05$ ($p = 0.00024$)

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Complications	Count	Percent
First group		
There is	27	13.5
There isnt	173	86.5
Second group		
There is	8	4.0
There isnt	192	96.0

Table 4. Number and percentage of patients with and without complications in the first and second group of patients

No complications in the first group 86.5% , 13.5% of patients with complications , while in the second group no complications in 96% of patients and 4% had complications . The percentage difference registered under diferens test between the two groups is statistically significant for the prevalence of complications $p < 0.05$ ($p = 0.0008$)

In 2,52% of patients in the first group arterial puncture was made while pneumothorax occurs in 6.5%. In the ultrasound quided group pneumothorax is not registered , while arterial cannulation was registered in 1.5% of patients. The percentage difference is statistically significant according diferens test for the occurrence of arterial cannulation for $p < 0.05$ ($p = 0.0107$).

Discussion:

Central venous catheterization is performed daily in intensive care units. Although a common procedure success with landmark method is between 60% and 95% and is associated with serious complications resulting in increased morbidity, length of hospital stay, increased costs, and mortality. The percentage of failure by 7% to 19,4% (Sznajder JI, 1986) is in part due to the inability of external features to precisely correlate with the position of the targeted blood vessel. With each subsequent attempt the success rate is reduced by 25%. Additionally there is a strong correlation between the number of attempts and the incidence of complications. (Troianos CA J. D., 1991)

The incidence of complications is between 5% and 19%. (McGee DC, 2003) They are divided into mechanical, thrombotic and infectious. Complications are more common where the doctors are less experienced, obese, kahectic patients, twisted or thrombosed vessels, congenital anomalies, present comorbidities, respiratory distress, mechanical ventilation, coagulopathy, emphysema, emergency situations. The most common complication of catheterisation of the internal jugular vein and the femoral vein is arterial puncture. The most common complication of catheterization of the subclavian vein is pneumothorax.

In our study canullation with landmark method was successful in 90.5% of patients and in 60.5% in the first attempt, while the success of canullation using ultrasound quided method was 98% and 77% at the first attempt. These results are consistent with other published studies. (Karakitsos, 17 Nov 2006) (Troianos CA J. D., 1991)

Landmark method of access to the central venous circulation through the subclavian vein is considered to be the simplest way for venous cannulation of the vessel. The advantages of using the subclavian vein are the constant external landmarks and the position of the vein, low risk for infection, easier to maintain and more comfortable for the patient.

Previous major surgery, radiation therapy, previous catheterization, high BMI, fracture of the first rib, clavicle, COPD, mechanical ventilation are risk factors for complications during landmark method of catheterization of the clavicle vein. Mansfield et al. in its note the study, that the risk of failed cannulation was 20.1% in patients with BMI > 30 kg / m². (Mansfield PF, 1994)

Beside patient's characteristics, the experience of the operator is of particular importance in cannulation of a subclavian vein. The frequency of complications is greater when the cannulation is made by operators with less experience. (Troianos CA H. G., 2011). However, serious complications occur even with experienced operators. (Merrer J, Aug 8 2001) (Mansfield PF, 1994). The success is significantly reduced with each failed attempt to cannulate. After two or more unsuccessful attempts the percentage of failure rises to 43.2%. The percentage of complications in the landmark method ranges from 0.3 to 12%. The most common complications were pneumothorax, hematoma, arterial puncture, hemothorax.

The use of ultrasound in subclavian vein catheterization increases performance and reduces the proportion of mechanical complications in adult patients. (Shah A, 2013) Success with the ultrasound guided method in the study of Fragou was 100%, and 87.5% with the landmark method; additionally there is a statistically significant lower number of attempts (1.1 vs. 1.9), shorter time to obtain blood (26.8 seconds versus 44.8 seconds) and a lower rate of complications (arterial puncture 0.5% versus 5 pneumothorax and 4% 0% vs. 4.9%) compared with ultrasonic method (Fragou M, 2011)

In our study in 2,52% of patients cannulated with the landmark method arterial puncture was recorded as a complication while pneumothorax occurred in 6.5%. In the ultrasound guided group pneumothorax was not observed while arterial cannulation was observed in 1.5% of patients.

Femoral vessels are used for access to the central circulation in emergency situations for invasive cardiac procedures as well as for providing access for renal replacement therapy. (MV Prabhu, 2010) Advantages are relatively constant anatomy, short access time, the absence of any manipulation in the area, no risk of pneumothorax and hemothorax and uninterrupted CPR. However, this approach is associated with complications like vascular injury, retroperitoneal bleeding, thrombosis, pseudoaneurysm, arteriovenous fistula etc. The overall success in the study by Prabhu is 89.1%, with 80% for the landmark method and 98.2% with the ultrasonic method (P 0.002). The success in the first attempt was 54.5% vs 85.5% (P 0.000), while the percentage of complications was 18.2% vs 5.5% (P 0.039).

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Conclusion: Ultrasound quided method of access to the central venous circulation via the internal jugular, and femoral vein and calviculle vein in critically ill patients in ICU, increases performance, reduces the required number of attempts and the complications associated with this procedure.



Figure 1. Ultrasound catheterization of the internal jugular vein

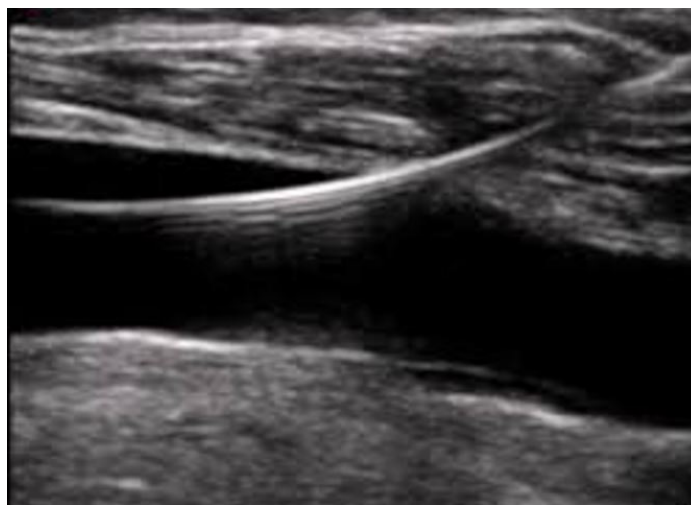


Figure 2. In plane technique for ultrasound guided procedures for central venous catheterization seen a longitudinal section of the vessel and placed venous catheter

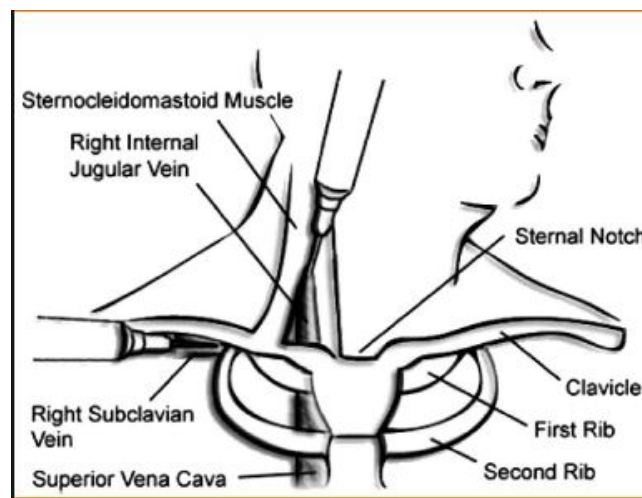


Figure 3. External landmarks in central venous catheterization of the internal jugular vein and calvculle vein.

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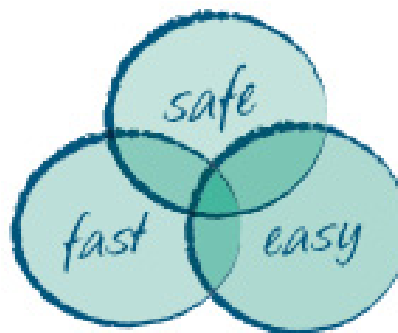
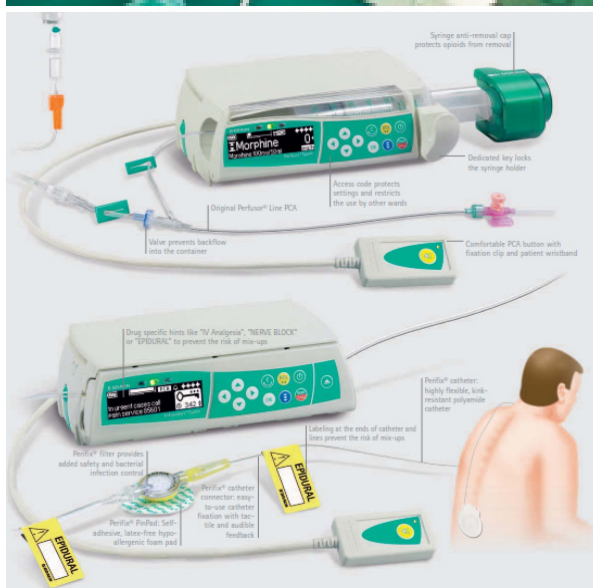


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Abstracts

Oral presentations

May 18, 2016, Wednesday
SESSION-1

13: 00-14: 15
Chairs: Dr. O. Vasileva, Dr. V. Mitashova

ANESTHESIOLOGICAL APPROACH IN SURGICAL TREATMENT AND VACUUM TREATMENTS OF SURGICAL WOUNDS IN PATIENTS WITH ORTHOPEDIC SURGERIES

Aleksovski E. , Stoicovski E. , Gramosli T. , Gjorgon M. , Angjuseva T. , Mitrev Z.

Special hospital for surgical diseases Filip Vtori, Skopje

INTRODUCTION AND AIM: High percent of the patients that are planned for surgery are associated with comorbidities, because of which they have anesthesiological contraindications and they are not accepted for ortopedic treatment. Certain number of the patients were already treated in other hospitals and they come to our hospital for repetitive surgical treatment because the previous one didn't succeed. In certain percent of those patients there are infected surgical wounds that require serious and effective treatment until healing of the wound. The goal of this study is to follow the time of recovery after anesthesia, and follow up of adverse effects from anesthetics, nousea, vomiting, pain and head ache.

MATHERIALS AND METHODS: The anesthesiological approach is to minimize the discomfort of the patient, minimize the fear, pain, and accompanying vegetative reactions. We present a series of 68 orthopedic patients that received short term intravenous anesthesia. All patients were pre oxygenated with gas flow six to eight litres/minute. They were all premedicated with Midazolam 2-3 mg, 3-5 minutes before the start of the intervention. The induction was with Propofol 1% 1mg per kilogram of body weight, and analgesia with fentanyl 0, 01 mg per kilogram of body weight. They were all monitored with standard non invasive monitoring, non invasive measurement of the blood pressure, peripheral oxygen saturation and ECG.

RESULTS: 68 patients received short term intravenous anesthesia, 52 for repetitive vacuum treatments and 16 for surgical intervention or surgical closure of the wound. In all patients we didn't require deepening of the anesthesia (general anesthesia or spinal anesthesia). We had 35 patients that recovered from anesthesia in time less than 5 minutes, 28 patients that recovered in time between 5 and 10 minutes, and 5 patients that recovered in time more than 10 minutes. We had 3 patients with nousea, 1 patient with vomiting, and 4 patients that had head ache.

Orthopedic Anaesthesia and Intensive Care

CONCLUSION: Short term anesthesia was the best choice for maximum positive benefit for the patients, because the recovery time after anesthesia was fast and they were transferred to the ward in stable condition, or if they were treated in ambulance they were discharged home in short time. With this the hospital had maximum benefit in orthopedics patients, as well as in other surgical treatments. This type of anesthesia become real asset in the department of anesthesiology for raising quality and safety of our anesthetic practice.

May 18, 2016, Wednesday
SESSION-1

13: 00-14: 15
Chairs: Dr. O. Vasileva, Dr. V. Mitashova

PERIOPERATIVE TRETMENT OF THE PATIENT WITH VON WILLERBRAND DISEASE SCHEDULE FOR TONSILOADENOIDECTOMY

Shirgoska B. , Netkovski J.

Von Willebrand disease (VWD) is a genetic disorder caused by missing or defective von Willebrand factor (VWF), a clotting protein. VWF binds factor VIII, a key clotting protein, and platelets in blood vessel walls, which help form a platelet plug during the clotting process. The condition is named after Finnish physician Erik von Willebrand, who first described it in the 1920s. VWD is the most common bleeding disorder. It is carried on chromosome 12 and occurs equally in men and women. There are three main types of VWD based on qualitative or quantitative defects in VWF. A fourth type, acquired VWD, is not hereditary.

A woman 20 years old came to our clinic with the diagnoses: Hypertrophy of the tonsils and adenoids. Preoperative analyses: HCT = 0. 33/l; MCV = 72fl; MCH = 24. 8pg; RDW = 15. 8%. ; APTT 38. 95 sec. Quantitative analyses of clotting factors showed that the level of Von Willebrand factor was 80. 49% and Von Willebrand Ag of 56. 75%. Platelet function measuring tests showed low percent of platelet aggregation with ADP 62% and Ristocetyn 64%. Our patient had type 2 VWD, a qualitative deficiency in her VWF, without spontaneous bleeding episodes.

Preoperative treatment with 1g tranexemic acid in 100ml 0. 9% NaCl in slow intravenous infusion was performed before the operation. The operative intervention was performed under general anesthesia. There was no need of local treatment with tranexemid acid during the operation. There was no need of postoperative repeating dose of tranexemic acid and clotting factor concentrates riched in VWF, too.

Aminocaproic acid and tranexamic acid are antifibrinolytics agents that prevent the breakdown of blood clots. These drugs are often recommended before dental procedures, to treat nose and mouth bleeds, and for menorrhagia. Antifi-

brinolytics are taken orally, as a tablet or liquid. Preoperative treatment with tranexemic acid in intravenous infusion is a treatment of choice for the patients who are scheduled for operative intervention and anesthesia.

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Chairs: Dr. O. Vasileva, Dr. V. Mitashova

INTRA-ABDOMINAL PRESSURE MEASUREMENT DOES NOT INCREASE THE RISK FOR URINARY TRACT INFECTION IN CRITICALLY ILL PATIENTS

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Introduction: Intra-abdominal hypertension and abdominal compartment syndrome have been shown to contribute to organ dysfunction and mortality in critically ill patients. Diagnosis relies on intra-abdominal pressure (IAP) measurement. For measuring IAP different techniques have been developed, either measuring IAP directly or indirectly. Intrabladder pressure monitoring is considered the method of choice for indirect IAP measurement due to its accuracy and relative ease.

Aim: To determine whether intra-abdominal pressure monitoring using the Foley catheters and bladder pressure measurements increases the risk of urinary tract infection.

Material and methods: Retrospective chart and database review of 130 critically ill patients admitted in the Intensive Care Unit in the University Clinic for Anesthesia Reanimation and Intensive Care, Skopje- Macedonia who underwent intravesicular pressure monitoring was done. For the measurements of IAP a standard sterile procedure was used. A system was used in which the catheter was disconnected from the bag and a three way stopcock was inserted for measuring the IAP after instillation of 25 mL of saline into the bladder. Urine analysis and urine cultures were obtained in any patient that developed a fever of > 38. 5°C or macroscopically grossly purulent urine. Urinary tract infection was defined by microbiological culture documentation of more than 100, 000 colony-forming units per high power field of either a specific bacterium or fungus together with significant pyuria.

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Results: In total, 130 patients had IAP measurements via the bladder. Patients had 520 intravesicular pressure measurements performed. In total 4, 6% of the patients who required intravesicular pressure monitoring developed an urinary tract infection.

Discussion: Although the benefits of IAP monitoring in the diagnosis, prevention, and management of Intra-abdominal hypertension and abdominal compartment syndrome have been demonstrated, some clinicians remain reluctant to institute this monitoring technique out of concern for increasing the patient's risk of device-related nosocomial urinary tract infection. There are only few scientific data to support or refute this theory that intravesicular pressure measurements increase the risk for urinary tract infection.

Conclusion: Intravesicular pressure monitoring does not have an influence on the risk of urinary tract infection in critically ill patients.

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Chairs: Dr. O. Vasileva, Dr. V. Mitashova

THE USE OF TRANEXEMIC ACID IN PATIENTS WITH TRAUMATIC BLEEDING-LITERATURE REVIEW

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Introduction: Trauma remains the leading cause of mortality and accounts for almost 9% of total mortality worldwide. Uncontrolled bleeding and exsanguination are the leading cause of preventable death after trauma. Tranexemic acid has been shown to reduce blood loss, vascular occlusive events and death in traumatic bleeding patients undergoing surgery.

Methods: A comprehensive literature search through PubMed and Medline using the words-tranexemic acid, trauma, injury, bleeding, surgery.

Results: The summary reveals that tranexemic acid is associated with 1. 5% reduction in all cause mortality in adult trauma patients with bleeding. The benefit form it was in the group with patients who were in most severe shock and if it was given one to three hours after injury. The treatment with tranexemic acid given after three hours of injury was associated with an increased risk of death caused by bleeding. No vascular occlusive events were associated with the treatment with tranexemic acid. Considering this it is still unknown in wich patients should tranexemic acid be used, what is the perfect timing and dose, what are

the neurological complications of its use, whether another tests for fibrinolysis should be performed before application and whether there is another antifibrinolytic agent that could be used instead.

Conclusion: Among different trauma centers exists a major diversity in the management of bleeding trauma patients. There is a strong need of prospective clinical trials. These trials must provide conclusive information that will challenge the medical community to consider readjusting the use of tranexemic acid.

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Chairs: Dr. O. Vasileva, Dr. V. Mitashova

SAFETY AND QUALITY OF DEEP SEDATION DURING ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY (ERCP) PROCEDURES IN HIGH RISK PATIENTS

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Introduction: Sedation during endoscopic retrograde cholangiopancreatography (ERCP) remains a problem, especially in high risk patients. We evaluated the safety and quality of propofol and fentanyl used for deep sedation and analgesia during this procedure, in high risk patients.

Methods: Fifty eight patients American Society of Anesthesiologists (ASA) Physical Status III or IV underwent ERCP procedure were included. Propofol was administrated in doses 0.5–1.0 mg/kg by slow IV infusion (over 60 s), followed by 10–20 mg/minute IV, until adequate sedation was achieved. Maintenance was realized with perfusion of propofol in doses 10–20 mg/hour. Analgesia requirement was achieved with fentanyl 20 mg/kg. Efficacy outcomes included procedural success rate, depth of sedation (Modified Ramsey sedation score) and recovery time. Safety outcomes were respiratory and hemodynamic status and frequency of adverse events.

Results: The mean duration of ERCP procedure was 56.7 minutes (range 20–105, SD 33). The mean propofol induction dose was 60 mg (SD 60) (0.9 mg/kg, SD 0.4 mg/kg). The mean propofol maintenance dose was 40 mg (SD 7.8). The mean fentanyl dose was 113 mcg (SD 12). Mean times to achieve adequate se-

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dation were 2.1 ± 0.6 . The quality of sedation is assessed as good in 48 patients and adequate in 10 patients. The desaturation episodes were transient and did not require any active airway intervention. No apnea was observed in any patient. The variations on blood pressure 2 minutes after the injection of propofol were significant. Other side effects did not occur.

Conclusion: Deep sedation with propofol and fentanyl during ERCP procedures in high risk patients achieve quality without compromising safety.

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DEEP VEIN THROMBOSIS AND THROMBOPROPHYLAXIS IN PATIENTS WITH ARTHROSCOPIC KNEE SURGERY

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Introduction: Although the deep venous thrombosis (DVT) is the most common cause of perioperative mortality following knee arthroscopy, the literature regarding actual implementation of pharmacologic thromboprophylaxis following knee arthroscopy shows that no consensus exists.

Purpose: The purpose of our study was to retrospectively assess and analyze the incidence of deep venous thrombosis after knee arthroscopies at our institution and to assess the efficacy of prophylaxis to prevent DVT.

Patients and methods: In this study 142 patients were included and divided into two groups: **Group I** with 110 patients where simple arthroscopic procedure was performed and **Group II** with 26 patients where arthroscopic anterior cruciate ligament (ACL) reconstruction was performed. In **Group I** only patients with risk factors (increased tourniquet use more than 60 minutes, age > 60 years, BMI > 30 kg/m², previous DVT, varicose veins or chronic venous insufficiency, history of malignancy, oral contraceptives or hormone replacement therapy, preoperative immobilization and prolonged postoperative immobilization) were treated with thromboprophylaxis and in **Group II** all the patients got thromboprophylaxis 15-20 days postoperatively. A retrospective analysis in all patients operated between June 2015 and December 2015 was conducted and the association between clinical factors and postoperative DVT was determined.

Results: There were only 5 patients with DVT in **Group II**. All of them showed clinical signs of DVT between the 5th and the 7th postoperative day. We found sig-

nificant association between the incidence of DVT and prolonged postoperative immobilization, inadequate liquid consumption during the summer and lower dosage with low molecular weight heparin (LMWH). Four of the patients with DVT were operated during the summer when the temperature exceeded 32 Celsius degrees, 4 of them were mobilized 5 days after the operation, and 3 of them got daily 40 mg of enoxaparin sodium although their weight exceeded 75 kg.

Discussion: Thromboprophylaxis should be given in all patients with ACL reconstruction and only in risky patients with simple arthroscopic procedures. Early postoperative mobilization, adequate liquid consumption and adequate doses of LMWH should be obtained to prevent DVT.

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INTRATHECAL MORPHINE AND POSTOPERATIVE DELIRIUM IN ELDERLY ORTHOPEDIC PATIENTS

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Introduction: Postoperative delirium is common in elderly orthopedic patients with hip fracture. The quality of postoperative analgesia is related to the postoperative delirium, so we evaluated the effect of 0. 1ml Morphine intrathecal on the incidence of postoperative delirium in elderly patients with hip fracture.

Material and Methods: 35 patients old 65years to 85years with hip fracture, ASA II-III were enrolled. We excluded patients with dementia, ASA IV and allergy to opioids. Spinal anesthesia was achieved at L3-L4 interspace and all patients get an intratecal injection of 0. 5% bupivacaine isobaric 2, 5-3ml and Morphine hydrochloride 0. 1 ml. All patients were given O2 3l/min. We recorded the following parameters: Age, the time between admission and surgery, duration of surgery and the time between intratecal injection and first postoperative supplemental analgesia. We evaluated: postoperative VAS pain score, nausea-vomiting and puls-oxymetry (pO2) at 6h, 12h, 18h and 24h after the operation. The incidence of postoperative delirium was assessed using the Confusion Assessment Method (CAM) at the same time points.

Results: 35patients were included with mean age of 70. 2 years. The time between admission and surgery was mean 26hours, 9 patients has more than one episode of nausea and vomiting, 3patients developed postoperative delirium (9%) and all patients had their postoperative VAS pain score less then 5. The supplemental analgesia was mean 20. 5hours.

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Discussion and Conclusion: Our study shows that intratecal injection of 0.1 ml Morphine in elderly patients with hip fracture is associated with a good quality of analgesia and low incidence of postoperative delirium.

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EMERGENCY MANAGEMENT AND RESUSCITATION OF THE CRITICALLY POISONED PATIENTS

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Acutely poisoned patients are commonly encountered in Emergency Centres. Acute poisoning (accidental or intentional) requires accurate assessment and prompt therapy. The necessity to prevent cross contamination during the initial evaluation should be emphasized. Early identification of the involved toxin/s is crucial and the majority will be identified by a thorough history and physical examination. An ABC-approach should be followed ensuring a protected airway, adequate ventilation and hemodynamic stability. Supportive and symptomatic care remains the cornerstone of treatment. A stepwise approach may be followed to decrease the bioavailability of toxins. Indications, contra-indications, risks and dosage regimens are describe for decontamination procedures including both termination of topical exposures and decreasing exposure to ingested toxins. Furthermore, procedures to increase the elimination of toxins and a short section covering specific toxins and their antidotes are also included.

The aim of this commissioned review was to establish concise guidelines for the initial management of the acutely poisoned patient in the Emergency Centre. The American Academy of Clinical Toxicology and the European Association of Poisons Centres and Clinical Toxicologists are the international leaders in the field of toxicology and the guidelines in their position papers were generally followed.

TREATMENT OF ECLAMPSIA IN INTENSIVE CARE UNIT

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Introduction: Eclampsia (EC) is a multisystemic disorder that appears in pregnancy and is defined with hypertension, proteinuria, edema, epigastric pain, HELLP Sy, headache, blurred vision and convulsions with altered consciousness. The aim of our study is to display the treatment of eclampsia in the intensive care unit (ICU) on Clinic for gynecology and obstetrics (CGO).

Materials and methods: Our study covered patients with eclampsia treated in our ICU during years 2014 and 2015. During 2014 there were 18 patients with EC on CGO, 8 of them treated in ICU, while during 2015 there were 21 patients with EC and 7 of them were treated in ICU. The treatment covered the period before and after the termination of pregnancy with cesarean section. Management of this life threatening condition both for the mother and the fetus depended on: quick laboratory analysis; monitoring of the vital signs on mother and fetus; appropriate medical therapy that mainly include antihypertensive medications, Magnesium sulphate and other anticonvulsive medications; adequate therapy with crystalloids, colloids, blood products; antiedematous therapy as well as treatment of potential complications, airway management with frequent need for endotracheal intubation and ventilator support. Termination of the pregnancy with cesarean section is usually the first step in the treatment of eclampsia and as soon the patient is stabilized cesarean section is performed.

Results and conclusion: All patients with eclampsia treated in ICU at CGO during 2014 and 2015 were with good outcome. The team work between experienced obstetric anesthesiologist and gynecologist- obstetrician, fast realization of the diagnostic and laboratory procedures, appropriate medical treatment, on time taken reanimation procedures as well as early termination of pregnancy with cesarean section contributed to the favorable outcome of all patients with eclampsia treated in our ICU.

MYOCARDIAL CONTUSION – THE DEVIOUS PARTNER OF POLYTRAUMA

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The aim of this paper is to review the particularities of myocardial contusion, a silent contributor to the outcome of polytrauma, through a presentation of two polytraumatised patients with different development.

The first case is one of a 25 years old male, a traffic accident victim, with fractured femur, fractured ribs, bilateral lung contusions with pneumothorax, pneumopericardium and signs of traumatic shock. The patient was intubated and mechanically ventilated, while the indicated femur operation was deferred due to the hemodynamic instability. Cardiac contusion was suspected considering the pneumopericardium, the increased cardiac enzymes, the persistent tachycardia, with paroxysms of extreme short lasting tachyarrhythmia subsiding either spontaneously or with antiarrhythmics. When the hemodynamic status improved (inotropes and fluids) on day 4 the femoral fracture was operated. On day 6 the patient was extubated, breathing sufficiently, with no signs and symptoms of cardiac instability, and was discharged from ICU 10 days after admittance.

The second case was of a 54 years old male, a pedestrian hit by a car, with fractured right femur and humerus with affected axillary artery, fractured several ribs, hemothorax and right lung contusion (CT scans). After the initial reanimation with fluids (traumatic and hypovolemic shock), the patient was stabilized and prepared for operation on the fractured femur and humerus, during which the axillary artery was sutured. After the operation the patient was returned in the ICU for postoperative treatment, while still sedated and mechanically ventilated. On day 2 the patient developed hypotension, bradycardia, that turned into asystole, which was immediately treated with adrenalin and CPR, but unfortunately the patient did not respond. The cardiac enzymes taken on day 2 before the cardiac arrest, showed increase in all the enzymes, especially the troponines. . Post-mortem examination showed massive cardiac injury.

These two cases show that myocardial contusion is a condition with many different “faces”. It can be plainly visible, but it can be also occult and masked in the signs and symptoms of a traumatic, hypovolemic or hemorrhagic shock. Being difficult to diagnose and here from to treat, myocardial contusion stays one of the most dangerous condition in polytraumatised patients, one which should be thought for, sought for and treated promptly and aggressively.

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Chairs: Dr. V. Gievski, Dr. G. Oranska

HEMANGIOMA CAVERNOSUM AFTER SPINAL ANESTHESIA FOR CAESAREAN SECTION

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Introduction: The aim of this case report is to present the occurrence of a neurosurgical disorder which is provoked by caesarean section. The incidence for these cases is extremely rare, but is there nonetheless.

Case presentation: A patient with initials L. M. , aged 32 with body weight of 105 kg was admitted to our clinic with diagnose: Graviditas ml X and haernia ventralis. She went under elective caesarean section, which was indicated by a digestive surgeon. This was her 3-rd regularly controled pregnancy, the first of which was finished 5 years ago with a C-section, the second one was terminated in the IV ml because of spina bifida feti and the 3rd one was once again with C-section. The C-section was lead in spinal anaesthesia. Spinal punction was performed at L3 – L4 level with a 27G needle and 10 mg of Bupivacain with 0. 02 mg Fentanil were administered. She received 2 liters of crystalloids during the intervention and she was cardiocirculatory stable the whole time during the operation. The baby had an Apgar score of 9, 10. She was released after 3 days with a good general condition. 8 days after her release she was again admitted in our clinic, following an abrupt decadence in her condition (somniaence, difficulties in talking, hypertension, convulsions). In diffetential diagnosis we thought it may be: late eclampsia or epilepsy or subarachnoid hemorrhage as a complication from the spinal punction. The MRI and CT angiography that ensued contributed to the diagnosis (tumorous change with 15 mm diameter, calcificated and located near corpora mamaria). The change was most probably in favor of angioma cavernosum. After the consultation with neurologist and neurosurgeon, the patient was transferred to Neurosurgery clinic for intensive monitoring. It was agreed upon a conservative treatmant for hypertension, hemodilution and hyperperfusion. She was discharged from the hospital after 10 days in good condition without any neurological signs, with recommendation for regular controls.

Conclusion: There is a possibilty a neurological deficit of, most likely, unknown etiology will ensue after a surgical completion of birth. Multidisciplinary approach is very important in early diagnosis and proper treatment.

HEMODYNAMIC PROFILE OF UNILATERAL SPINAL ANESTHESIA FOR HIP FRACTURES

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Background: Hemodynamic stability is desired outcome of any anesthetic technique. Tachycardia, hypotension and hypertension can lead to perioperative myocardial infarction, and hypotension can lead to stroke. Spinal anesthesia in elderly patients with hip fracture provides more stable hemodynamic profile. Unilateral spinal anesthesia (USA) has proven hemodynamic stability in patients with hip fractures. This study aimed to explore the hemodynamic profile of USA with hyperbaric Bupivacaine and Levobupivacaine.

Methods: Patients with hip fractures were randomized to three study interventions: unilateral spinal anesthesia with either hyperbaric Bupivacaine, and two different hyperbaric preparations of Levobupivacaine. Patients were observed for hemodynamic changes during anesthesia. Groups were compared for differences.

Results: 24 patients (17 female/7male), average 75. 77 ± 11 . 23years old, ASA II/III (6/18), baseline MAP 115.42 ± 13.61 . Nine patients in Group I underwent USA with hyperbaric 5-10mg Bupivacaine in 7% dextrose+20mcg Fentanyl, 9 pts in Group II hyperbaric 5-10mg L-Bupivacaine in 7% dextrose+ 20mcg fentanyl, Group III 6 pts hyperbaric 5-10mg L-bupivacaine in 3% dextrose+20mcg fentanyl. Blood pressure (BP) at 5, 15 and 30 minutes, was stable in all groups (105.92 ± 16.09 , 91.38 ± 16.15 , 83.33 ± 14.86 respectively). Significant relative drop of BP $\geq 30\%$ from baseline was observed in 11 cases (3, 3 and 5 cases in Group I, II and III respect.) and absolute drop (MAP <60 mmHg) in 1 case from Group III. Bradycardia (HR <50 /min) was not observed. The blood pressure resolved to preferred range with vasopressor (1-3mg etylephrine) in 2 cases, and colloid bolus in 5 cases.

Conclusion: USA with hyperbaric bupivacain or levobupivacaine is safe and reliable technique for the patients with hip fractures. Mild and easily manageable hypotension occurred in nearly half patients. No cases were observed with subsequent perioperative major cardiac events.

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NONINVASIVE VENTILATION IN CARDIOGENIC PULMONARY OEDEMA CASE REPORT

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Introduction: Respiratory insufficiency due to cardiogenic pulmonary oedema or congestive heart failure (CHF) is another condition that is effectively treated with noninvasive ventilation (NIV). Respiratory failure due to heart failure is potentially a rapidly reversible condition, similar in its reversibility to decompensated COPD and NIV is an ideal adjunct to the other treatments used in the management of CHF.

Material: 37 year old woman with history of spinal disorders was admitted in obstetric ward for Caesarian Section (C. S). Spinal anaesthesia was given. During the operation she was bleeding and hysterectomy was performed. She was difficult for intubation and Proseal LM was inserted.

Result: After surgery she was admitted in ITU and the pulmonary oedema was occurred. Cardiogenic pulmonary oedema is common medical emergency and NIV has been shown to improve both physiological and clinical outcomes.

Conclusion: A number of emergency department have introduced NIV and CPAP for patients presenting with acute respiratory failure.

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Chairs: Dr. V. Gievski, Dr. G. Oranska

UTERUS ATONY – ANESTHETIC APPROACH AND OUTCOME

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Introduction: After the baby delivery, in the third maternity time, uterine contraction performs compression on their own vessels. It allows restoring func-

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tion to it. However, postpartum inappropriate myometric contraction leads to postpartum bleeding, which in terms of no recognition and delayed approach and treatment both, it becomes life-threatening. This condition is called uterus atony.

Aim of the study: Recognizing symptoms of uterus atony. Comprehensive and synchronized anesthetic-obstetric approach, quick, emergency and efficient access. Prevention of postpartum bleeding and further complications. Treatment of concomitant comorbid diseases, evaluated with praepartum ASA II, or ASA III access and risk factor for postpartum hemorrhage. Interactive access with a transfusiologist, with a final, successful outcome.

Materials and methods: A randomized study of 50 parturients with spontaneous baby delivery, with postpartum clinical signs of bleeding from the uterus. Emergency access and treatment in collaboration with the obstetrician. Parturient undertaken, transferred to Intensive Care Unit (ICU). Evaluation, monitoring and state of shock healing. Medical treatment and technical approach, further incidence of serious complications, incidence and frequency of hysterectomy. Final treatment in ICU, transfer to the department and hospital discharge.

Results: The demographic profile of parturients. Incidence of uterine atony at the Clinic is approximately 5% per year. Tabular display of procedures for treatment, in the birth room and ICU, too. Unmeasurable blood pressure in 8% of parturients, in the first 5 minutes. 90% of them received oxytocin (Syntocinon) 40-60 I. U. , in the first 3 hours of treatment. Adequate volume resuscitation with crystalloids and blood derivatives. 6% of them received platelet packages in the late treatment in ICU. 12% received 6 units of packed red blood cells – massive transfusion. To 4% of parturients a hysterectomy is performed. 36% received tranexamic acid for prolonged bleeding and prevention the same. 4% have got acute renal failure, requiring dialysis. Renal function restored 7-9 days after.

Conclusion: Postpartum bleeding in form of uterus atony is a high-risk postpartum condition of parturient. The transfer and treatment in ICU is essential, with continuous, complete hemodynamic monitoring. Sufficient, adequate volume resuscitation, need of various blood derivatives. Establish hemostasis, interactive surgical, obstetric, anesthetic and later transfusion access, is a priority key to successful outcome!

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Chairs: Dr. V. Gievski, Dr. G. Oranska

BILATERAL INTERSCALENE PLEXUS BRACHIALIS BLOCK FOR BILATERAL HUMERUS FRACTURE. A CASE REPORT

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Male patient, age 45 was injured during a paraglide flight. After the accident a closed reposition and fixation was performed. After 15 days he was brought to our hospital where an operative procedure was planned. The patient was healthy and other then smoking, he had no comorbidities. He was taking a large amount of Tramadol 100mg, 4 times a day for pain relief.

We planned a single shot bilateral plexus brachialis block before surgery. We gave him Midazolam 2mg. i. v before the procedure. The block was carried out with a help of an ultrasound image with M-Turbo Sonosite and a linear probe 7-14 Hz. We chose an interscalene approach and with a Stimuplex D 50mm needle we administrated 10 ml L-Bupivacaine 0, 5 % with Dexamethasone 2mg. on each side separately. Sensory block was achieved after 15 min. The patient did not have any breathing problems or any other side effects from the block (Horn-er syndrome, local anesthetic toxicity). After this procedure the patient received general anesthesia with Propofol 2 mg/kg, Rocuronium 0, 6mg/kg and Fentanyl 100 µg. For maintaining the anesthesia we used Sevoflurane 1. 5 vol% with a mixture of 50% O₂ and Air. The operation lasted 5 hours. An open reposition and fixation was performed. After the operation, the patient was awoken and extubated. He had no problem breathing and his pain score was 10mm according to Visual Analogue Scale 0-100mm. The sensory block lasted for 18 hours, and the motor 10 hours after the application.

The discussion about this case is about the effect of the bilateral interscalene block on breathing and the possibility of bilateral n. phrenicus block and paral- asys of the diaphragm muscle. In literature there are cases like this described, but they are very rare because of the rare pathology, but also because of the danger that this block brings.

Bilateral block of plexus brachialis can be preformed, but it has to be done care- fully, with the use of an ultrasound image, with low doses of local anesthetic and with an optimized preoperative respiratory condition.

DEVELOPMENT OF POSTOPERATIVE DELIRIUM IN THE ELDERLY

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Introduction: Postoperative delirium is adverse event that occur frequently in elderly patients. The transient mental dysfunction has an important impact on the patient's morbidity, delayed functional recovery, and prolonged hospital stay. The reported incidence ranges from 2% to 50%, reflecting differences in the diagnostic criteria for delirium, the populations under study, and the method of post-operative surveillance for delirium. Preexisting patient factors, medications, and various intraoperative and postoperative causes have been implicated in the development of postoperative delirium and cognitive decline. The available studies also suggest that general anesthesia or regional anesthesia techniques do not influence cognitive function differently.

Aim: To compare the effect of regional versus general anesthesia and their influence on delirium in the postoperative period in elderly patients after trauma surgery.

Material and methods: Patients operated in the University Clinic for Trauma Surgery, Skopje Macedonia from the period of 01 January to 15 March 2016 were randomly allocated to either spinal or general anesthesia. No patient was demented pre-operatively. Recovery from drugs used in anesthesia usually is complete after 8 hr, and so any abnormal mental states seen within the first eight postoperative hours were not registered as confusion. Patients were tested with the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) criteria for delirium, patients were defined as confused if they had clouding of consciousness and were disoriented as to their own identity, to time, or to situation, and if the mental symptoms fluctuated.

Results: 214 patients in total were operated in this period. 126 of them had spinal and 88 general anesthesia. 100 patients were over 65 years of age. The overall incidence of acute delirium was 25% in the general anesthesia group and 22% in the spinal group, with no statistically difference between types of anesthesia. All cases resolved within 1 week, and length of stay and achievement of physical therapy goals were the same for delirious and non-delirious patients.

Discussion: Among the multitude of factors associated with POCD and delirium, are there management options that can reduce the incidence of these events? Because preoperative patient-related factors are not modifiable, intraoperative

anesthetic types and management have not been shown to influence outcomes, and the postoperative period has received little attention, further definitive studies are needed to confirm that.

Conclusion: There is a high incidence of post-operative delirium in elderly non-demented patients following trauma surgery, regardless of whether anesthesia is administered by the spinal or intravenous route.

May 18, 2016, Wednesday
SESSION-2

14: 15-15: 30
Chairs: Dr. V. Gievski, Dr. G. Oranska

COMBINED SPINAL EPIDURAL ANESTHESIA (CSEA) VERSUS SPINAL ANESTHESIA (SA) DURING HIP SURGERY IN HIGH-RISK ELDERLY PATIENTS. A RETROSPECTIVE STUDY

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Background: Surgical repair of hip fracture in the elderly, is associated with life-threatening complications, with perioperative morbidity and mortality, related to their age and co-morbidities. (CSEA) is useful in high-risk patients by providing better hemodynamic stability, but (SA) is the most popular regional anesthetic technique. (CSEA) involves using both a spinal and an epidural for pain relief and offers several advantages over single- short (SA).

Aim: The aim of this study was to compare the clinical and hemodynamic effects off (CSEA) versus (SA) in high-risk elderly patients undergoing hip surgery.

Materials and Methods: Seventy patients older than 70 years, American Society of Anesthesiology (ASA) III and IV undergoing surgery for hip fracture were randomly divided into two groups of 35 patients. For spinal anesthesia (SA) group 1(n=35) received 12. 5 mg of 0. 5% isobaric bupivacaine and 10mcg sufentanyl and Group 2(n=35) (CSEA) received 1. 5 ml(7. 5 mg) of 0. 5% isobaric bupivacaine with 10 mcg sufentanyl through spinal route and was continued with small incremental dose of 1 ml 0. 5 isobaric bupivacaine through epidural catheter, to achieve T10 sensory level. Intraoperative monitoring, postoperative pain, recovery time, complications were compared between the two groups.

Results: The two groups were comparable with respect to age, body mass index weigh, height, ASA classification. Both the groups showed rapid onset, excellent

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quality of surgical analgesia and motor block. No patient required conversion to general anesthesia. Group1(SA) with 12. 5mg four patients required one dose of ephedrine and two patient required two doses to correct hypotension. In the group2 (CSEA) with 7. 5 mg one patient developed hypotension. Group2 showed a significantly less incidence of hypotension with the provision off prolonging analgesia as compared to group1.

Conclusion: (CSEA) can be used successfully for hip surgery by experienced anesthetists and has advantage over SA for high-risk elderly patients. It showed better hemodynamic stability, prolongation and extension of the block, better quality off post-operative pain relief and surgical outcome. Careful hemodynamic monitoring and management are warranted in high-risk elderly patients undergoing hip surgery.

May 18, 2016, Wednesday
SESSION-2

14: 15-15: 30
Chairs: Dr. V. Gievski, Dr. G. Oranska

ACUTE PULMONARY EVENTS REHABILITATION IN INTENSIVE CARE

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Introduction: Rehabilitation is an integral part in the treatment of patients with acute pulmonary events in Intensive Care (IC). When patients stay in bed because of critical illnesses for prolonged periods, the excessive forced immobility may result in profound physical deconditioning. Early mobilization during the second day of IC is necessary and crucial because intubation leads to muscle atrophy of the diaphragm that can cause drastic physiological muscle changes.

Objectives:

*Increasing functional capacity of patients in general and maintaining or restoring the respiratory parameters.

*Shortest possible disconnection time from the mechanical ventilation.

*To leave IC as soon as possible.

Materials and method: This is a prospective study, including 48 patients with acute pulmonary events, who were treated at our service during January - December2015.

The physiotherapy techniques applied included:

Mobilization: posture (30° Angle), passive and active limb exercise.

Chest physiotherapy: Manual Hyperinflation, percussion/vibration (When there are no rib fractures)

Cough provocation (when patient is conscious)

Retraining respiratory muscles.

Results: 48 patients with acute pulmonary events were assisted, 41 Males– 7 Females, average age (30 + -5), 8 patients have died because of trauma.

Conclusion: Early respiratory gymnastics in patients with acute pulmonary events is one of the most common therapies for those who are in intensive care unit because: *Early initiation prevents mucociliary dysfunction. *Improves the effects of intubation.

May 18, 2016, Wednesday
SESSION-2

14: 15-15: 30
Chairs: Dr. V. Gievski, Dr. G. Oranska

DAY CASE ORTHOPEDIC SURGERY

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Introduction: Advances in anesthetics and surgical techniques have resulted in an increasing number of surgical procedures which can be performed on a day-case basis. **Aim:** The aim of our study is to report the annual frequency of the day case surgeries in our clinic, as well as to point out the types of orthopedics surgical procedures used. **Material and methods:** In 2015, at the University clinic for orthopedic surgery, patients were selected for day case surgery on hands and feet. Local anesthesia, intravenous regional anesthesia or peripheral nerve blocks were used for different types of operations. **Results:** In 2015 we operated 1708 patients, 381 of them were treated as day case surgery. We found that our day case surgery rate was 22%. Out of 381 patients, 219 (57%) were operated under local anesthesia, 79 (21%) with intravenous regional anesthesia and 83 (22%) with peripheral nerve blocks. 215 were females and 166 were males with average age of 48 ± 12 years. The procedures performed under local anesthesia were; 133 (35%) release of carpal tunnel, 57 (15%) trigger finger, 28 (7%) de Quervain's and 1 (0. 2%) minimal invasive suture of Achilles tendon rupture. Procedures performed with intravenous regional anesthesia were; 52

(14%) excision of fascia palmaris and 27 (7%) excision of ganglion of the wrist. Operations performed with peripheral nerve blocks were; 57 (15%) correction of hallux valgus deformities and 26 (7%) bunion deformities. **Discussion:** In the past decade, day case surgery expanded especially as a result of improved anesthetics and minimally invasive surgical techniques. **Conclusion:** The rate of day case surgery in our clinic is low. We use local, intravenous regional anesthesia and peripheral nerve blocks for hand and foot operations. Day case surgery can offer a number of advantages for patients; it can minimize the costs, reduces the surgery waiting time and lowers the postoperative complications.

May 18, 2016, Wednesday
SESSION-3

15: 30-16: 45
Chairs: Dr. D. Angjushev, Dr. V. Dzambazova

TRANEXAMIC ACID FOR REDUCTION OF BLOOD LOSS IN TOTAL KNEE ARTHROPLASTY

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INTRODUCTION: Tranexamic acid is an anti-fibrinolytic drug whose administration during the perioperative period by intravenous route has been shown to reliably reduce blood loss and need for transfusion in patients undergoing total knee arthroplasty. Tranexamic acid is an inexpensive agent that is little used in orthopedic surgery due to the absence of standardized optimal administration protocols.

Material. and methods: Twenty-one patients were allocated in 2 groups to receive or not tranexamic acid 15 mg kg⁻¹ a few minutes before a tourniquet deflation. Blood loss during surgery, both in the recovery room and on the surgical ward was recorded, together with the number of blood transfusion units used. Standard protocol for anesthesia and surgery was used. A combination of epidural and spinal anesthesia was applied in eleven patients, five were subjected to spinal, and five to general anesthesia.

Results: Mean blood loss during surgery was 216 ml in the tranexamic acid group ($n = 11$) compared with 333 ml in the control group ($n = 10$). In the recovery room the tranexamic acid group lost 378 ml, and the control group lost 633 ml ($p < 0.001$). Total blood loss was 847 (356) ml in tranexemic group and 1549 (547)ml in the control group. During the hospital stay the tranexemic group received 0.7 blood units versus 2 in the control group.

Conclusion: We conclude that in patients undergoing in total knee arthroplasty, perioperativ administration of tranexemic acid is associated with reduction of blood loss and for transfusion.

May 18, 2016, Wednesday
SESSION-3

15: 30-16: 45
Chairs: Dr. D. Angjushev, Dr. V. Dzambazova

**PREVALENCE AND ANTIBIOTIC SUSCEPTIBILITY OF
MULTI-DRUG RESISTANT ACINETOBACTER SPECIES,
PSEUDOMONAS AERUGINOSA AND METHICILLIN RESISTANT
STAPHYLOCOCCUS AUREUS IN CLINICAL SAMPLES FROM
INTENSIVE CARE UNIT IN SKOPJE, REPUBLIC OF MACEDONIA**

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Background & Objectives: Multi-drug resistance in Acinetobacter species, Pseudomonas aeruginosa and methicillin resistant Staphylococcus aureus (MRSA) can cause a wide range of infections, including bacteremia, pneumonia, urinary tract infection, peritonitis etc. , which can lead to substantial morbidity and mortality, particularly in the ICU settings. These organisms have been shown to be increasingly resistant to a large group of antibiotics, especially β -lactam antibiotics. The aim of the present study was to determine the prevalence and antibiotic susceptibility of Acinetobacter species, Pseudomonas aeruginosa and methicillin resistant Staphylococcus aureus (MRSA) in patients admitted in Intensive Care Unit in Skopje, Republic of Macedonia during seven months period.

Methodology: A total of 209 bacterial isolates were collected from ICU during the period from 1st June 2014 to 31 Januari 2015.

Results: Out of a total of 209 bacteriological positive cultures obtained, 52 (24, 8%) were positive for Acinetobacter species, 57 (27, 2%) were positive for Pseudomonas aeruginosa and 8 (3, 8 %) were MRSA positive. Vancomycin was the most effective drug against MRSA, while colistin was the most effective against Acinetobacter species.

Conclusions: There is an increased frequency of multi-drug resistant Acinetobacter species and Pseudomonas aeruginosa among patients in the ICU setting which calls for continuous surveillance to determine prevalence and effective antibiotic susceptibility of these bacteria.

CHANGES IN BISPECTRAL INDEX AND HEMODYNAMIC PARAMETERS USING SCALP INFILTRATION WITH LOCAL ANESTHETICS IN SUPRATENTORIAL CRANIOTOMIES

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Introduction: During craniotomy insertion of cranial pins for head stabilization with results with significant hemodynamic response and in patients with impaired autoregulation may lead to increased intracranial pressure. Bispectral index is a measure for depth of patient consciousness intraoperatively. Hemodynamic parameters represent an excellent guide for physiologic response to nociceptive stimulus. The purpose of the study is to determine the benefit of using the local anesthetics infiltrated on the place of cranial pin insertion for decreasing the hemodynamic response and not impairing the depth of consciousness.

Material and Methods: The study was designed as prospective, control randomized research. They were included 25 patients who underwent craniotomy and randomly assigned to three groups. Induction to anesthesia was performed with TIVA. Skin on the scalp, where pins were planned to be inserted was infiltrated with 1% 20ml lidocaine (group 1, N=9), 0, 25% bupivacaine (group 2, N=8) and group 3 without any infiltration with local anesthetic. After 5 minutes interval pins were inserted. We followed changes in BIS value and hemodynamic parameters as systolic arterial pressure, diastolic arterial pressure, mean arterial pressure and frequency.

Results: BIS value was comparable in all groups after induction but showed significant difference ($p < 0.001$) after pin insertion between groups with local anesthetic and group without local anesthetic: in group 1 and group 2 BIS value was 44 (± 5) and in group 3 was 57 (± 11). There was significant difference ($p < 0.001$) in hemodynamic parameters as frequency which was 73 (± 8) in group 1 and 2 and in group 3 was 91 (± 15). The value of mean arterial pressure after pin insertion in group 1 and 2 was 78 (± 9) mmHg and in group 3 was 105 (± 25) mmHg and show significant difference ($p < 0.001$).

Discussion: Results indicate that we have significant reduction of hemodynamic response on pain stimulus during pin insertion and little change in BIS value when we use local anesthetic infiltrated in the skin of the scalp.

Conclusion: For improved control of hemodynamic and intracranial pressure during painful procedure as pin insertion is much better to use local anesthetics infiltrated in the skin of the scalp.

May 18, 2016, Wednesday
SESSION-3

15: 30-16: 45
Chairs: Dr. D. Angjushev, Dr. V. Dzambazova

MODERN TRENDS IN MANAGEMENT OF FLUIDS DURING THE RESUSCITATION IN BURNS IN INFANT IN OUR SERVICE OF BURNS AND PLASTIC SURGERY

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Introduction. Burns are one of the common injuries of childhood. Because of the potential severity of their residual deformities, burn injuries in infants justify an early management in specialized centres when they cover more than 5% of body surface and in every case when hands, face, or external genitalia are concerned. The risk of death from a major burn is associated with increased burn size, decreased age, the presence of a full-thickness burn, the presence of inhalation injury.

Material and methods. The current article is a case report and will review the management of ongoing effective treatment of the first phase: the resuscitation. This article is a part of a large study about the challenge of treatment in the phase of burned shock with colloids and plasma for a good judgment of a good resuscitation and in final of a good outcome.

Conclusions. Management of this age of pediatric burn patients remains a difficult challenge for clinicians from clinical, social and ethical perspectives. General treatment includes fluid and electrolyte therapy, temperature control, appropriate nutrition and pain suppression. Pain suppression is a major part of the treatment and morphine must be largely used. Chemical or electrical burn, radiation, associated CO intoxication or multiple trauma, as well as burn injury in infants, raise specific problems.

GERIATRIC HIP FRACTURES – ONGOING MEDICAL CHALLENGE

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Introduction Throughout the world, life expectancy has risen to well above 70 years. There is an expected increase in the number of hip fractures in the world and also an increasing demand for treatment of geriatric hip fractures.

Materials and methods At the University Clinic of Traumatology in Skopje, 136 patients with hip fracture of age 65 and above were treated between 2012-2014. The patients were divided into two groups: one consisting of the patients operated in the first 24 hours, and other treated after 24 hours. Inclusion and exclusion criteria were defined; comorbidities and previous surgeries were noted. Patients were analyzed in a follow-up period of one year.

Results The average survival time analyzed for one year after the surgery in the group operated within the first 24 hours post injury was 328. 4 days (300. 7 to 343. 6) and 279. 3 (251. 2 to 309. 7) days average survival time in patients operated after 24 hours of hospital admission. At one year postoperative follow up a total of 14 patients who were operated within the first 24 hours of admission died compared to significantly more- 28 patients operated after 24 hours.

Conclusion Our results showed that the patients operated within 24 hours after admission have a longer survival time. The number of variables that could be modified by the surgeon in order to reduce the morbidity and mortality is limited.

PERCUTANEOUS TRACHEOSTOMY

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Background: Percutaneous tracheostomy (PDT) has become a well-established procedure on the intensive care unit (ICU) for patients requiring prolonged in-

vative mechanical ventilation (MV). Tracheostomy offers a number of potential benefits such as increased patient comfort, reduced sedation requirement, and a decrease in dead space, all of which may aid the weaning process. PDT using a Seldinger-based insertion method was developed by Ciaglia and colleagues¹ in 1985 and since then has been widely adopted. Over the last 10 years data on newer methods of insertion, timing, safety profile and complication rates have been published, which have greatly improved our understanding of this procedure.

Material and methods: During last 12 years at 345 PDT had been performed. The procedure had been performed by an intensive care physician at the bedside. All patients passed through respiratory weaning protocol. . Major complications such as bleeding, wound infection, tracheo-oesophageal fistula had been followed during this study

Results: Average insertion time was 1, 5min, total time of procedure 25min. All 345 PDT patients had camphor table in hospital stay. No death result was noted during procedure. Early per oral feeding was possible in 240pts after 7th day on PDT. 4(1, 1%) patients had a stoma bleeding, 3 of them were with severe hypertension and thrombocytopenia. No wound infection as a result of every day tracheostoma dressing. No other major complication.

Conclusion: PDT performed on the ICU is a safe and reliable procedure. Major tracheostomy-related complications are uncommon, but displaced and blocked tracheostomies are a cause of significant morbidity and mortality. While the insertion of a tracheostomy has the potential to improve some aspects of patient care, it is not without risk and should be carefully considered in all cases. There is little evidence to recommend early PDT in critically ill patients to facilitate weaning, reduce rates of VAP, or improve patient mortality.

May 18, 2016, Wednesday
SESSION-3

15: 30-16: 45
Chairs: Dr. D. Angjushev, Dr. V. Dzambazova

EFFECTS OF THREE COLLOID SOLUTIONS IN HEMORRHAGIC SHOCK TREATMENT

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Introduction: Managing trauma patients with a hemorrhagic shock is complex and difficult. The physician must involve fluid resuscitation, vasopressors and blood transfusion. The optimal resuscitative strategy is still controversial. The

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goal is to find the optimal therapeutic regiment for substitution of the lost blood volume.

Materials and methods: In this study the effects of three colloid solutions dextran 70 polysuccinilated gelatin and hydroxyethylstarch 130/0, 42 (HES 130/0, 42), in achieving hemodynamic stability were compared. The included patients presented with clinical signs of moderate to severe hemorrhagic shock. They were randomly distributed into three groups. The first group received Dextran 70 solution, the second polysuccinilated gelatin solution and the third HES solution. Restrictive approach was considered with administering blood transfusion. Vasopressors were used in cases of persistent hypotension, with central venous pressure (CVP) above 10cmH₂O. In the ICU, the blood pressure, heart rate, CVP and diuresis, were monitored in the first 24 hours. The time intervals in achieving hemodynamic stability, volume of the given colloids and occurrence of new episodes of hemodynamic instability were compared.

Results: The patients in the HES group, needed the smallest volume of a colloid solution, compared to the dextran and gelatin group of patients (950ml, 1150ml and 1400ml respectfully). Also the hemodynamic stabilization occurred sooner compared to the other two groups (after 53 minutes in the third, 70 minutes in the first and 85 minutes in the second group). The administration of blood products was slightly lower in the HES group of patients. Another hemodynamic destabilization occurred with 7% of the patients in the first group, approximately 680 minutes after the initial resuscitation. This was noted at 15% in the second group, and at 5% in the third group, at 290 minutes and 810 minutes after the initial resuscitation, accordingly.

Conclusion: The results of this study suggested that the HES solution was superior to Dextran 70 and polysuccinilated gelatin solution in the hemorrhagic shock treatment. The patient's hemodynamic stabilization occurred sooner, less fluid volume was needed and were hemodynamically more stable in the following time period.

May 18, 2016, Wednesday
SESSION-3

15: 30-16: 45
Chairs: Dr. D. Angjushev, Dr. V. Dzambazova

ULTRASOUND GUIDED CENTRAL VENOUS CATHETERISATION IN THE ONSET OF ICU – IS IT A METHOD OF CHOICE FOR EMERGENCY CASES?

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Introduction: Central venous catheterization is a very common procedure in the intensive care unit (ICU). Data from the study of prevalence of infection in the European ICU-s show that 75% of patients in ICU have a central venous catheter (CVK). Central venous catheterization can be achieved with a landmark and an ultrasound guided method. The purpose of the study was to compare the success and complication rate between the two methods in the early moments after ICU admission.

Materials and Methods: This is a prospective study done during 2015 and 2016 in the ICU of clinical Hospital Acibadem-Sistina. 400 patients with the need of CVK were prospectively randomized in two groups. Patient in the first group were cannulated with the landmark technique and patients in the second group were cannulated with the real time ultrasound guidance with an ultrasound machine Genera Electric e-logic and a linear ultrasound probe 5 to 10 Mhz. Patient demographics as well as the central vein being chosen for cannulation, side of cannulation, number of attempts, time to return of blood, and immediate complications during the procedure were collected.

Results: Both groups are homogenous for patient age and gender. Cannulation using the landmark method was successful in 90. 5% of patients, 60. 5 of which during the first attempt. Cannulation using real time ultrasound guidance was successful in 98% of patients with a first pass success of 77% of patients. The average number of attempts in the first group was 1.4 ± 0.9 compared to 1.2 ± 0.5 attempts in the second group which was a statistically (t test=2. 180828 i $p=0.029$). Complication rate with the landmark method was 13. 5 which was significantly more than with real time ultrasound guidance where complication rate was 4% $p<0.05$ ($p=0.0008$)

Conclusion: Real time ultrasound guidance improves success, decreases number of attempts, and decreases complications in emergency patients admitted to general intensive care unit.

URGENT SURGICAL PROCEDURE OF A PATIENT ON TREATMENT WITH VITAMINE K ANTAGONIST

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INTRODUCTION: It is a big challenge both for the anesthesiologist and the surgical team to do an urgent surgical procedure on a patient who is on a continuous (chronic) therapy with VKA.

Over 4 million people in Europe (1, 2 – 1, 7%) is on a chronic treatment with these drugs, urgent surgical procedures are with a big risk for perioperative and postoperative bleeding as a result of inhibiting of Vitamine K dependent factors (II, VII, IX, X).

CASE REPORT: Female patient, 76 years old, was admitted in the University Clinic for Digestive Surgery with a diagnosis of incarcerated ventral hernia. There was an indications for urgent surgical treatment. The patient was ASA – 4 – E score with associated comorbidities: hypertension, DM type II, thrombophlebitis on lower extremities, AFF, chronic cardiomyopathy. From farmacologic history (anaemnesis) the accent is on the chronic treatment with VKA (Tbl. Sintrom).

After the primary trials (investigations) and blood analysis, 3 units of FFP were given, 10mg Vitamin K i. v. and 500 IU PCC (Octaplex).

The surgical procedure was done with no significant blood loss and stable post-operative period.

The next day, the patient was reversed on LMWH (Enoxiparin 2 x 40 IU). Control haemostasis was done (INR =1, 3).

DISCUSSION: VKA inhibits the Vitamine K dependent factors and the process of their synthesis in the presence of Vitamine K is longer than 6 hours.

FFP consists Vitamine K and all other factors of coagulation in small amounts and big volumes of FFP are needed and longterm period to achieve INR in normal level.

PCC is primarily made for treatment of Haemofilia B, consists Vitamine K dependent factors II, VII, IX, X, protein C and Protein S.

The volume which was given is very small, it cannot cause volume overload, the possibility for viral transmission has been avoided, the possibility for TRALI has been excluded and another important thing is that the effect of abolition of the action of VKA is much shorter from the FFP (30 minutes).

CONCLUSION: Basically, many of the clinical trials, many of research papers, as well as new guidelines, it is recommended use of PCC as a primary treatment for rapid reversal of the effect of VKA during the life- threatening bleeding, conditions in which emergency surgical treatment is needed, as well as for control and prevention for acute bleeding in critically ill patients with liver disease and accompanying deficiency of Vitamine K dependent factors.

May 19, 2016, Thursday
SESSION-4

13: 45-15: 00
Chairs: Volkan Hancı, Aysun Ankay Yılbaş

ULTRASOUND-GUIDED INFRACLAVICULAR BRACHIAL PLEXUS BLOCK AND LEECHES THERAPY FOR LIMB ISCHEMIA IN AN INFANT IN INTENSIVE CARE UNIT

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Objectives: Various approaches of brachial plexus blocks are recommended for upper limb ischemia and can be performed by different techniques. Different type of peripheral nerve blocks have been used for specific surgical and intensive care unit procedures. Ultrasound guidance has increased the feasibility of using these techniques in neonates and infants. We report the case of a low birth-weight infant with severe hand ischemia after left radial artery catheterization and accidental arterial drug and total parenteral nutrition injection.

Methods: An ultrasound-guided infraclavicular brachial plexus block with 0.5 ml bupivacaine 0.25% was performed and after 24 hours from infraclavicular brachial plexus block leeches therapy was started and continued 3 days. After 24 hours following the leech therapy we repeated the ultrasound guided infraclavicular block with 0.5 mL/kg of 0.25% of bupivacaine. But no significant local changes occurred and ischemic changes did not improve. He moved his hand more strongly, never appeared to be in pain.

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Results: Rapid removal of the arterial line improves limb ischemia in neonates and infants. Vasodilation may prevent further ischemia. One of the vasodilation technique is peripheral plexus nerve block. In our case we used a ultrasound-guided single-shot infraclavicular brachial plexus block for the ischemic hand and forearm. Medicinal leeches therapy is the supplement therapy. Leeches secrete a substance in their saliva called hirudin which is a powerful anticoagulant allowing the continuation of bleeding.

Conclusion: We want to point out that ultrasound-guided infraclavicular brachial plexus block and combined treatments are applicable therapy options in the management of ischemia in the upper limb.

Keywords: Ultrasound-guided infraclavicular block, leeches therapy, infant limb ischemia



May 19, 2016, Thursday
SESSION-4

13: 45-15: 00
Chairs: Volkan Hancı, Aysun Ankay Yılbaş

COMPARISON OF THE EFFECT OF CONTINUOUS VERSUS INTERMITTENT ENTERAL FEEDING ON PLASMA LEPTIN AND GHRELIN LEVELS IN INTENSIVE CARE UNIT

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3: Ordu University, School of Medicine, Department of Biochemistry
4: Ordu University, School of Medicine, Department of Gastroenterological Surgery

Clinical trial registration: NCT02282501

Conflict of Interest: None.

Ethics Committee Approval: Ethics committee approval was received for this study from Ethics Committee of Ondokuz Mayıs University (2013/475).

Financial Disclosure/Supporting Organizations: This study was supported by Ordu University Scientific Research Projects Coordination Department (Project Number: 2013; AR-1352).

SUMMARY

Background and Objectives: Leptin and ghrelin are the hormones that have been defined to have an important effect on energy balance. The aim of this prospective randomized trial is whether there is an association between the administration pattern of enteral nutrition and the leptin and ghrelin hormones which functions in the energy metabolism.

Materials and Methods: This study enrolled 38 patients given enteral nutrition (EN) whose ages range from 18 to 85 in the ICU. The patients were prospectively randomized to receive either continuous infusion (Group I; n=19) or intermittent feeding (Group II; n=19) with EN. In addition to routine biochemical assays, the blood samples were taken from the patients for leptin and ghrelin analyses on the 1st, 7th and 14th days of EN. Plasma leptin and ghrelin levels were analyzed with sandwich enzyme analysis method with ELISA. The presence of gastrointestinal and technical complications were recorded daily and gastric residual volumes were measured.

Results: A total of thirty-seven patients' data were assessed. There was no statistical difference between the groups regarding descriptive data and categori-

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cal variables such as underlying disease, complication, steroid use and etc. ($p > 0.05$). The decrease in white blood cell count, creatinine and C-reactive protein levels in time were statistically significant ($p = 0.010$, $p = 0.026$, $p < 0.001$ respectively). There was no statistical significance between the groups with respect to leptin and ghrelin levels ($p = 0.982$ and $p = 0.054$). While leptin levels do not change in time, the ghrelin levels of both groups were significantly higher on 7th and 14th days than the first day analyse ($p = 0.003$).

Conclusions: Our study revealed that both of continuous and intermittent EN protocols were tolerated well with minor complications by the patients in ICU. The pattern of EN administration alone, doesn't effect the leptin and ghrelin levels. The randomized controlled studies in large cohorts are needed to compare whether intermittent or continuous EN is more adaptable to hormones with diurnal rhythm in the metabolism.

Key words: enteral nutrition; ICU; leptin; ghrelin

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SESSION-4

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Chairs: Volkan Hanci, Aysun Ankay Yılbaş

EVALUATION OF THE EFFICACY OF NOREPINEPHRINE AND DOBUTAMINE IN ROPIVACAINE CARDIOTOXICITY: AN EXPERIMENTAL RABBIT STUDY

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Objective: Prolonged resuscitation efforts may be necessary in the management of local anesthetic cardiac toxicity (1). In this study, it was aimed to compare the effects of norepinephrine and dobutamine on the time for cardiac arrest in ropivacaine induced cardiac toxicity model at rabbits.

Methods: Fifteen adult New Zealand rabbits were randomly divided into three ($n = 5$ in each) groups. In all of the groups ropivacaine was administered 3 mg/kg/min rate. Rats in Group R did not receive any drug other than ropivacaine. Group N: Norepinephrine infusion at 2 µg/kg/min rate was begun at the beginning of first dysrhythmia occurrence. Group D: Dobutamine infusion at 20 µg/kg/min rate was begun at the beginning of first dysrhythmia occurrence. The time of dysrhythmia, 50% decrease of mean arterial pressure and heart rate and the time of asystole were recorded in all groups.

Results: There was no significant difference between the groups in the time of dysrhythmia occurrence. The time of 50% decrease in mean arterial pressure and heart rate and time of asystole were significantly shorter in Group R when compared with other groups. In Group N, the time of asystole occurrence was significantly longer when compared to Group D (Table 1).

Discussion: The cardiovascular system is seriously affected from local anesthetic toxicity and may result in severe hypotension, cardiac dysrhythmia, arrhythmia, myocardial depression, cardiac arrest and death (2-4). Ropivacaine is a new local anesthetic which has been developed as an alternative to bupivacaine and is less toxic than bupivacaine (5). The parenteral administration of drugs such as dobutamine and norepinephrine is lifesaving in critical patients in various clinical conditions (1, 6). Norepinephrine's direct stimulating effects on myocardial tissue might be responsible for the delay in the occurrence of 50% decrease in mean arterial pressure, heart rate and prolongation of asystole time in this experiment.

Conclusion: Immediate norepinephrine infusion may enhance the efficacy of resuscitation when ropivacaine toxicity is suspected.

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	The occurrence time of dysrhythmia (sec)	The occurrence time of 50% decrease of MAP (sec)	The occurrence time of 50% decrease of HR (sec)	The occurrence time of asystole (sec)
Group R (n= 5)	52,6 ± 10,1	60,4 ± 22,8 ^{a,d}	68,2 ± 22,7 ^{b,e}	105,4 ± 34,9 ^{c,f}
Group N (n= 5)	74,8 ± 24,3	118,8 ± 26,3	158,8 ± 70,9	360,4 ± 161,6 ^g
Group D (n= 5)	67,4 ± 14,9	119,4 ± 43,7	114,8 ± 33,5	210,6 ± 61,8

Table 1. The times of occurrence of dysrhythmia, asystole, 50% decrease of MAP and HR

MAP: Mean Arterial Pressure, **HR:** Heart Rate

^{a, b, c:} p<0. 05, compared with the Group N. ^{d, e, f, g:} p<0. 05, compared with the Group D.

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Chairs: Volkan Hancı, Aysun Ankay Yılbaş

EVALUATION OF THE EFFECTIVENESS OF SUGAMMADEX FOR CEREBRAL ISCHEMIA REPERFUSION INJURY

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Objectives: Cerebral ischemia may cause permanent brain damage and behavioral dysfunction. The efficacy and mechanisms of pharmacological treatments administered immediately after cerebral damage are not fully known. Previous studies have not clearly described the effects of the cyclodextrin family on cerebral ischemia-reperfusion damage. The aim of the study was to determine whether sugammadex had a neuroprotective effect against transient global cerebral ischemia.

Methods: Animals were assigned to control group, sham-operated, sugammadex 16 mg/kg, and sugammadex 100 mg/kg groups. Transient global cerebral ischemia was induced by 10 minute occlusion of the bilateral common carotid artery, followed by 24 hour reperfusion. At the end of the experiment rats had neurological behavior scoring followed by histomorphological and biochemical as TAS, glutathione peroxidase (GSH-px), superoxide dismutase (SOD) and malondialdehyde (MDA) content assessments. Sugammadex 16 mg/kg and 100 mg/kg improved neurologic outcome, which was associated with reduction in both histological and neurological scores.

Results: The total neuron counts in the hippocampus regions in the treatment groups of S 16 and S 100 were found to be statistically significantly high compared to Group I/R. The hippocampus tunel and caspase results in the S 16 and S 100 treatment groups were found to be statistically significantly lower compared to Group I/R. Neurological scores in treated groups were significantly higher than I/R group.

Conclusions: The study has showed that treatment with 16 mg/kg and 100 mg/kg sugammadex had a neuroprotective effect in a transient global cerebral ischemia reperfusion rat model. However, 100 mg/kg sugammadex was more neuroprotective in rats. There is a need for pharmacological applications, if possible cheap and simple, to reduce and/or prevent the negative and unwanted results of hypoxia and these applications should reduce neurological damage and improve patient prognosis. Sugammadex is frequently used in routine anesthesia administrations. The results of this study found that sugammadex had a protective effect against I/R injury.

Key Words: sugammadex, hypoxia-ischemia, neuroprotection

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SESSION-4

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Chairs: Volkan Hanci, Aysun Ankay Yılbaş

CO-LOADING OR PRELOADING IN BONE CEMENT IMPLANTATION SYNDROME?

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INTRODUCTION-OBJECTIVE: Bone Cement Implantation Syndrome (BCIS) that has been described during various cemented procedures including knee arthroplasty and vertebroplasty; is primarily a problem associated with hip replacement (1). In this study, we attempted to compare the effects of colloid preloading before or co-loading simultaneously at cement implantation on BCIS development and hemodynamic parameters in patients undergoing total knee arthroplasty.

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MATERIAL-METHOD: The study included 68 patients over 60 years of age with ASA I-III classification to undergo knee surgery. The patients were given spinal anesthesia, and they were then divided into two groups randomly. The patients in Group I were infused 8ml/kg HES (130/0, 4) (Voluven) 20 minutes before the cement implantation, and those in Group II were infused the same; simultaneously during cement implantation. Hemodynamic parameters of the patients were recorded at 1st, 2nd, 3rd, 5th, 10th and 15th minutes before and after cement implantation and once the tourniquet was removed.

RESULTS: There was no statistically significant difference between the groups in terms of demographic data (Table 1). It was observed that more patients developed BCIS in Group I (%17, 6) compared to patients in Group II (%8, 8) ($p=0,476$) (Figure 1). Systolic arterial pressure in both groups following cement implantation remained higher than the values before cement implantation (p). It was found that diastolic pressures in Group II were higher than those in Group I on a statistically significant level at 2nd and 15th minutes after the cement implantation ($p=0,03$).

DISCUSSION and CONCLUSION: BCIS is a syndrome characterized by hypoxia, hypotension, cardiac rhythm disorders, increased pulmonary vascular resistance and cardiac arrest (2). Avoiding intravascular volume depletion may reduce the extent of the hemodynamic changes in BCIS (3). In the present study, BCIS was observed on Grade I level in both groups following cement implantation. It has been shown that moderate volume of colloid preloading is more effective than crystalloids in maintaining cardiac output (CO) and hemodynamic stability in elderly patients (4). We couldn't show any difference between the two groups in terms of hemodynamic stability.

In conclusion; we believe that avoiding intravascular volume depletion, particularly in elderly patients, is important for preventing hemodynamic changes during BCIS.

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	Group I (n=34)	Group II (n=34)	p
Age (years)	68,82 ± 7,68	66,79 ± 7,56	0,276
Sex			
Male	7 (20,6)	5 (14,7)	0,750
Female	27 (79,4)	29 (85,3)	
Height (cm)	162,62 ± 8,93	160,56 ± 7,64	0,311
Bodyweight (kg)	78,68 ± 11,20	83,68 ± 14,55	0,117
ASA			
I	5 (14,7)	9 (26,5)	0,481
II	27 (79,4)	23 (67,6)	
III	2 (5,9)	2 (5,9)	
Permanent variables and categorical variables were presented as “mean ± standard deviation” and “number (column percentage)”,respectively.			

Table 1: Distribution of some descriptive and clinical features between the study groups

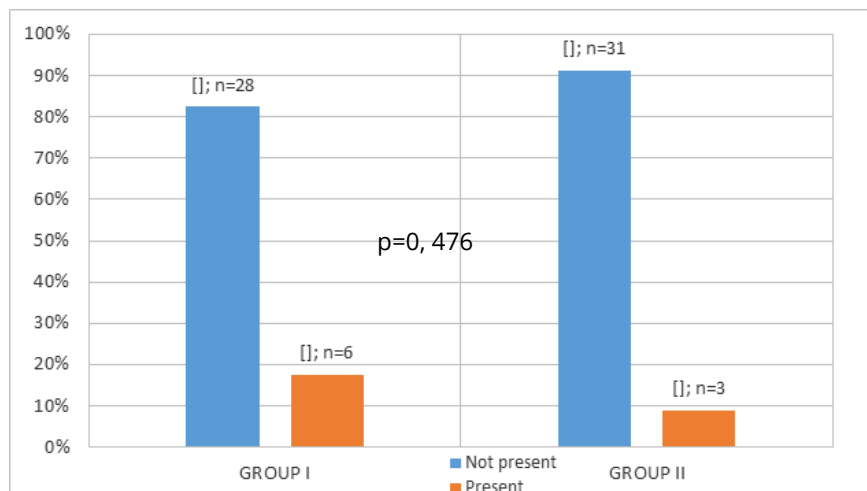


Figure 1: Development of moderate hypoxia (Grade 1 BCIS) by study groups

DOES PATIENT-CONTROLLED INFRACLAVICULAR PERINEURAL DEXMEDETOMIDINE INCREASE THE DURATION OF POSTOPERATIVE ANALGESIA ?

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Introduction: A good postoperative analgesia accelerates healing process of patients, increases patient satisfaction and reduces the length of stay in hospital and costs. In recent years, postoperative analgesia purpose peripheral nerve blocks and even peripheral nerve catheters have been widely used. Objective of this study was to investigate effect of the perineural infusion of dexmedetomidine on the postoperative analgesia.

Material & Methods: A total of 60 ASA I-II patients undergone distal upper extremity surgery was included in the study. Group 1 received infraclavicular patient-controlled perineural bupivacaine and Group 2 was administered infraclavicular patient-controlled perineural bupivacaine + dexmedetomidine. Patient-controlled perineural method was administered in the patients through infraclavicular catheter in the postoperative care unit. Blood pressure, pulse, peripheral oxygen saturation, modified Ramsay sedation scale, visual pain scores, total amount of analgesics and nausea / vomiting were recorded at the 0, 30, 60, 90 and 120 minutes and 4, 6, 8, 12 and 24 hours. Neurological examination was carried out after 1 month.

Results: Systolic blood pressure was higher in Group 1 compared to Group 2 at the hour 6 (p: 0. 007). Whereas, diastolic blood pressure was higher in Group 1 at the hours 4 and 6 (p: 0. 000, p: 0. 003). Heart rate was found to be higher in Group 2 at the hours 8, 12 and 24 (p: 0. 004, p: 0. 002, p: 0. 002). Patients in Group 1 were found to significantly feel pain and need analgesics at the hours 4 and 6 (p: 0. 002, p: 0. 000). The time of first pain feeling was found as the 6th hour in Group 2. Mean number of the need for analgesia was 5. 8±1. 4 times in Group 1 and 2. 2±0. 4 in Group 2 (p: 0, 000). None of the patients developed sedation and neurological deficits.

Conclusion: Perineural infusion of dexmedetomidine combined with bupivacaine was found to increase the duration of postoperative analgesia, reduce 24-hour need for analgesia and have not any adverse effect at low doses.

AN EVALUATION OF THE LEVELS OF MEETING THE EXPECTATIONS OF THE NON ANESTHESIOLOGISTS SUBJECTED TO ROTATION PROGRAMMES IN THEIR GETTING ACQUAINTED WITH AND APPLYING AIRWAY DEVICES IN ADULT PATIENTS

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PURPOSE: Traumas of the airway are important morbidity and mortality reasons. Successful intubation is an essential skill requiring a strict training but arduous to gain for all health professionals. The anesthesiologists take a crucial role about training of the airway management as the most experienced professionals. Operation rooms are the most ideal places to be trained about protocols of successful airway management.

There are only a few studies devoted to feedbacks of rotation programmes focused on successful airway management trainings held for non-anesthesiologist health care professionals. The purpose of this study was to evaluate the proficiency of training on adult airway management and level of recognition and ability to use of airway instruments of the health care professional who involved in rotation programmes in Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation at the end of their training programmes.

MATERIAL AND METHOD: A questionnaire including 22 questions was prepared by reviewing and adapting previous studies. The study was approved by Hacettepe University Ethics committee of non-invasive clinical studies (GO 14 / 221-05). The health care professionals that were trained in rotation programmes at Hacettepe University, School of Medicine, Department of Anesthesiology and Reanimation were enrolled in this study. The participants were asked to respond to the questionnaire at the end of their rotation programmes. The study group was consisted of 60 nurses, dentists, trainees, interns, residents and subspecialists that involved in 3 months rotation programmes at the department.

DISCUSSION AND RESULTS: The results of this study demonstrated that the training on intubation and especially application of mask and ambu given by the anesthesiologists was satisfactory. The skills on application of different airway instruments were higher for the participants that previously had practical training about airway management. The importance of the experience on airway management was also emphasized in this study.

The airway management trainings given by anesthesiologists can be standardized with the contribution of this study or similar studies. Our study can help or

have a contribution to the other studies with wider participations about evaluation of training on airway management in our country or worldwide.

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SESSION-4

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Chairs: Volkan Hancı, Aysun Ankay Yılbaş

ULTRASOUND-GUIDED INFRACLAVICULAR VERSUS RETROCLAVICULAR BLOCK: A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL

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Antalya Training and Research Hospital

BACKGROUND

Infraclavicular brachial plexus block is presented as an alternative to axillary and supraclavicular approaches. The brachial plexus in infraclavicular region can be blocked by various approaches. Retroclavicular block is a variant of the coracoid approach. We compared the ultrasound guided infraclavicular approach and the ultrasound guided retroclavicular approach for infraclavicular brachial plexus block in patients undergoing elective upper limb surgery.

METHODS

One hundred patients were randomized to receive either traditional approach for infraclavicular block (the needle insertion point is inferior to the clavicle) or retroclavicular approach (the needle insertion point is posterior to the clavicle) for infraclavicular block for elective upper limb surgery. The primary outcome measure was difference of the sensorial block success rate of the blocks. Secondary outcome measures were the difference of the needle tip and shaft visibility, procedure time, motor block success rate, complications, patient satisfaction, duration of the block's effect, use of supplemental local anesthetic and use of analgesic.

RESULTS

One hundred patients were randomized and so far 60 patients have enrolled the study. There was no significant difference between two groups in sensorial block success rate. Needle tip and shaft visibility was high and procedure time was short in retroclavicular approach. Patient satisfaction scores, duration of the block's effects and use of analgesic were similar in both groups. Use of supplemental local anesthetic was higher in traditional approach. 2 vascular puncture and 2 transient paresthesias were recorded in traditional approach group.

CONCLUSION

Preliminary findings of this study are that the retroclavicular approach for infraclavicular brachial plexus block is quick, safe and reliable method. A significant advantage of the retroclavicular approach lies in the perpendicular alignment of the ultrasound beam and the needle, as reflected by the high visibility provided for the shaft and tip.

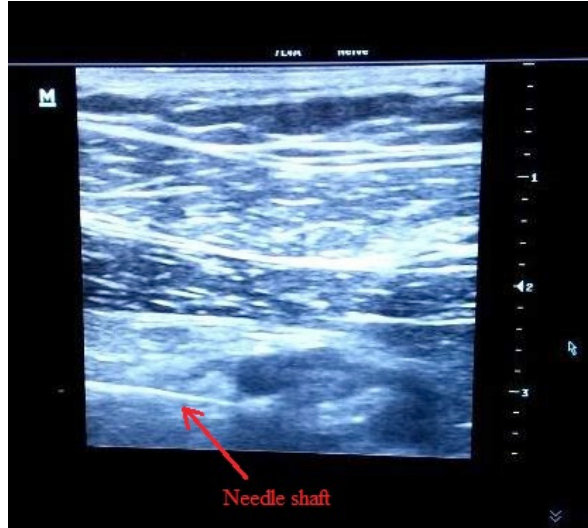


Figure 1: Retroclavicular approach for infraclavicular brachial plexus block

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Chairs: Volkan Hancı, Aysun Ankay Yılbaş

RETROSPECTIVE ANALYSIS OF ANESTHESIA METHODS USED FOR HIP SURGERY

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INTRODUCTION AND AIM

Hip fractures are important causes of mortality and morbidity in advanced-aged people (1). Perioperative morbidity and mortality largely increase due to neces-

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sity of surgery for treatment, accompanying cardiac, renal, respiratory and cerebral diseases (2). Regional anesthesia techniques (RA) are preferred to general anesthesia (GA) for hip fracture surgeries (3, 4). This study presents our anesthesia experience in 787 hip surgery cases in 6 years.

MATERIAL AND METHOD

Anesthesia records of 787 hip surgery cases between January 2010 and December 2015 were examined retrospectively. Demographic characteristics, number of patients according to ASA values, accompanying diseases, anesthesia techniques, morbidity and mortality, number of patients who had hypotension or bradycardia during surgery and who needed postoperative ICU hospitalization were recorded.

RESULTS

Mean age was 71 years, 472 were female and 315 were male; 62 of the patients were ASA1, 236 of them were ASA2, 432 of them were ASA3 and 57 were ASA4. Anesthesia methods were GA for 39 patients, spinal anesthesia for 550 patients and combined spinal-epidural anesthesia for 198 patients. Spinal anesthesia with local anesthetics alone was performed for 316 patients whereas for 432 patients local anesthetics were combined with opioids. Bradycardia and hypotension developed in 164 of the local anesthetic alone group and in 60 of the local anesthetic plus opioid group. Forty-four patients required postoperative ICU hospitalization; 15 patients deceased during surgery or in the ICU.

DISCUSSION AND CONCLUSION

Regional anesthesia has a wide area of use both in surgery and pain management. Superior postoperative pain control; lesser effects on vital signs, endocrine and metabolic responses bring RA to the forefront (5). There are studies that report RA is preferred in hip surgery (3). Our study shows that RA was performed in 95% of the cases. Addition of opioid to local anesthetics in single dose spinal anesthesia is considered as a separate method (6, 7). Addition of opioids is reported to help both decrease local anesthetic dose and maintain more efficient and longer anesthetic effect (6). In our study number of patients who developed bradycardia and hypotension was lower in local anesthetic plus opioid group than local anesthetic alone group. In conclusion we think that RA techniques are used extensively for hip surgery and combination of opioid with local anesthetics is a safe and effective method.

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May 19, 2016, Thursday
SESSION-4

13: 45-15: 00
Chairs: Volkan Hancı, Aysun Ankay Yılbaş

FACTORS EFFECTING MORTALITY RATES OF COPD PATIENTS IN ICU

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INTRODUCTION AND AIM: Chronic Obstructive Pulmonary Disease(COPD) constitutes majority of ICU admissions, its mortality and morbidity rates increase continuously and imposes as a great socioeconomic burden. It is a major reason for ICU deaths(1, 2). In this study we aim to compare factors effecting mortality rates of COPD patients in ICU and examine whether red cell distribution width (RDW), mean platelet volume(MPV) and uric acid have effect on mortality rates.

MATERIAL AND METHOD

This study was conducted in ICU department of our hospital. Third level ICU has 18 beds and managed by anesthesiologists 7/24. All of the data included in the study(physical examination findings, APACHE II, GCS and tests) were recorded by the anesthesiologist upon patients admission to ICU. Files of 735 ICU patients were examined retrospectively. 178 of them had COPD diagnosis, 26 of these patients were admitted to the ICU primarily because of acute COPD exacerbations.

RESULTS: Mortality rate in our study was 67. 42%. Mortality rate in patients who were already intubated upon admission was significantly higher than non-in-

tubated patients and; GCS, APACHE II, ICU hospitalization days and duration of mechanical ventilation were statistically significant in deceased patients than surviving patients($p < 0.0001$). Uric acid and RDW levels were not significantly different whereas MPV, creatinine, PLT, neutrophil, lymphocyte and BE levels were significantly different in deceased patients($p < 0.0001$). Accompanying diseases such as CHF, post-CPR, pulmonary embolism and AF and inotropic support upon admission were statistically different between non-surviving and surviving patients.

DISCUSSION AND CONCLUSION: There are many studies examining factors effecting mortality of COPD patients in ICU(1-4). Mortality rate in our study was 67.42%. The reasons for this high rate are high mean age(>74 years), 63.7% of the patients were already intubated during admission and abundance of co-morbid diseases. Other biochemical risk factors that also reported in studies are uric acid, low PLT count, RDW, GGT, MPV, CRP, urea and creatinine(5-9).

The most significant factor effecting mortality according to our study was co-morbid diseases(CHF, AF, pulmonary embolism and post-CPR). Other independent variables that effect mortality were MPV, creatinine, being intubated upon admission, duration of mechanical ventilation and EF of the patients.

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May 19, 2016, Thursday
SESSION-5

15: 00-16: 15
Chairs: Aydın Erden, Seher Altinel

COMPARISON OF FENTANYL AND BUPIVACAINE WITH SINGLE DOSE MORPHINE PLUS BUPIVACAINE FOR PATIENT-CONTROLLED EPIDURAL ANALGESIA IN PATIENTS UNDERGOING LOWER EXTREMITY ORTHOPAEDIC SURGERY

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Background and Purpose

Effective treatment of post-operative pain represents an important component of postoperative recovery as it serves to blunt autonomic, somatic and endocrine reflexes with a resultant potential decrease in perioperative morbidity. Poly-pharmacological approach is the most common practice to treat peri- and post-operative pain, as no single agent has not been identified to specifically inhibit pain perception without associated side effects. Opioids such as Fentanyl and Morphine are commonly added to local anesthetics to produce epidural analgesia. However, significant adverse effects may limit their use. The aim of this study is to compare the safety and efficacy of fentanyl and bupivacaine with single dose morphine plus bupivacaine for patient-controlled epidural analgesia in patients undergoing lower extremity orthopaedic surgery.

Patients and Methods

This single center retrospective study evaluated patients undergoing lower extremity orthopaedic surgery from January 2013 to December 2015, those who had combined spinal-epidural anesthesia and those with a patient controlled epidural analgesia within the three days after surgery. Two different group of patients were identified according to the analgesic regimen. In Group F, infusion of epidural Fentanyl (8 mg/h) and Bupivacaine (4 mg/h) was performed. The patients received an initial bolus epidural injection of 2 mg morphine followed by a continuous epidural infusion of Bupivacaine (4 mg/h) in Group M.

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The demographical aspects, comorbid conditions, ASA status, Ramsay sedation scale (RSS) score, Bromage scale score, numerical rating scale score of the patients were retrospectively reviewed. Postoperative adverse events were also noted.

Results

The results of the study are summarized in Table 1 (A: patients' characteristics; B: outcome parameters and medications used; C: adverse events during post-operative period)

Discussion and Conclusion

This study have demonstrated that epidural fentanyl and bupivacaine is more effective than a single bolus dose of epidural morphine followed by bupivacaine. However, the amount of medication used was higher and the frequency of adverse events were more than in Group F when compared with Group M. A single bolus dose of epidural morphine followed by bupivacaine minimizes opioid-related side effects and should be more effective for management of post-operative pain if the amount of morphine is increased in patients undergoing lower extremity orthopaedic surgery.

Table 1. Summary of demographical aspects of the patients', outcome parameters, medications used and adverse events.

A. Patients' characteristics.

	Group F	Group M (N: 279)	p
	n=306	n=279	
Age (years) (mean)	60. 50	59. 30	0. 404
Sex (M/F)	85/221	81/197	
BMI (kg/m2)	29. 76	30. 20	0. 383
ASA satatus	1. 91	1. 90	0. 421
Comorbidity	n (%)	n (%)	
<i>Diabetes Mellitus</i>	67 (22)	56 (20)	0. 589
<i>Hypertension</i>	199 (65)	172 (61)	0. 396
<i>Hyperlipidemia</i>	51 (16. 7)	41 (14. 7)	0. 513
<i>Obstructive Lung Disease</i>	8 (2. 6)	8 (2. 8)	0. 851
<i>Asthma</i>	16 (5. 2)	15 (5. 3)	0. 937
<i>Goiter</i>	42 (13. 7)	41 (14. 7)	0. 737
<i>Coronary Artery Disease</i>	57 (18. 6)	40 (14. 3)	0. 163

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B. Outcome parameters and medication used.

Postoperative Day	1			2			3		
Group	F	M		F	M		F	M	
	mean±SD	mean±SD	p	mean±SD	mean±SD	p	mean±SD	mean±SD	P
NAS	2.5±1.3	3.1±1.6	<0.001	1.1±1.4	2.5±1.6	<0.001	0.5± 1.0	1.8± 1.5	<0.001
RSS	2.02±0.4	2.1±0.4	0.189	2.0±0.1	2.0±0.3	0.01	2.1± 1.6	2.0± 0.2	0.136
BSS	0.07±0.4	0.2±0.5	<0.001	0.01±0.1	0.06±0.3	<0.001	0	0	
Medication (mg/day)	62.5±21.4	49.3±27.4	0.002	150.6±40.6	112.6±48.4	0.213	107.4±72.7	96.3± 73.3	0.114

NAS: Numerical rating scale; RSS: Ramsay sedation scale; BSS: Bromage scale score

C. Adverse events during post-operative period.

Postoperative Day	1			2			3		
Group	F	M		F	M		F	M	
	n	n	p	n	n	p	n	n	P
Vomiting	126	64	<0.001	71	39	0.01	14	0	<0.001
Nausea	58	29	0.004	19	9	0.091	1	0	0.34
Urinary retention	104	43	<0.001	65	17	<0.001	13	1	0.002
Difficulty in Concentration	5	13	0.034	3	6	0.253	1	0	0.335
Pruritus	6	3	0.385	6	0	0.19	1	1	0.340
Skin eruption	2	0	0.176	1	0	0.339	1	0	0.339
Apnea	10	4	0.147	1	0	0.339	1	0	0.339
Hypotension	31	24	0.510	26	18	0.349	5	4	0.844
Constipation	181	74	<0.001	138	48	<0.001	52	6	<0.001
Confusion	5	1	0.126	3	2	0.729	1	1	0.340
Dizziness	15	36	<0.001	12	16	0.322	2	2	0.934

EFFECTS OF LOCAL ANAESTHETICS ADMINISTERED INTO THE INTRAPERITONEAL OR TROCHAR AREA ON POSTOPERATIVE PAIN FOR LAPAROSCOPIC CHOLECYSTECTOMY SURGERIES.

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Aim: The aim of this prospective, randomized, controlled study is to compare the efficacy of the bupivacaine administration to trochar area or intraperitoneally as a part of multi-modal analgesia for the post-laparoscopic cholecystectomy pain treatment.

Method: Upon receipt of Ethics Committee, the study is conducted over 90 patients ASA I-III between the ages of 20 and 70 years old to have laparoscopic cholecystectomy. All patients received the same general anesthesia drug regimen.

Patients were randomized into three groups. The groups are as follows; in Group I, bupivacaine was injected to trochar area that included skin, fascia, muscle; in Group II, bupivacaine was injected to intraperitoneal area; in Group III saline was injected to trochar and intraperitoneal area.

Morphine was used for 24 hours via IV PCA (Patient Controlled Analgesia) for postoperative analgesia. The patients VAS(Visual Analogue Scale) (on resting, coughing, during mobilization) scores, nausea-vomiting scores and Ramsay sedation scores, shoulder pain were recorded at postoperative 1st, 2nd, 4th, 8th, 12th and 24th hours.

Results: During the follow-up periods, VAS level of Group I is ($p < 0,001$) lower than Group II and III respectively. There is no significant difference in groups for nausea and vomiting ($p = 0,058$). In Group III ($p < 0,05$) had more frequent shoulder pain compared to Group I and II. Total morphine consumption was higher in Group II and III ($p < 0,001$, $p < 0,001$) compared to Group I. Rescue analgesic requirement was higher in Group III ($p < 0,05$) compared to Group I and II.

Conclusions: In laparoscopic cholecystectomies, bupivacaine injection to the trochar area is as effective as intraperitoneal bupivacaine injection for postoperative analgesia as a part of multi-modal analgesic technique.

Keywords: Multi-modal analgesia, bupivacaine, wound site infiltration, intraabdominal local anesthetic.

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LATERAL SAGITTAL INFRACLAVICULAR BLOCK IN ORTHOPEDIC SURGERY: ONE YEAR EXPERIENCE

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Background: The lateral sagittal infraclavicular block (LSIB) is commonly used for anesthesia for mid-humerus region of upper limb surgery. The aim of the study is to analyse the success rate of LSIB for orthopedic surgery retrospectively.

Materials and Methods: We retrospectively analyzed orthopedic surgical procedures and identified patients who were applied LSIB between January 2015 and December 2015. Patient age, gender, American Society of Anesthesiologists (ASA) Physical Status classification, diagnosis, surgery time, choosing drug for premedication and guidance type like ultrasound (US) and nerve stimulator (NS) were recorded. Need for sedatives and analgesics, laryngeal mask airway (LMA) anesthesia, and general anesthesia were documented. The successful block was defined as the block sufficient to perform the surgery without any additional anesthetic and analgesic methods. The Student's t and the Pearson Chi square tests were used for statistical analysis.

Results: We identified 233 patients who underwent 244 orthopedic procedures. 9 patients were operated at two times and one patient was operated three times. Ultrasound and NS-guided LSIB were applied in 170 (69. 7%) and 74 (30. 3%) procedures, respectively. The mean age, gender, ASA classification, surgery time, and the number of patients applied premedication were similar between the each guidance of LSIB. The success rates of US-guided and NS-guided LSIB were 95. 3% and 83. 8%, respectively. The success rate of LSIB was higher in US guidance than NS guidance ($p=0. 02$). General anesthesia was applied in 3 (1. 8%) and 4 (5. 4%) patients, LMA anesthesia was applied in 1 (0. 6%) and 5 (6. 8%) patients, needed additional sedatives and analgesics were applied in 4 (2. 3%) and 3 (4. 0%) patients under US-guided or NS-guided LSIB, respectively.

Discussion: US-guided LSIB was gradually applied in our practice. Moreover, it was higher success rate than NS-guided LSIB.

Key Words: Infraclavicular block, ultrasound, nerve stimulator, success rate, orthopedic surgery

ANAESTHETIC TECHNIQUES FOR EMERGENCY ORTHOPEDIC SURGERY

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Introduction

Emergency orthopedic surgery provides care often for geriatric patients and trauma patients with musculoskeletal injuries. Pre-anaesthetic assessment associated with emergency orthopedic surgery lacks of comprehensive medical evaluation of patients because of time constraints. Decision making in anaesthesia is largely influenced by the presence of co-morbidities, type of surgery, neuro-cognitive function, hypovolemia, hemorrhage, pain, period of starvation, the high American Society of Anaesthesiologists' (ASA) score and advancing age. The anaesthetist should also consider the personal experience in anaesthetic skills for choice of anaesthetic technique.

The aim of this retrospective study is to evaluate the preferred anaesthesia techniques in our clinic for emergency orthopedic surgery at a 1 year period.

Material and Method

This retrospective study included 477 patients of all ages who have undergone emergency orthopedic surgery between January 2015 and December 2015 after approval of the research ethics committee. Medical record forms and electronic medical record system of the hospital were used in the analysis of medical data with regard to age, sex, ASA score, anaesthesia technique, comorbidities, surgery diagnosis, length of surgery, complications and admission to intensive care unit after surgery.

Results

176 (36. 9%) of the patients were female, 301 (63. 1%) of the patients were male and the mean age of the patients was 44. 6±26. 0 (male 38. 5±24. 4; female 55. 1±25. 3). General anaesthesia for 95 patients (19. 9%), periferic nerve block for 99 (20. 8%), spinal anaesthesia for 74 (15. 5%), combined spinal-epidural anaesthesia for 168 (15. 5%), epidural anaesthesia for 4 (0. 8%), LMA for 26 (5. 5%), sedation for 3 (0. 6%) and general anaesthesia after failed regional anaesthesia for 8 (1. 7%) was performed. There were significant differences in anaesthetic

methods according to the patient's age (Table 1) and type of surgery (Figure 1) (chi-square, $P < 0.05$).

Conclusion

We found that the regional anaesthesia was the most (72.3%) used anaesthetic technique for orthopedic emergency by three quarters of patients, however general anaesthesia was most routine in 0-12 years old children. We conclude that regional anaesthesia applications in children for the emergency operations could be used more widely according to the patient's medical condition and preferences.

Keywords: Emergency orthopedic surgery, anaesthesia, general anaesthesia, regional anaesthesia

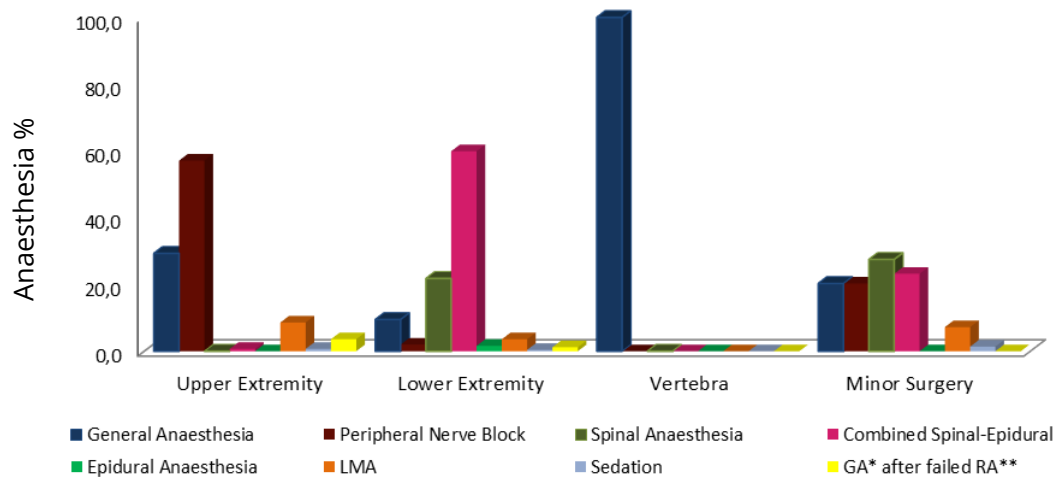


Figure 1: The prevalence of anaesthetic techniques within each group of surgery were listed (chi-square test, $p=0.001$) (* general anaesthesia, ** regional anaesthesia)

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Anaesthesia Techniques	Age Groups													
	0-5 Years		6-12 Years		13-18 Years		19-65 Years		66-85 Years		Over 85 Years		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
General Anaesthesia	8	33.3	27	60.0	5	12.5	44	18.8	10	8.2	1	8.3	95	19.9
Peripheral Nerve Block	5	20.8	5	11.1	15	37.5	64	27.4	9	7.4	1	8.3	99	20.8
Spinal Anaesthesia	-	-	1	2.2	7	17.5	36	15.4	28	23.0	2	16.7	74	15.5
Combined (Spinal-Epidural)	-	-	-	-	9	22.5	82	35.0	69	56.6	8	66.7	168	35.2
Epidural Anaesthesia	-	-	-	-	-	-	-	-	4	3.3	-	-	4	0.8
LMA	6	25.0	11	24.4	4	10.0	4	1.7	1	0.8	-	-	26	5.5
Sedation	2	8.3	-	-	-	-	1	0.4	-	-	-	-	3	0.6
GA* after failed RA*	3	12.3	1	2.2	-	-	3	1.3	1	0.8	-	-	8	1.7
TOTAL	24	100.0	45	100.0	40	100.0	234	100.0	122	100.0	12	100.0	477	100.0

Table 1: The primary outcomes were listed by the patient's age related to anaesthesia technique (chi- square test, p=0. 001)(* general anaesthesia, ** regional anaesthesia)

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COMPARISON OF BUPIVACAINE AND LEVOBUPIVACAINE IN CONTINUOUS AXILLARY BRACHIAL PLEXUS BLOCK

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Aim: This study compares bupivacaine – lidocaine and levobupivacaine – lidocaine administrations in terms of initiation and duration of motor and sensorial

blockage, total number of additional analgesic applications, analgesic amount consumed in 24 hours, side-effects and hemodynamic effects in continuous axillary brachial plexus block in hand and forearm surgery.

Method: Thirty ASA I & II physical status patients, scheduled hand or forearm surgery were enrolled for of the two groups in a randomized study. Axillary catheter duly placed in both group with appropriate guided techniques. Patients in group B received 0.5% bupivacaine 20 ml + 2% lidocaine 20 ml and group L received 0.5% levobupivacaine 20 ml + 2% lidocaine 20 ml through the axillary catheter. Initiation and duration of motor and sensorial block, total number of additional analgesic applications and analgesic amount consumed in postoperative 24 hours were recorded. Pre-block, peri-operative and post-operative blood pressures and heart beat rates were also recorded. Block application duration, operation duration, tourniquet duration and demographic data of patients (age, sex, weight, and length) were recorded. Demanded and applied analgesic doses by the patient controlled analgesia devices, side effects and complications were also recorded.

Results: There was no statistically significant difference between two groups in terms of initiation and duration of motor and sensorial block, amount of analgesic consumed in 24 hours, demanded and applied analgesic doses by the patient controlled analgesia devices and hemodynamic data ($p > 0.05$). There is a mild and positive relation between block application duration and patient weight. ($p = 0.014$; $r = 0.444$)

Discussion: Both bupivacaine+lidocaine and levobupivacaine+lidocaine combinations can safely be used in axillary continuous brachial plexus block without any difference in terms of initiation and duration of block, total analgesic amount consumed. Their duration of action and effect on hemodynamic responses are similar.

Keywords: Axillary brachial plexus blockage, continuous brachial plexus blockage, bupivacaine, levobupivacaine.

**IMPROVING EFFECT OF THE USE OF AMANTADINE ON
NEUROLOGIC PROGNOSIS IN HYPOXIC BRAIN DAMAGE AFTER
CARDIOPULMONARY BYPASS SURGERY**

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Introduction: Although developments in extracorporeal perfusion devices, anesthetic and surgical managements; hypoxic brain damage(HBD) and neurologic complications after cardiopulmonary bypass surgery(CPBS) are still common and serious problems(1). Microembolization and insufficient cerebral perfusion are most possible mechanisms of hypoxic brain damage. In spite of many studies, the treatment modalities of HBD are not usually effective. Some studies showed decreased cerebral catecholamine levels in traumatic and hypoxic brain damages. Amantadine is an antiviral agent and highly debating due to its dopamine secreting effects from central nervous system(CNS).

Case: Our patient was 50 years old with no comorbidities. He was cared by routine supportive management in intensive care unit(ICU) with a Glasgow Coma Scale(GCS) of 3 after ascending aortic aneurysm repair. Amantadine therapy was initiated at 48 hours after surgery. In consecutive days patient had progressive improvement and GCS was increased to 10. Tracheostomy was performed due to prolonged mechanical support and he has been still cared with antiepileptic and amantadine therapy for about 50 days in the ICU.

Discussion: Amantadine is presented as an additional agent to routine supporting therapy especially in traumatic brain damage patients. Its effect is supposed to be related with increasing secretion of catecholamines; especially dopamine in CNS(2). Our patient who may be diagnosed as HBD due to CPBS; amantadine with routine supportive therapy improved neurologic recovery. Although many studies about the use of amantadine in traumatic brain damages; there is a lack of studies on HBD after CPBS. Our case may support further clinical trials about the use of amantadine in HBD.

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TROMBOLYTIC THERAPY IN CARDIAC ARREST DUE TO MASSIVE PULMONARY EMBOLI AFTER OPEN HEART SURGERY: CASE REPORT

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Introduction: Massive pulmonary emboli(MPE) is a highly mortal complication that can be seen after major surgical interventions and as a consequence new treatment modalities are being searched(1). The use of thrombolytic therapy in patients with MPE and prolonged cardiopulmonary resuscitation(CPR) is a new treatment regimen(2). In this report we present a case of cardiac arrest due to MPE after open heart surgery in which trombolytic therapy was successfully used.

Case: Our patient who has undergone CABG 1 month ago has applied to our hospital with dyspnea. Right atrium and ventricle was dilated, systolic pulmonary arter pressure was 55 mmHg in TTE (transtoracic echocardiography) and D-dimer value was 12250 ng/ml. Major thrombi was detected in pulmonary angiography. We started CPR after a sudden cardiac arrest and administered tissue plasminogen activator at the same time. After a successful CPR attempt; patient was mechanically ventilated and trombolytic therapy was continued with clexane in the intensive care. He was weaned from mechanical ventilation 2 days later and discharged from hospital at 21st day.

Discussion: MPE can lead to right ventricular insufficiency due to increased right ventricular pressure and may be a cause of mortality after open heart surgery. Right ventricular preload can be decreased with thrombolytic therapy for preventing a hemodynamic impairment. This treatment model may be a part of

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MPE originated cardiac arrest CPR algorithm in the future. Our case is a successful example of the use of thrombolytic therapy in a MPE originated cardiac arrest.

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THE EFFECT OF PREOPERATIVE EVALUATION AND PERIOPERATIVE ANESTHETIC MANAGEMENT ON POSTOPERATIVE MORTALITY AND MORBIDITY IN MAJOR AMPUTATION: A SINGLE CENTER EXPERIENCE

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Objective: Patients undergoing major extremity amputation are often elderly, debilitated, and fraught with medical comorbid conditions that place them at high risk for surgical intervention; hence these life threatening procedures are frequently related with high postoperative morbidity and mortality rates (1).

The aim of this retrospective study is to evaluate the factors with regard to anesthetic issues affecting mortality and morbidity after major amputation surgery.

Method: After Ethical Committee approval, data was retrospectively collected from files of patients who underwent major extremity amputation surgeries between January 2014- March 2016 in our hospital. Patient characteristics, indications for amputation, anesthetic techniques and surgical procedures performed, perioperative complications, requirement of intensive care unit (ICU) admissions, length of stay in ICU and hospital together with

mortality rates were recorded. The results were represented as numbers and percentage.

Results: A total of 126 patients were included in the study. The mean age was 68.1 ± 15.9 years. Of the patients, 71 (56.3%) were male, 55 (43.7%) were female. ASA III patients made up 35.7% and ASA IV patients made up 46% of all. 64% of patients suffered from diabetes mellitus, while 55.6% from hypertension and 54% from coronary artery disease. A hundred and ten patients (87.3%) had emergency surgeries and the rest (12.7%) were elective cases. Lower extremity amputations were remarkable with an incidence of 80.2%. Below knee amputations were 56.2% of these. Peripheral artery disease (48.4%) and diabetes mellitus (42.4%) were the first two commonest indications for amputation. Spinal anesthesia, general anesthesia with endotracheal intubation or with a laryngeal mask airway (LMA) were performed by a percentage of 46.8%, 19%, 31.7%, respectively. Fifty-one patients required intensive care unit admission. The median length of stay in ICU and hospital was 3 (1-135) and 12 (1-135) days, respectively. During this time 27 (21.6%) patients were reamputated and 12 (9.6%) patients died due to postoperative complications.

Conclusion: We herein documented the data of patients undergoing major amputation surgery including perioperative complications, morbidity and mortality rates (2). We tried to call attention to caring about factors important in the prognosis of these patients with a multidisciplinary approach in major amputations to attenuate high incidence and consequence of perioperative complications.

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**THE COMPARISON OF THE ORTHOPEDIC PATIENTS ADMITTED
IN ICU PREOPERATIVELY OR POSTOPERATIVELY ACCORDING
TO RISC FACTORS AND COMORBIDITIES**

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Introduction: In this study, the risk factors and comorbidities of the orthopedic patients followed in ICU preoperatively and postoperatively were compared retrospectively.

Method: After receiving approval from the ethics committee (No. 397), operating characteristics and comorbidities of the patients followed in our Critical Care Unit- 3 between 01/01/2010-31/12/2014, were retrospectively analyzed and recorded by evaluating surgical records, anesthesia forms and ICU files.

Results: The total patient number was 283 (132 male and 151 female patients) and 167 (64 male and 103 female) of them were admitted postoperatively. 54.4% and 32.3% of these patients were accepted after trauma and total hip replacement operations, respectively. The mean age of patients who underwent surgery was 61.5 years, while that of non-operated patients was 73 years. Mean APACHE II scores of the patients were 13.8 and 12.97 for postoperatively and preoperatively accepted patients, respectively ($p = 0.487$). 21% of operated and 18% of non-operated patients were with COPD ($p=0.016$). Monitoring requirement among the reasons for ICU admission was 62% and 47% for non-operated and operated patients, respectively ($p=0.014$). Symptomatic electrolyte disturbances were higher in the non-operated patients ($p = 0.016$). Hypotension rate in patients requiring vasopressors was 11% in operated patients while 3% in non-operated ones ($p = 0.011$). Charlson score of postoperative patients was higher than that of preoperative patients ($p = 0.001$).

Discussion and Conclusion: In our study, we can explain the higher number of the postoperative orthopedic patients who were followed in intensive care unit and a higher rate of hypotension requiring vasopressors in these patients with their higher Charlson scores. The higher rates of COPD, severe electrolyte disturbances and the monitoring requirement in preoperative patients show that preoperative patients have more risks in terms of respiratory, hemodynamic and electrolyte levels. Therefore, we decided that orthopedic patients with risk factors may be prevented from entering into ICU preoperatively with early

and effective consultations and early starting of the treatments in orthopedic services.

Key words: Intensive care, Orthopedics, Charlson score

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Chairs: Aydın Erden, Seher Altinel

DIFFERENT ANESTHETIC AGENT MANAGERMENTS EFFECTS ON ELECTROCARDIOGRAPHY DURING REGIONAL INTRAVENOUS ANESTHESIA

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Objective: Intravenous regional anesthesia (IVRA) could be performed using various local anesthetics and adjuvant agents. In our study we observed the (QT and QTc intervals and) electrocardiographic (ECG) changes during IVRA with lidocaine or lidocaine and ketamine.

Methods: After local ethic committee approval and written informed consent, the study was performed on 60 patients between 18-60 years old, with ASA 1-2 who were planned arm or forearm operations less than 1 hour under IVRA. Unregulated diabetes, renal insufficiency, cardiac failure, respiratory failure, central nervous system disease, electrolyte imbalances, arrhythmia, prolonged QT syndrome were excluded. Automatic double cuffed pneumatic tourniquet were placed to proximity of the extremity. The patients were allocated to two groups randomly. In Group 1 (n=30) lidocaine 0.5 % and ketamine 0.8 mg/kg and in Group 2 (n=30) 0.5 lidocaine were used as 40 ml in each groups. Anesthetic solution was injected with a rate of 20 ml/min and at the end of the operation, the distal cuff was deflated 50 mmHg every 5 minutes. Just before the local anesthetic injection (basal level) and at the 5th, 10th, 15th, 30th, 45th, 60th minutes after the starting of deflation ECG, systolic, diastolic and mean blood pressures, heart rate, sPO₂, were recorded. The QT, and QTc intervals were determined. Adverse reactions were recorded in all groups.

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Results: Demografic characteristics and operation time were similar between the groups ($p > 0.05$). Although basal levels weren't similar between two groups, but QTc intervals were longer from basal values in Group 2 at the 5th, 10th, 15th, 30th, 45th, 60th minutes of deflation ($p < 0.05$). Mean arterial pressure (MAP) was higher in group 2 at the 45th minutes of deflation ($p = 0.001$). Visual hallucination (2 patient in Group 2), nistagmus (1 patient in Group 2), dizziness (2 patient in Group 2) were recorded in 2 patient as adverse reaction.

Discussion/Conclusion: Local anesthetics and sedative hypnotised agents including ketamine prolong the QT c interval. Arrhythmia incidence is higher with long QTC interval.

When ketamin is used as an adjuvant agent with lidocaine, QTC interval is much longer than lidocaine alone from basal levels. Ketamine should be used cautiously at patients with arrhythmia risk during IVRA. Systemic effect of lidocaine is less with IVRA ketamine increased the QTC intervals used as adjuvant agent ketamine for lidocaine during the IVRA. After the deflation of tourniquet was completed, in ketamine group (group1) QT and QTc values especially NIBP were significantly higher and it was observed that arrhythmia risk was increased. The incidence of adverse effects increases due to the risk of consistence of a complicated structure throughout multiple drug combinations. So drug combinations must be used carefully by patients who are especially under risks.

Keywords: IVRA, ketamine, lidocaine, ECG

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ICU ADMISSIONS, MECHANICAL VENTILATION AND MORTALITY RATE

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Background and objectives: admission in ICU due to traumatic injuries is common clinical settings. Literature argues that the mortality rate due to any kind of trauma is increased with the advanced age in the patients and the duration of the mechanical ventilation. The aims of this study was to analyze the mortality rates in patients who were admitted to the ICU due to traumatic injuries.

Material and method: in retrospective study, randomly assigned 200 records of patients (with traumatic injuries) who were admitted in the ICU at the Clinic for Anesthesia Reanimation and Intensive (CARIC) in Skopje were evaluated. De-

mographic data, need for mechanical ventilation, duration of mechanical ventilation <5 days and >5 days an ICU outcome were analyzed.

Results: mean age of the patients was 38. 4 years. Out of all patient significantly larger number were male 161(80. 5%) compared to female 39 (19. 5%). Mechanical ventilation was needed in 40% of the patients(80pts) from whom 18% needed ventilation longer than five days. Mortality rate in patients was 21% vs 34 % in respect to the days of the mechanical ventilation.

Discussion: Many studies give different results of trauma associated ICU admissions and deaths. Most of the literature suggest that the higher the number of injuries and the longer need for mechanical ventilation is the increased risk for mortality occurs.

Conclusion: For most of the ICU patients admitted to CARIC due to traumatic injuries are young male individuals. Mechanical ventilation longer then 5 days is associated with higher mortality rate in all patients.

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NEW EXPERIENCES OF USING EPIDURAL ANESTHESIA IN CONDITIONS OF SEDATION DURING APPLICATION OF ILIZAROV APPARATUS FOR PEDIATRIC PATIENTS

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Musculoskeletal problems in children represent around 1/3 of all congenital anomalies. Many of them occur as only diseases in otherwise healthy children, and a certain number of children appear as part of the syndrome or associated with neuromuscular diseases. The treatment of various types of deformities is most effective with Ilizarov apparatus. Basically transosseous osteosynthesis Ilizarov apparatus used to effect distraction and compression. This technique is followed by high intensity of pain. Intraoperative is necessary trauma-induced inhibition of transmission of pain, autonomic and somatic reflex responses to pain associated with orthopedic surgery and provide a subjective sense of comfort. Neuroendocrine response to stress induces a series of disturbances that negatively contribute to the perioperative outcome.

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Regional anesthesia has specific advantages in providing anesthesia and analgesia in orthopedic surgery. Continuous epidural administration of opioids in combination with local anesthetics in small doses reduces the adequate response to stress and provides the highest level of analgesia both intraoperative and postoperative. New experiences at University Children's Hospital in Belgrade related to the anesthesia only in conditions of sedation with the use of continuous epidural analgesia through the catheter for the entire duration of operative work as well as providing complete indolence while maintaining motorics in the postoperative period which is not time-limited. In the period of twelve months, six children aged 6 to 15 years have been operated. Without taking into account their associated diseases, neuromuscular, cardiac or endocrine we have been monitoring their need to use analgetics during the intraoperative and postoperative period until the moment of verticalization.

Patients were premedicated with Midazolam at a dose of 0.3-0.4 mg/kg at the ward. After thirty minutes are moved into the operating room where we have done placement of epidural catheter with continuous Propofol sedation. For the purposes of achieving analgesia for a surgical procedure, we used 0.5% Bupivacaine in a dosage of 2 mg/kg as a bolus dose, followed by analgesia and motor blockade accomplished by continuous infusion, 0.125% Marcain and Fentanyl at doses that were tailored to the individual needs and the degree of the intensity of surgical pain. Required sedation was achieved by continuous administration of Propofol in a dose of 3 mg/kg. Upon completion of the surgery patients were awake and able to leave operation room absolutely pain-free. At the ward they were immediately allowed to begin oral intake of fluids and then food, which represents a special advantage. Continuous analgesia through epidural catheter in combination Bupivacaine/Fentanyl in the ward ruled out the need for providing any other analgesics until the moment of verticalization. There have been no neurotoxic nor cardio depressive effects of used drugs, or neurological sequelae.

THREE MONTH PROFILE OF PATIENTS IN THE INTENSIVE CARE UNIT

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Background and objectives: Clinic for Anesthesia Reanimation and Intensive Care(CARIC) unit from Skopje has ICU where most of the critically ill patients from all parts of the Republic of Macedonia are treated. This ICU has been established mainly as a surgical and trauma intensive care center but many of the patients in whom ventilatory support is needed from other clinics are transferred to this ICU. The aim of this study was to evaluate and classified what diagnosis were treated in this ICU during 3 month period (1st January to 31st March).

Material: in retrospective study, records of all patients who were treated in the ICU of CARIC during 3-month period were evaluated. Patients general data, gender, diagnosis, from what clinic transfer was done and duration of mechanical ventilation (<2 days or >2 days) and were analyzed.

Results: Total of 287 patients were treated in this ICU during this period, 115 were patients with polytraumatic injuries where as 172 were patients who needed intensive care for other reasons. Patients with polytraumatic injuries were excluded from further analysis.

Out of 172 non trauma patients, 59. 88%(103) of patients were admitted after surgery while 69 patients were transferred from non-surgical departments (pulmonology, toxicology, neurology, gastro-entero-hepatology, nephrology). From the post surgical admissions (64. 08% were after abdominal surgery; 20. 38% after thoracic -vascular surgery and 15. 54% after other surgeries-urology, maxillo-facial or neuro surgery). 58. 1% (100 pts) out of total patients needed prolonged mechanical ventilation longer than 2 days.

Conclusion: For three month period larger number of patients are admitted in the ICU at CARIC after surgery and from non surgical departments compared to the traumatic admissions.

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LIPOSUCTION UNDER LOCAL ANAESTHESIA

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Introduction. Each year plastic and reconstructive surgeons improve the lives of millions of patients. One-day surgery is a current trend in the aesthetic procedures. Therefore part of these interventions is made under local anesthesia. Liposuction is one of such procedures. Thus most of the liposuctions at our clinic are performed as one-day procedures, under local anesthesia.

Materials and methods. In the past three years 70 patients were treated for liposuction at the Clinic for plastic and reconstructive surgery in Skopje, Macedonia. Two thirds of them were operated under local anesthesia. Among these patients, 15 had lipomas, 10 had gynecomastia and the rest were treated for body contouring. The most common areas treated were lateral thighs, abdomen and the neck for the treatment of "double chin".

Results. There were no significant complications. Five patients required "touch-up" procedures again performed under local anesthesia.

Discussion and conclusion. With this study, we would like to emphasize the meaning of local anesthesia which when appropriately applied provides good working conditions on the other hand allows early patient mobilization and early releasing from hospital (within few hours after the operation). The latter especially highlights the patient satisfaction. 4

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ACUPUNCTURE FOR PAIN MANAGEMENT IN EVIDENCE-BASED MEDICINE

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Pain is an enormous and prevalent problem that troubles people of all ages worldwide. The effectiveness of acupuncture for pain management has been strongly verified by large randomized controlled trials (RCTs) and meta-analy-

ses. Increasing numbers of patients with pain have accepted acupuncture treatment worldwide. However, some challenges exist in establishing evidence for the efficacy of acupuncture. A more applicable and innovative research methodology that can reflect the effect of acupuncture in the settings of daily clinical practice needs to be developed

Keywords: acupuncture; evidence-based medicine; pain management; re-search methodology

Introduction

Pain is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. The previous experience of acupuncture research studies are invaluable for researchers to recognize the limitations and challenges of research designs and would help to move the field forward in future research. For example, the design of an adequate sham control, involvement of skilled and experienced acupuncturists, adequate outcome measures in the clinical trials, and the discovery of physiological effects of acupuncture in basic science are all important tasks for acupuncture researchers to address and solve. Acupuncture is a complex intervention and focuses on individualized treatment. Other challenges also exist in the clinical research of acupuncture. One challenge is the involvement of the acupuncturist.

Challenges and future directions of acupuncture research for pain conditions in EBM

High-quality RCTs and meta-analysis have increasingly produced robust evidence of the effectiveness of acupuncture for pain conditions, although non-specific physiologic response to the needle insertion and the nature of holistic character of acupuncture treatment lead to many challenges in the research designs that reflect the daily clinical acupuncture practice

Individual patient data meta-analysis and large RCTs of acupuncture for pain conditions

In recent years, studies have increasingly provided some evidence for using acupuncture for pain management. In 2012, an individual patient data meta-analysis was conducted by Andrew et al to evaluate the effectiveness of acupuncture for four types of chronic pain: back and neck pain, osteoarthritis, chronic headache, and shoulder pain. The result reflects that acupuncture was superior to sham acupuncture controls and to the usual care controls in all four chronic pain conditions

Discussion

As the newest revolution in the field of medical science, EBM has converted the classic authoritarian expert-based medicine and become the fundamental basis for clinical practice

Conclusion

In recent years, large RCTs and meta-analysis of the effectiveness of acupuncture have greatly advanced our knowledge of acupuncture. Increasingly more patients worldwide now accept acupuncture treatment. Challenges remain in the course of establishing evidence on acupuncture,

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HERBAL MEDICINE TODAY: CLINICAL AND RESEARCH ISSUES

Dr Mohammed Taque Ansari

MAK College Of Pharmacy

Demonstrate our indigenous medicines that are made by 1000 years old Herbal & Ayurvedic medicines practicing field in the spectrum of finding remedies for Asthma, Tuberculosis, Cancer and various other ailments.

Allopathic practitioners in India are outnumbered by practitioners of traditional Indian medicine and homeopathy (TIMH), which is used by up to two-thirds of its population to help meet primary health care needs, particularly in rural areas. India has an estimated 2.5 million HIV infected persons. However, little is known about TIMH use, safety or efficacy in HIV/AIDS management in India, which has one of the largest indigenous medical systems in the world.

The purpose of this review was to assess the quality of peer-reviewed, published literature on TIMH for HIV/AIDS care and treatment. Of 206 original articles reviewed, 21 laboratory studies, 17 clinical studies, and 6 previous reviews of the literature were identified that covered at least one system of TIMH, which

includes Ayurveda, Unani medicine, Siddha medicine, homeopathy, yoga and naturopathy. Most studies examined either Ayurvedic or homeopathic treatments. Only 4 of these studies were randomized controlled trials, and only 10 were published in MEDLINE-indexed journals.

Overall, the studies reported positive effects and even "cure" and reversal of HIV infection, but frequent methodological flaws call into question their internal and external validity. Common reasons for poor quality included small sample sizes, high drop-out rates, design flaws such as selection of inappropriate or weak outcome measures, flaws in statistical analysis, and reporting flaws such as lack

of details on products and their standardization, poor or no description of randomization, and incomplete reporting of study results.

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FREQUENCY AND TIMING OF VENOUS AIR EMBOLISM IN THE INFRATENTORIAL OPERATIONS IN SITTING POSITION

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Introduction: Venous air embolism (VAE), intraoperative haemodynamic instability, tension pneumocephalus, lingual or laryngeal oedema are among the most common complications that make the choice of the sitting position controversial in infratentorial operations (1). The aim of this study was to assess the incidence and timing of VAE in posterior fossa surgeries in sitting position performed in Hacettepe University.

Materials and Methods: The records of 124 patients who underwent posterior fossa craniotomy in the sitting position between January 2004 and April 2014 were reviewed retrospectively. Demographic data, pre- and intraoperative arterial blood gas analysis, anaesthetic technique and intraoperative hemodynamic variables were recorded. Standard monitoring included electrocardiogram, invasive arterial blood pressure, pulse oxymeter, capnography, temperature, central venous pressure and urine output. VAE was detected by sudden drop in end-tidal CO₂ which was verified by simultaneous arterial blood gas analysis.

Results: VAE was seen in a total of 21 patients (16. 9%) and it was detected by decreased end-tidal CO₂ in all cases. The mean duration of surgeries were 5. 6±1. 88 hours and 76. 3% of the emboli occurred in 2. 83±0. 99 hours following the first surgical incision. Mean end-tidal CO₂ value at the time of emboli was 25. 38±3. 28 mmHg. All patients were hemodynamically stable both at the time of diagnosis of VAE and following aspiration of air from the central venous catheter. There was neither mortality, nor morbidity due to VAE.

Discussion: VAE was most frequently seen in the 3rd hour of surgery which coincide to tumor resection in our study, thus proposing anesthesiologists to be more cautious about end-tidal CO₂ during this period. Precordial doppler ultrasonography is the most sensitive non-invasive monitoring device for accurate detection of even small VAE which are not clinically relevant. As VAE results in an increase in dead space ventilation, it causes a decrease in the level of end tidal

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CO₂ (1). In case of absence of precordial doppler, careful monitoring of end-tidal CO₂ can be considered as a reliable method of early detection of VAE providing enough time for aspiration of the air via the central venous catheter with the tip in the right atrium, thus preventing further air passage to pulmonary artery.

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Chairs: Bahar Öç, Seyhan Yağar

THE EFFECTS OF DIFFERENT ANALGESIC METHODS USED FOR VAGINAL DELIVERY TO THE FETUS AND MOTHER

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Introduction: Labor pain creates sympathetic stimulation, increases maternal oxygen demand, causes hyperventilation leading to metabolic acidosis and reduction in placental blood flow (1). For these reasons, labor analgesia is becoming more important. This study aimed to investigate the effect of different labour analgesic methods which we use routinely; epidural, combined spinal epidural (CSE), and systemic opioid analgesia, to the mother and fetus.

Methods: Retrospectively 138 parturients who were followed for labor analgesia (68 epidural, 50 CSE, 20 systemic opioid analgesia) in Hacettepe University Faculty of Medicine, Obstetrics and Gynecology Department between 2010-2015 were enrolled in this study. Demographic data, analgesia technique, labor information, drug information, hemodynamic data, mode of delivery, pain assessment, maternal satisfaction and neonatal outcome information were recorded.

Results: The duration of first, second, third stages of labour and length of hospital stay did not differ between the groups ($p > 0.05$). CSE and epidural groups were divided into subgroups according to the cervical dilatation at the time of catheter placement. Neuroaxial analgesia initiation before cervical dilatation of 4 cm was associated with longer duration of first stage ($p < 0.05$). Additionally regardless of analgesic method, nulliparity was found associated with longer labour duration in comparison with multiparity ($p = 0.05$). Instrumental delivery and cesarean section (c/s) ratios were comparable between groups ($p > 0.05$). Visual analog scale of pain scores were found higher and maternal satisfaction was found lower in the opioid group than the other groups ($p < 0.001$). There was

no difference between the groups in terms of itching, nausea, vomiting, chills and back pain. But sedation ratio was significantly higher ($p < 0,001$) and hypotension ratio was lower ($p = 0,02$) in the opioid group compared to other groups. There was no difference in terms of 1. and 5. min Apgar scores between epidural, CSE and the opioid groups ($p > 0,05$).

Conclusion: Regional methods applied for labor analgesia can be used safely for both mother and baby without increasing the rate of c/s and instrumental delivery. Especially in terms of patient satisfaction, advantages of regional methods were found to be higher compared to systemic analgesia.

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THE EFFECT OF INHALED NITRIC OXIDE ON PLATELET MORPHOLOGY IN CHILDREN UNDERGOING CONGENITAL HEART SURGERY

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Introduction and Aim: Use of inhaled nitric oxide (iNO) as a selective pulmonary vasodilator in congenital cardiac surgery has been one of the most significant pharmacological advances in managing pulmonary hypertension and life threatening right ventricular dysfunction and failure. This study aims to assess the effects of iNO on postoperative thrombocyte morphology in children undergoing congenital heart surgery.

Material and Methods: After Ethics Committee approval, study was conducted by retrospectively analyzing the data from 36 patients undergoing atrial septal defect, ventricular septal defect correction surgery (Age: 2-11). Patients were divided into two groups: iNO users (iNO+, n=18) and non-users (iNO-, n=18). Patients who received anticoagulant treatment before surgery, re-operations and emergency surgery were excluded. All patients' demographic data, platelet count (PLT) (K/uL), mean platelet volume (MPV) (fL), platelet distribution width

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(PDW) (10GSD), platelet crit (PCT) (%) and platelet large cell ratio (PLCR) (%) were recorded. The following parameters were derived from the blood analysis performed at preoperative (t1), end of surgery (t2), postoperative 12th h (t3) and 24th h (t4). Results were analyzed with Students t test and chi-square test as appropriate, $p < 0.05$ was considered as significant.

Results: Patients were similar regarding demographic data ($p > 0.05$). Our study revealed that PLT and PCT were decreased in patients with iNO+ compared with iNO- patients at t2, t3 and t4 times ($p < 0.05$). MPV and PDW were higher in iNO+ than iNO- patients at t2 and t3 times ($p < 0.05$). PLCR appeared to be similar between the groups at all times.

Conclusion: After congenital heart surgery, implementation of iNO is associated with change in PLT, PCT, MPV and PDW values. These parameters may affect postoperative complications. Careful assessment of platelet morphology, which is part of the routine whole blood analysis may serve as a guide for assessing the effects of iNO on platelet morphology and function after congenital heart surgery.

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EFFECT OF STATINS ON GLUCOSE METABOLISM DURING ON-PUMP CABG SURGERY

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Background and Aim:

Hypercholesterolemia has been well recognized as a risk factor for atherosclerosis. Cholesterol lowering agents such as statins reduce cardiovascular morbidity. Statins are thought to potentially impair glucose metabolism, increasing glucose concentrations and insulin resistance. In this study we aimed to investigate statins effects on glucose homeostasis in on-pump CABG patients.

Methods:

In this observational study we targeted totally 300 on-pump CABG patients. With IRB approval and consent, a total of 48 consecutive on-pump CABG patients enrolled so far. 27 patients were statin non-users and 21 patients were statin users. The demographic and operational data, probable predictive factors (history of; DM, insulin and OAD use, hypertension), intraoperative and postoperative glucose levels and used insulin amounts were recorded.

Results:

There were no differences between the groups regarding history of DM and preoperative insulin and OAD use. Total amount of intraoperative insulin used was 3.67 ± 7 units in the non-statin group and 1.57 ± 4.2 units in the statin group ($p: 0.065$). Glucose levels were lower in the statin group intraoperatively. First 8 hours glucose levels in the ICU were statistically significantly higher in the statin group (167.8 ± 26.2 vs 179 ± 57.2 $p: 0.000$; 183.1 ± 39.6 vs 200.6 ± 62.8 $p: 0.018$). Total amount of postoperative 24 hours insulin used was 0.19 ± 0.18 U/kg in the non-statin group and 0.2 ± 0.26 U/kg in the statin group ($p: 0.041$).

Discussion:

The key finding of this study is that glucose metabolism is impaired in the ICU after surgery in CABG patients and difference may become clear in this period between statin users and non-users. We found that statin users required more insulin than non-users in the ICU. More recent studies indicate that statins increase the risk of new-onset diabetes and insulin resistance. However larger clinical trials are needed to confirm whether statins are associated with insulin resistance during open heart surgery.

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SODIUM HOMEOSTASIS AND PREDICTIVE FACTORS IN LIVER TRANSPLANTATION

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Background and Aims: Impairment in body water homeostasis and hyponatremia are often seen in patients with end-stage liver disease and some studies showed high mortality rate in hyponatremic patients after liver transplantation. The integration of the serum sodium level into the model for end-stage liver disease (MELD) score has been proposed and has been used by some investigators because it is thought to provide better estimate of perioperative mortality. In this study we aimed to evaluate the effect of serum sodium level on the outcome in liver transplantation patients.

Methods: The data of 73 liver transplantation cases of our center were analyzed retrospectively. Data collection included patient demographics, etiology of liver disease, history of hepatic encephalopathy and hepatorenal syndrome, preoperative diuretics, serum sodium levels, intraoperative fluid interventions and alkalizing agents and 1 year mortality.

Results

Age (y)	46.5±10.8
Gender	M 50 (%68.5) F 23 (%31.5)
Encephalopathy	13 (%17.8)
Etiology	
HBV	32 (%43.8)
HCV	11(%15.1)
Wilson's Disease	8 (%11)
Cryptogenic Cirrhosis	8 (%11)
Primary Biliary Cirrhosis	4 (%5.5)
ETOH	3 (%4.1)
Others	7 (% 9.6)
Na preoperative	138.2±5.2
Na preanhepatic	138.5±5.1
Na anhepatic	140.5±4.8
Na neohepatic	140.5±5.4
Na postoperative	142.4±4.7

Table 1. Patient Data

No statistical differences were found in Na levels regarding mortality. There were no relation between alkalinizing agent (NAHCO₃) usage and intraoperative or postoperative Na levels. We found correlation between hepatorenal syndrome and mortality (p: 0. 000). When we searched mortal patient's Na_{preoperative} individually we noticed that 4 of them were hyponatremic, 2 of them were hypernatremic.

Discussion and Conclusion

Hyponatremia is associated with an increased risk of mortality on liver transplantation patients. Furthermore, the relationship between hypernatremia and risk of mortality remains unexplored. Our small size study is lack to show impaired sodium homeostasis (hyponatremia or hypernatremia) effects on outcome. Multicentral larger clinical trials are needed to confirm Na homeostasis effects on outcomes in liver transplantation.

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RETROSPECTIVE REVIEW OF AIRWAY MANAGEMENT IN PATIENTS UNDERGOING CERVICAL SURGERY IN NEUROSURGICAL OPERATING ROOMS

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Background: Cervical spinal injury is seen as 1. 5-3% of all traumas and is a major cause of morbidity and mortality (1). In these patients, inappropriate management of airways can cause serious neurological damage. Neurological damage can be caused by mechanical movements at the level of cervical instability, or hypoventilation and hypoxia due to misuse of airway devices. The aim of this study is to investigate the airway management in patients that undergo cervical surgery in our hospital.

Methods: After ethical committee approval, the files of the patients that had cervical surgery by the neurosurgery department of Hacettepe University between the dates of 1 January 2003- 31 December 2013 were examined retrospectively. Datas including the patients' age, gender, body mass, comorbidities, ASA scores, Mallampati scores, difficult airway history, preoperative and postoperative neurologic examinations, mask ventilation, type of cervical pathology, muscle relaxant used in induction, position of the surgery, complications were collected from their charts.

Results: Fiberoptic intubation was performed in patients who were operated on due to cervical trauma and dislocation. In the patients that had not documented cervical trauma and dislocation, the proportions of laryngoscopy and videolaryngoscopy use were the same. There was no significant difference between the types of muscle relaxant used and intubation methods. In all the patients, preoperative and postoperative neurological examinations were compared. In total, 5 patients develop postoperative neurologic deterioration but there was no relation to the airway devices used.

Conclusion: Based on this data, we concluded that the airway management must be both safe enough to protect cervical stability and fast enough not to cause hypoxia. If there was any doubt of cervical instability, fiberoptic intubation (awake or under anaesthesia) must be preferred. If there is not enough experience, videolaryngoscopy also can be used.

Keywords: cervical instability, cervical surgery, airway management

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THE EFFECTS OF DEXMEDETOMIDINE INFUSION ON TOURNIQUE-INDUCED ISCHEMIA REPERFUSION INJURY IN TOTAL KNEE REPLACEMENT SURGERY UNDER SPINAL ANESTHESIA.

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Objective: This study aims to measure the effects of dexmedetomidine on tourniquet-induced Ischemia reperfusion Injury with respect to malondialdehyde (MDA) and total antioksidan capacity (TAC) blood levels, in patientst undergoing total knee replacement surgery under spinal anesthesia and sedation.

Methods: After having obtained ethics committee approval, 60 ASA I-III patients scheduled for total knee replacement were included in the study under spinal anesthesia. Patients were randomized into two groups as Group D (dexmedetomidine; n=31) and Group K (Ketamine; n=29). Both groups received spinal anesthesia with bupivacaine 0. 5%, 15 mg. Group D received dexmedetomidine 0, 1 mcg/kg loading dose in 10 minutes, followed by a continious infusion at a rate of 0. 2-0. 7 mcg/kg/h. Ramsey Sedation Scale (RSS) at level 4, whereas Group K recieved 0. 9% NaCl in an equivalent volume and rate. Intra-Operative Hemodynamical parameters, peripheric oxygen saturation and sedation scores (Ramsey sedation scale (RSS) levels were recorded. Blood samples for MDA and TAK levels were obtained prior to spinal anesthesia (B), at one minute before tourniquet release (i), and 15 minutes after tourniquet release (R).

Results: Groups were similar regarding patient demographics, anesthesia-surgical data and tourniquet times. Plasma MDA levels were lower during the reperfusion period compared with basal levels in both groups. Groups were similar regarding MDA and TAC levels. The plasma TAC level was reduced during ischemia and reperfusion periods in Group D and during reperfusion in Group K

compared with basal levels. There was no difference for hemodynamical parameters and peripheral oxygen saturation between two groups. The sedation scores in Group D were higher than in Group K.

Conclusion: Dexmedetomidine has no effect on tourniquet-induced ischemia/reperfusion injury with respect to plasma MDA and TAC levels, in patients undergoing total knee replacement surgery under spinal anaesthesia.

Key Words: Dexmedetomidine; Ischemia reperfusion injury; Total knee replacement surgery; Tourniquet

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SESSION-7

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Chairs: Bahar Öç, Seyhan Yağar

IS NEAR INFRARED SPECTROSCOPY (NIRS) USEFUL FOR ASSESSING POSTOPERATIVE NEUROLOGIC COMPLICATIONS DURING CAROTID ENDARTERECTOMY?

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Introduction and Aim: Carotid endarterectomy (CEA) is beneficial for both symptomatic and asymptomatic patients with high-grade carotid artery stenosis. Near Infrared Spectroscopy (NIRS) based technology can be used to monitor cerebral perfusion changes during CEA. We aimed to assess the relation between changes in NIRS and postoperative neurological complications in patients undergoing CEA surgery with carotid artery clamping.

Material and Methods: After Ethics Committee approval, study was conducted by retrospectively analyzing the data from 61 patients undergoing CEA surgery with unilateral carotid artery clamping under general anesthesia. Patients were divided into four groups according to contralateral carotid artery occlusion level and symptomatology. Group T (symptomatic, total occlusion, n=10), group S50 (symptomatic, occlusion >50%, n=19), group AS60 (asymptomatic, occlusion >60%, n=25) and group NL (no occlusion, n=7). Standard monitoring and anesthesia protocol were used for all patients. Bilateral continuous NIRS (rSO₂) monitoring was applied during and after surgery and all data were recorded with a computer. A decrease of >20% from baseline of rSO₂ were considered significant reduction in regional cerebral perfusion. Carotid clamping time, any episode of postoperative neurological deficit, TIA and stroke were recorded. Patients who

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received re-operations and emergency surgery were excluded. All patients' demographic data were recorded. Results were analyzed with Students t test and chi-square test as appropriate, $p < 0.05$ was considered as significant.

Results: Patients were similar regarding demographic data ($p > 0.05$). There were no difference between the four group regarding rSO_2 levels at all times ($p > 0.05$). Especially, in carotid clamping period rSO_2 changes were similar in all groups. In the group AS60, only one patient rSO_2 levels decreased 42% from baseline and experienced TIA after surgery. Following the operation there were no additional neurological abnormalities in any patient. Carotid clamping time was similar between the groups ($p > 0.05$).

Conclusion: Our initial results indicate that NIRS monitoring may be is useful for identifying patients who would experience a postoperative neurologic deficit after intraoperative cerebral desaturation due to carotid clamping. Routine NIRS monitoring may serve as a guide for postoperative complication after CEA. Further studies with large group of patients are needed to assess the true value of NIRS monitors in patients undergoing CEA.

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PROTECTIVE EFFECT OF NERIUM OLEANDER ON TYPE 2 DIABETIC RAT HEART ELECTROPHYSIOLOGY

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INTRODUCTION AND AIM: Non-insulin-dependent diabetes mellitus (NIDDM) (diabetes mellitus type 2) is a metabolic disorder that is characterized by high blood glucose in the context of insulin resistance and/or relative insulin deficiency. Diabetes must take its place alongside the other major risk factors (stroke, peripheral arterial disease, nephropathy, retinopathy, and possibly neuropathy) as important causes of cardiovascular disease (CVD), more specifically diabetic cardiomyopathy.

Although the hypolipidemic and hypoglycemic potential of NO have been screened, there have been no reports on the possible therapeutic and/or protective effect of NO on the diabetic cardiomyopathic changes. Therefore current study aims to investigate the possible role of NO distillate (375 µg/0.5 ml dH₂O/day) on the diabetic cardiomyopathy (both for therapeutic and for protective potential).

MATERIAL and METHODS: Type 2 diabetes was induced by combination of single dose streptozotocin injection (35 mg/kg) and high fat diet for four weeks. Experimental groups were designed as follows: control, diabetic, restorative-NO treated diabetic and protective-NO treated diabetic. Intracellular action potentials (AP) and contractile activities were measured from left ventricular papillary muscle strips as well as histopathological examination of heart tissue and biochemical examinations of serum were performed.

RESULTS: Type 2 diabetes induced AP prolongation was prevented with both ways of NO treatments. Moreover, treatments produced nearly complete restorations of diabetes-induced depressed amplitude and altered kinetics of contractile activities. In parallel to electrophysiological parameters, both histopathological and biochemical results indicates the NO induced beneficial effects on the diabetes related alterations.

CONCLUSION: The current study has for the first time shown that NO applications for both treatment and protective purposes have promising positive effects on diabetes induced alterations. The detailed molecular mechanisms of these positive effects, either on the basis of ionic currents or on the structural ones, need further investigations.

KEY WORDS: Type II diabetes, cardiomyopathy, Nerium oleander, heart, electrophysiology.

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THE EFFECTS OF NIRS (NEAR INFRARED SPECTROSCOPY) USE ON POSTOPERATIVE EARLY NEUROCOGNITIVE FUNCTIONS IN GERIATRIC PATIENT GROUP TO UNDERGO HIP SURGERY

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INTRODUCTION AND OBJECTIVE: Postoperative cognitive dysfunction (POCD) is one of the complications known to develop following a major surgery, particularly among geriatric patients (1). In the present study, we attempted to determine the effects NIRS use in prevention of early neurocognitive dysfunctions in geriatric patients to undergo hip surgery under general anesthesia.

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MATERIAL AND METHOD: 60 patients in ASA I-III risk group to undergo hip surgery under general anesthesia were included in the study. All subjects, who had not received premedication, were administered neurocognitive tests, consisting of preoperative Montreal Cognitive Assessment (MoCA) Scale and Mini Mental Test (MMSE). The subjects were randomly assigned to 2 groups: Group N (to be followed up for rSO₂, n=30) and Group C (Control Group, n=30). Cerebral oximeter monitor in Group N was observed, and the values were recorded at certain intervals after basal values were obtained. During anesthesia administration, we tried to keep basal values of rSO₂ over 75%. Group C was corrected using iv fluids or vasoconstrictor agents.

RESULTS: There was no significant difference between the groups in terms of demographic data. We found a moderate positive correlation between preoperative Hb values and cerebral rSO₂ values. No statistically significant difference was found between MOCA results ($p>0,05$) and MMSE values ($p>0,139$) on preoperative and postoperative day 1 in Group N. Yet, statistically significant difference was found between MOCA results ($p=0,001$) and MMSE values ($p<0,001$) on preoperative and postoperative day 1 in Group C. Postoperative MOCA values were significantly lower than preoperative MOCA values.

DISCUSSION and CONCLUSION: Cerebral oximetry is a reliable marker of cerebral oxygenation changes caused by hypoxemia (2). It was reported that preoperative and postoperative cognitive dysfunction is present in geriatric patient population with hip fracture, and this is correlated with low cerebral oximetry values (3). The fact that the study group in our study had lower postoperative neurocognitive dysfunction compared to control group demonstrates the importance of cerebral monitoring conducted during preoperative period.

In conclusion, we believe that use of cerebral oximetry peroperatively in geriatric patients to undergo hip surgery is important in terms of preservation of cognitive functions.

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ANESTHESIA EXPERIENCES FOR LASER AIRWAY SURGERY

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INTRODUCTION / BACKGROUND

The laser technology used in many areas today, also has a wide range of applications in the medical field. Especially in surgery, the advantage of microscopic incision, maintaining good hemostasis, providing surgical site without bleeding and less postoperative pain are a great advantage for the patient and surgeon. In this case report, we have discussed the anesthesia management, complications, possible problems and preventive measures in patients undergoing laser surgery at department of Ear Nose Throat (ENT) surgery, Dışkapı Yıldırım Beyazıt Training and Research Hospital.

CASE

6902 patients were operated in 5 operating theatres of ENT surgery between the years 2014 to 2015. Total 88 patients were operated with laser surgery. Among them, 6 patients were underwent subglottic tumor resection, 46 patients were applied cordectomy, 36 patients were dilated subglottic stenosis and laryngeal web excision. The five patients managed with high frequency jet ventilation and the 21 patients that 11 of them were pediatric group applied apneic ventilation for laser surgery. Any complications such as hypoxia, hypercapnia, atelectasis, pneumothorax, pneumomediastinum and burns on the airway did not occur.

RESULTS / DISCUSSION

Sharing the airway with surgeon in laser surgery may complicate airway control for anesthetist. Thus the cooperation between the surgical team and the anesthesiologist is especially essential for the laser surgeries. It is important to ensure adequate depth of anesthesia, adequate oxygenation, elimination of CO₂, maintaining specific monitoring (transcutaneous blood gas monitoring), and applying specific ventilation techniques such as (high frequency jet ventilation, apneic ventilation) at anesthesia management for laser airway surgery. Anesthetists should always be prepared for airway fire.

**USE OF SUGAMMADEX IN DEPARTMENT OF ANAESTESIOLOGY
AND REANIMATION, DIŞKAPI YILDIRIM BEYAZIT TRAINING
AND RESEARCH HOSPITAL**

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INTRODUCTION / BACKGROUND

Sugammadex is a new agent directly linked to neuromuscular blocking agents and is manufactured as an alternative to anticholinesterase drugs. It is popular in anesthesia practice because of its fast-acting and safe profile. As a new agent in anesthesia practice, we planned a survey on consumption of sugammadex in daily practice.

MATERIAL and METHODS

The study was conducted on 58 members of Anesthesia and Reanimation clinic of Dışkapı Yıldırım Beyazıt Training and Research Hospital. Participants were asked 18 questions, enquiring about their practice in the use of sugammadex. Demographic data, frequency of sugammadex consumption, clinical situations where it is preferred or not, and side effects of sugammadex were asked in the survey.

RESULTS

Responses were collected from all over anesthesia groups. Sugammadex were most commonly used in Ear Nose and Throat (ENT) clinic (%36 respectively). % 89, 7 of participants 'sometimes' were using sugammadex in adult patients who were operated electively. It were used most in case of 'cannot ventilation-cannot intubation'(%30, 4). From there spondents, %35, 2 didn't want to use for sugammadex is an expensive agent and half of the group stated the most important disadvantage of sugammadex was 'to be expensive'. Half of the participants did not know the side effects of sugammadex and %96, 9 from the respondents had not witnessed sugammadex side effects and also believed that sugammadex is safer than other anticholinesterase agents.

CONCLUSIONS

According to the survey sugammadex is mostly preferred in ENT clinic and especially in 'cannot intubate – cannot ventilate ' situation. Although sugammadex is an expensive agent, it's believed to be superior than other cholinesterase inhibitors.

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Chairs: Nurten Bakan, Şennur Uzun

KNOWLEDGE OF PATIENTS ABOUT ANESTHETISTS: A CROSS-SECTIONAL STUDY FROM TURKEY

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Background:

It is important for anesthetists to establish an instructive and revealing relationship with patients, in order to combat their fears and to provide wholesome perioperative period. However, patients mostly don't meet their anesthetists before operation and learn from other health care professionals necessarily (1).

This cross-sectional study was planned to assess the perception of Turkish patients toward anesthetists at a teaching hospital in Ankara.

Methods

A survey designed to evaluate patients' knowledge and preferences toward anesthetists was completed by 1994 patients attending preanesthetic evaluation clinic at a teaching hospital.

Results

A total of 2010 patients were enrolled; however; 0. 7% didn't complete the survey. Among 1994 patients, 1. 9% were illiterate. When reviewed in the aspect of prior anesthetic experience; it was found to be 58. 1%. Of all patients 66. 3% knew that an anesthetist was a medical doctor specialized in anesthesia. Only 37. 4% told that an anesthetist was also in charge of intensive care unit. The most feared issue about anaesthetical issues was not waking up after operation (22. 5%). Most patients (63. 7%) didn't find anesthetists as explanatory and wanted to get more information from the anesthetists.

Conclusion

The available data from this study suggest that there has been a favorable development in the public largely about the role of an anesthetist. For position of our specialty, besides our educational effort; an important task falls to other practitioners, as well; due to the limited time we spend for communicating with patients (2). Thus, we should give importance in spread of large-scaled studies

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about anesthesia and anesthetists; not only in the public; but in the current health care environment, also.

Key words: anesthetist, information, public, medical community

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CAN ONDANSETRON BE USED IN THE TREATMENT OF SUBDURAL BLOCK?

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As with other neuroaxial techniques, subdural block can also occur associated with caudal anesthesia. However, there are no clear guidelines in the treatment of subdural block (1). This report presents a pediatric case with subdural block that showed rapid recovery after i. v. ondansetron administration.

Case Report

A 6-year-old healthy boy weighing 20 kg was taken to the operating theatre for circumcision. After general anesthesia induction, caudal analgesia with bupivacaine 40 mg (2 mg/kg) diluted with 20-ml serum physiologic was administered in 1-minute period after negative aspiration. At the end of the operation that lasted for a duration of 10 minutes, the patient did not have respiration but had pupil dilatation and unconsciousness despite discontinuation of inhalation anesthetics for which the patient was thought to have subdural block. At 20 minutes after completion of surgery, i. v. ondansetron 4 mg (0. 2 mg/kg) was administered, and the patient achieved spontaneous respiration, normal pupil diameters and regained consciousness within 2 minutes after administration.

Discussion

The patients developing accidental subdural block must be closely monitored and cardiovascular as well as respiratory support must be provided if sensorial block develops (1). We administered 5-HT₃ antagonist ondansetron i. v. due to studies by Mowafi et al. (2), who reported the use of granisetron accelerated reversal of sensorial block developing during spinal anesthesia with bupivacaine, and Fassoulaki et al. (3) who reported the use of ondansetron antagonized the effects of sensorial block during spinal anesthesia with lidocaine. Our aim was to rapidly reverse subdural block. Approximately 2 minutes after drug administration, the patient achieved spontaneous respiration unexpectedly and suddenly, pupil dilation disappeared and the patient showed complete recovery. It is difficult to explain the mechanisms of these actions; however descending serotonergic system at the level of spinal cord has antinociceptive properties as noted in the literature. Systemic administration of ondansetron is considered to affect these mechanisms. It is certainly very difficult to perform controlled studies on this subject; however, the findings of this case are very interesting and a single dose i. v. ondansetron can be attempted in such patients.

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SMARTPHONE USE OF ANESTHESIA PROVIDERS DURING ANESTHETISED PATIENT CARE

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Objective: Smartphones are being used in many areas of anesthesia practice. Concerns about the use of smartphones in the operating room for non-medical purposes, however, is increasing in editorial articles. We try to learn about

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their smartphone use habits and views of anesthesia providers in this survey.

Materials and methods: A questionnaire consisting of 14 questions about their smartphone usage habits during anesthesia care sent to anesthesia providers.

Results: 955 participants answered our survey interval between November-December 2015. 66.3% of respondents regularly use smartphones during the anesthetized patient care. Phone calls (65.4%), messaging (46.4%), social media (35.3%), surfing the internet (33.7%) are the most common purposes, respectively. But, the question whether smartphones were used during critical stages of anesthesia was replied as either "never" or "seldom" (96.7%). Most of the respondents (87.3%) stated that they never distracted because of smartphone use. However, the proportion of colleagues encountered such a distraction, "I have never met" rate of those fallen to 58.4%, and at a rate of 5.6% as "I've had more than 5 times" they replied. **Discussion-Conclusion:** According to the results of the survey as smartphones often are used in the operating room for non-medical purposes, evidence-based data will require the restriction of the use of smartphones is not yet available.

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SEDATION PRACTICE ADMINISTERED OUTSIDE OF THE OPERATING THEATRE BY NON-ANESTHESIOLOGISTS

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Introduction: Sedation and analgesia are commonly applied by non-anesthesiologists during various minimally invasive diagnostic and therapeutic procedures with technological and pharmacological improvements. American Society of Anesthesiologists (ASA) has developed a guideline to minimize associated complications during these procedures¹. The aim of this study was to evaluate the sedation practice by non-anesthesiologists in our hospital using a questionnaire in order to exemplify the situation in Turkey.

Methods: Data was collected via a questionnaire conducted to 100 non-anesthesiologist residents applying sedation and analgesia in their routine practice. The questionnaire included information about pre-procedure patient evaluation, fasting period, monitoring, drugs used, recording of sedation, availability of emergency equipment, follow-up procedure during recovery, complications and training of personnel in basic and advanced life support.

Results: Majority of the procedures were applied in wards, intensive care units and cardiac catheterization laboratories. Midazolam, opioids and propofol were the most commonly used sedative and analgesic drugs. Thirty-five percent of the participants didn't have any sedation protocols in their departments. Before the sedation, 38% of participants didn't recommend fasting. The least monitoring ratio during the procedure was in pediatrics department (58. 3%). The highest ratio of presence of a recovery room with the capability of monitored care was in cardiology department with 47. 1%. Overall incidence of facing at least one complication was 60% and there was no significant difference between departments in terms of complication ratio. Hypoxia, hypotension and prolonged sedation were most commonly seen complications. Although 92% of participants had a certificate of basic life support provider, the ratio of having a certificate of advanced life support provider decreased to 32%.

Conclusion: Major safety issues to be improved during sedation applied by non-anesthesiologists in our hospital seem to be selecting appropriate patients by pre-procedural evaluation, record keeping, establishing appropriate sedation protocols and training. In Turkey, there isn't any educational program for non-anesthesiologist doctors administering sedation. We suggest that each hospital should develop their own policy for sedation protocols at least guaranteeing the qualification of doctors administering sedation in advanced life support.

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ASSESSMENT OF THE PATIENTS WITH MORTALITY AFTER ERCP

Nurten Bakan, Gülşah Karaören, Şenay Göksu Tomruk, Mehmet Erdem Akçay, Ahmet Yıldırım, Semra Yanık

ERCP is a high quality but invasive procedure performed for diagnosis and treatment of biliary tract, pancreatic tract and periampullary region diseases. Severe pain, hypertension, hypotension, bradycardia, desaturation, abdominal discomfort, dizziness are adverse events that can be seen during the procedure, beside this, severe cardiovascular complications (dysrhythmias, cardiac arrest) are more likely to occur in patients who are already severely ill (ASA>III, besides acute cholangitis, in those with substantial comorbidities.) Risk factors for cardiopulmonary complications include known or unsuspected premorbid condi-

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tions, and problems related to anxiety, and insufficient analgesia. To facilitate the surgeon's work, to ensure patient safety and comfort, patients need to be sedated and followed closely with monitorisation (1).

Method

Standard monitoration and sedoanalgesia protocol (dormicum 0, 02mg/kg, fentanyl 1mcg/kg, propofol 1mg/kg bolus/**intermittent**) is used for 1471 ERCP procedure from 2011. 10 patients had complications during procedure and internalize at ICU. 7 of them (0, 47%) had died. Average ASA score of patients who had been lost was 2, 57 and 2, 33 who survived. Charlson Comorbidity Index 3, 28; 3, 00 (**Tablo 1**).

Discussion

The causes of death in all of the reported series cover the spectrum of commonest complications resulting from pancreatitis, bleeding, perforation, infection (sepsis), and cardiopulmonary events (myocardial infarction, cardiac dysrhythmia). In 21 selected surveys, involving 16, 855 patients, cardiovascular and/or analgesia-related complications amounted to 173 (1. 33%), with 9 fatalities (0. 07%) (2).

Conclusion:

ERCP remains the endoscopic procedure that carries a high risk for morbidity and mortality. Complications continue to occur at a relatively consistent rate. The majority of events are of mild-to-moderate severity. Therefore ERCP procedures should be applied under sedation and / or analgesia and must be closely monitored with the methods of monitoring of patients.

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	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7
BMI	29	33	30	34	31	19	24
Smoking (Pack-years)	10		40		20		
Apache II	36	42	38	41	21	42	31
CCI	3	4	3	3	4	2	2
Emergency surgery	+	+	+	+			
Pneumothorax		+	+			+	+
Severe dysrhythmia				+	+		
AMI	+			+	+		
Respiratory arrest	+			+	+		
24 th ex	+			+	+		

Table 1: Patient characteristics (n=7).

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SEDATION AND ANALGESIA IN ELECTIVE COLONOSCOPY PROCEDURE; COMPARING TO KETAMINE, FENTANYL AND MEPERIDINE

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Background and Objective: Colonoscopy is painfull endoscopic procedures so It should made under sedation.

In this prospective, randomized study we to compare one dose of ketamine, meperidin and fentanyl applied right before the procedure regarding the hemodynamics, sedation levels, postoperative recovery times in elective colonoscopy procedure.

Method: After approval of ethics committe and receiving written consent, ninety patients, aged 18-70 years with ASA I-III were included.

Patients were randomized to 3 groups as providing sedation via 0. 5mg/kgIV ketamine(Group-K), 0. 5mg/kgIV meperidin(Group-M) and 0. 5mg/kgIV fentanyl(Group- F) during colonoscopy.

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0. 5mg/kgIV propofol and 1mgIV midazolam were administered to all patients before the study drug.

Parameters assessed: demographic data, hemodynamic data, SpO₂, respiration rate, Ramsey sedation scores (RSS), Visual Analog Scale (VAS) and side effects during and after the procedure.

It was planned to achieve RSS >2, apply an extra dose of propofol(10 mg IV) when RSS<2, and to apply 50microgramIV fentanyl to the patients feel pain.

The time between the end of the procedure to reaching Aldrete10 has been recorded. After the procedure the patient's and doctor's satisfaction was recorded(bad, moderate, good).

Findings: 30patients were recruited in each study group. Demographic data, duration of procedure, SpO₂, hemodynamic measurements and respiration rate were similar.

Significantly, Group-K has high RSS during first 5minutes, heart rate was low in Group-F in first minute and lower than Group-K in other measurements and SpO₂ value was found higher in the Ketamine group than Group-M(p<0. 05).

No additional analgesics were required, no complications has been observed. Sedation time was found long in Group-K and Group-F have reached Aldrete-10 level earlier than the other groups. Patient satisfaction was found significantly higher in Group-K, then Group-F(p<0. 05). Doctor satisfaction was found significantly higher in Group-K, then other groups(p<0. 05).

Discussion and conclusion;

In conclusion, all 3 agents can be used for sedoanalgesia during colonoscopy procedures, and doctor satisfaction was higher in Ketamine group, compared to the other groups based on the high RSS, however, time of recovery can be longer. In Fentanyl group, a more stable hemodynamy and a shorter recovery time has been observed.

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FAILED INTUBATION IN AN INFANT WITH ANTICIPATED DIFFICULT AIRWAY: HIGH DOSE SUGAMMADEX AS A RESCUE DRUG

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Introduction: Perioperative management of burn-injured children may be challenging especially in terms of airway problems, fluid resuscitation, vascular access, cardiovascular instabilities, regulation of body temperature and postoperative pain management (1). In this case report, we aimed to share difficult airway management in an infant with post-burn contractures at neck and whole face.

Case report: A 7 month-old, 5 kg male patient who had many contractures due to fourth degree burn on whole body including neck, mouth and nose was scheduled for skin grafting to right arm by plastic and reconstructive surgery. The pre-operative assessment revealed no mandibular mobility and severely contracted oral commissures making mouth opening impossible. Fiberoptic intubation while protecting spontaneous respiration was planned for airway management. Sedation was achieved with 5 mg ketamine and 1 mg midazolam and oxygen was supplied with a nasal airway. Atropine 0.01 mg/kg was administered for antisialagogue premedication. After insertion of fiberoptic bronchoscope from mouth, vocal cords were difficultly seen but intubation failed due to both anatomical difficulties and airway reflexes. The second attempt after administration of 1 mg/kg rocuronium also failed probably due to airway collapse. We were unable to see the vocal cords in the third attempt of intubation via videolaryngoscopy. Due to the difficulty with mask ventilation and decreased SpO₂ (60%), 10 mg/kg sugammadex was administered immediately to reverse rocuronium and oxygen supply was proceeded with nasal airway. A few seconds later, the patient started to breathe spontaneously and oxygen saturation returned to normal levels. Concerning future need for multiple surgeries, tracheotomy was performed by ENT surgeons under sedation maintaining spontaneous ventilation. After skin grafting was completed uneventfully, the patient was transferred to intensive care unit.

Discussion: Securing the airway in a pediatric patient with generalised contractures at face and neck due to a burn injury can be impossible even for the experienced anesthesiologists. The team should be prepared for a 'cannot intubate, cannot oxygenate' scenario to immediately perform emergency invasive airway access. In cases which rocuronium was used, high dose sugammadex can be considered as a rescue drug to add safety to the difficult airway algorithm.

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May 20, 2016, Friday
SESSION-8

14: 30-15: 45
Chairs: Nurten Bakan, Şennur Uzun

COMPARISON OF THE RESULTS OF NUMBER 4 AND 5 I-GEL SUPRAGLOTTIC AIRWAY DEVICE IN MEN: PRELIMINARY STUDY

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Introduction and Aim: Airway management is one of the most important and basic issues in the anesthesia practice. I-gel is one of the most popular supraglottic airway devices in the airway management practice. The aim was to compare number 4 and 5 I-gel supraglottic airway devices in men undergoing minor operations under general anesthesia in terms of best fitting size, hemodynamics, airway pressures, ventilation parameters and complications.

Material and Methods: In this preliminary study, 50 male patients (aged 18-65 years) were randomized into two groups according to the size of the I-gel device. In every patient, standard anesthesia protocol was applied. The selected I-gel was placed after adequate anesthetic depth was achieved. Time for insertion, number of attempts, and insertion success were recorded. After evaluation of the compatibility of the I-gel with a fiberoptic bronchoscopy in accordance with the established airway anatomy, positive pressure ventilation was applied in order the airway pressure not to exceed 20 mmHg and the oropharyngeal seal pressure was measured and recorded. Intraoperative and postoperative complications (at the postoperative 1st and 24th hours) were also evaluated.

Results: There was no statistical difference between the two groups regarding the demographic data, insertion time, number of attempts, oropharyngeal seal pressure, intraoperative and postoperative complications ($p > 0.05$). Increase in the mean arterial pressure after the induction was more in I-gel 5 group than in I-gel 4 group ($p = 0.02$). The successful insertion rate at the first attempt was 100% in I-gel 4 group while 82.5% in I-gel 5 group and this difference was statistically significant ($p = 0.015$). The optimal settlement of the device in fiberoptic bronchoscopic imag-

ing was found as 66. 6% in I-gel 5 group while 33. 3% in I-gel 4 group and this difference was statistically significant ($p=0. 0$).

Conclusion: Although hemodynamic responses were higher in I-gel 5 than I-gel 4 group, optimal placement was better in I-gel 5 group. The successful first attempt insertion rate was 100% in I-gel 4 group. Opposed to the company's recommendation, insertion success rate of I-gel 4 was found 82. 5% and failed insertion rate was found 16. 2% so that patient weight isn't enough for considering appropriate size of I-gel.

Key words: I-gel, supraglottic airway device, fiberoptic bronchoscopy, general anesthesia

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SESSION-9

15: 45-17: 00
Chairs: Ahmet Eroğlu, Derya Özkan

THE EFFECT OF PATIENT POSITION DURING INDUCTION OF SPINAL ANESTHESIA ON EARLY COMPLICATIONS OF SPINAL ANESTHESIA IN ARTHROSCOPIC KNEE SURGERY

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Background and aim: Spinal anesthesia is commonly induced at lateral and sitting position. The aim of this prospective, randomized study is to compare the early complications of spinal anesthesia at sitting and lateral position in patients who are planned to undergo arthroscopic knee surgery.

Material and methods: This study was performed on total of 100 patients between the ages of 18-65, ASA 1-2 physical status undergoing arthroscopic knee surgery. Spinal anesthesia was performed in the sitting position (Group S) 48 of patients, in the lateral decubitus position (Group L) 52 of patients. After anti-septic conditions, 22 gauge Quincke spinal needle is inserted into subarachnoid space with median approach at level of L2-3 or L3-4. After free CSF flow is observed in each patient, hyperbaric 0. 5% bupivacaine is administered at dose of 15 to 17. 5 mg. After local anesthetic agent is administered, patients are immediately switched to supine position. Sensorial and motor block levels of spinal anesthesia were determined. Th10 level was deemed as sufficient sensorial block level for operation. Heart rates and blood pressures (systolic-diastolic-mean) were recorded before and after spinal anesthesia at five minutes intervals.

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Results: There is no statistically significant intergroup difference regarding demographic, heart rate, volume of fluid infused, intervertebral disc level used for LP and level of sensory block as well as need to atropine, adrenalin and ephedrine.

The values of systolic, diastolic and mean arterial blood pressures were significantly lower in the lateral decubitus position at 1, 5, 10, 15 and 60 minutes after spinal anesthesia induction than those in the sitting position ($p < 0.05$). The mean time to achieve T10 level and motor block onset time were significantly longer in the sitting position compared with lateral decubitus position ($p < 0.001$).

Discussion and Conclusion: Our study demonstrated that induction of spinal anesthesia led to a significant decrease in arterial blood pressures of lateral group in comparison with the sitting group. Moreover, it is also demonstrated that time to onset of motor and sensory blocks were significantly shorter in the lateral group. These results demonstrate that lower volume of anesthetic agent flows at cephalic direction at sitting position when compared with lateral position after subarachnoid injection.

Conclusion: Considering blood pressures changes, induction of spinal anesthesia at sitting position may be safer compared with lateral decubitus position.

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Chairs: Ahmet Eroğlu, Derya Özkan

FACTORS AFFECTING THE DURATION OF ADMISSION AND DISCHARGE IN A PALLIATIVE CARE CENTER FOR GERIATRIC PATIENTS

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Introduction-aim: The factors that have an impact on the stay and discharge of geriatric patients who were admitted to palliative care center (PCC) were investigated.

Materials and Method: 111 were included in the study. Age, gender, marital status, primary diagnoses, nutritional status, decubitus ulcer, pain issues, palliative performance scale (PPS) scores, duration of PCC and “wanting to be discharged” status of patients were recorded.

Results: Distribution of patients were as follows: neurological disease 47 (42. 3%), cancer 26 (23. 4%), chronic systemic conditions 46 (41. 4%), infections 12 (10. 8%), nutritional problems 58 (52. 2%), decubitus ulcers 45 (40. 5%) and pain 14 (12. 6%). The median duration of PC was 24 days. Duration of hospitalization in patients with nutrition and decubitus ulcers were detected longer ($p < 0. 05$). “Wanting to be discharged” rate was lower in patients with neurological disease, poor PPS scores, decubitus ulcer and nutritional problems whereas higher in patients with cancer. According to the binary logit model, a diagnosis of cancer and PPS score were increased whereas nutritional problems and decubitus ulcers were decreased the probability of wanting to be discharged.

Discussion: Specific health problems associated with aging and multi-systemic conditions in geriatric patients are associated with an increased need for palliative care. However, the availability of palliative care services is far from adequate, even in developed countries. Obviously, the existing palliative care facilities should also function more efficiently to meet the increasing requirements for palliative care.

Conclusion: A coordinated effort between palliative care and home health care may shorten the duration of in-patient palliative care and hasten the process of discharge.

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Chairs: Ahmet Eroğlu, Derya Özkan

TRAUMATIC BRAIN INJURY AND PALLIATIVE CARE IN TURKEY

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BACKGROUND AND PURPOSE: Traumatic Brain Injury(TBI) is seen more in young adults in economically developed countries. Patients with disability can encounter physical, mental, cognitive, social and economic problems. The acceptance of TBI is a difficult situation, which affects the patient, the social network of the family and the community. Although TBI is seen throughout the

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world, the need for palliative care(PC) in TBI and the limits of the care requirement are not known.

MATERIAL AND METHODS: A retrospective examination was made of the records of 49 TBI patients in the PCC between 2013 and 2016. A record was made of the age and gender of the patients, the duration of PCC stay, the cause of TBI, diagnosis, Karnofsky Performance Status(KPS), Glasgow Coma Score(GCS), Glasgow Outcome Scale(GOS), discharge status, mobilisation status, form of nutrition(oral, PEG) and pressure sores. In addition, the patients were separated into 3 groups of mild, moderate and severe in respect of GCS, GOS and KPS.

RESULTS: The study included a total of 49 patients with a mean age of 45. 4±20. 2 years. The median stay in PCC was calculated as 34. 0 days. Patients in the severe GCS group were determined to be those who were not mobilised, with a tracheostomy, PEG nutrition and had pressure sores. No difference was found between those discharged and others in respect of tracheostomy, PEG, mobilisation and pressure sores.

DISCUSSION: There is very little data, even almost negligible, related to the PC needs of patients with head trauma. This study examining the PC needs, duration of hospitalisation and discharge status of TBI patients is important as the first study in this field in Turkey. To improve the quality of life of TBI patients, it is important to determine the PC requirements and to integrate PC with other services according to the principles of PC.

CONCLUSIONS: TBI patients followed up in PCC were determined to be relatively young patients with mobilization and nutrition problems and pressure sores. As TBI patients require complex treatment, from the time of admittance to ICU, PC services should be provided integrated with clinical applications.

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VIDEOLARYNGOSCOPY USE IN EXCHANGING ENDOTRACHEAL TUBE WITH NASOTRACHEAL TUBE INTRAOPERATIVELY IN A PATIENT WITH APERT SYNDROME

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INTRODUCTION: Apert syndrome is an autosomal dominantly inherited rare disease, characterized with cleft palate, syndactily, coronal synostosis, midfacial

hypoplasia, hypertelorism, central nervous system, cardiac and kidney abnormalities. Nasotracheal intubation may be required for certain procedures, but may not be performed easily due to abnormal facial anatomy¹. We present, the intraoperative exchange of an oral endotracheal tube (ETT) with nasal ETT by videolaryngoscopy in a patient with Apert Syndrome undergoing Lefort I osteotomy for maxillary protrusion.

CASE: A 17-year-old patient with Apert syndrome was scheduled for maxillary protrusion surgery. Nasotracheal intubation was required for surgery, however was not possible due to the narrow passage of nasal airway (figure 1). The surgery was decided to be started with orotracheal intubation and an exchange with nasotracheal tube was planned intraoperatively after maxillary osteotomy. The Mallampati score was I and oral intubation was easy. After establishing the mobility to widen the nasal passage by the maxillary osteotomy, the anesthetist was prepared to perform nasotracheal intubation in the surgical area under sterile conditions. Despite aspiration, larynx could not be visualized by direct laryngoscopy because of the bleeding and maxillary mobility. By using videolaryngoscopy, larynx was visualized and the nasotracheal tube was advanced next to the orotracheal tube. When both tubes were visualized, the blood in the area was aspirated, then the orotracheal tube was withdrawn and the nasotracheal tube was inserted to the trachea (figure 2). The surgery was completed without any complication and the patient was transferred to the ICU, intubated.

DISCUSSION: In patients with Apert syndrome, scheduled for maxillary protrusion or dental procedures, nasotracheal intubation is generally required to optimize the exposure of the surgical site. There are reports addressing alternative airway management techniques for nasotracheal intubation in these patients ¹. ². If the nasal passage is wide enough to insert an ETT, methods including warming of the ETT or advancing the ETT by using a soft urethral catheter on the tip, to decrease the bleeding and trauma in the airway can be used².

In our patient, the nasal passage was not wide enough for the ETT. Consulting with the surgeon, after the maxillary mobility was provided and the nasal passage was widened, nasotracheal intubation was performed. The maxillary instability and the blood in the airway made direct laryngoscopy difficult to perform and videolaryngoscopy was performed instead.

CONCLUSION: When it is necessary to exchange an ETT during the surgery, in which the surgical procedure and bleeding make it difficult to visualize the laryngeal inlet with direct laryngoscopy, videolaryngoscopy can be considered as an alternative.

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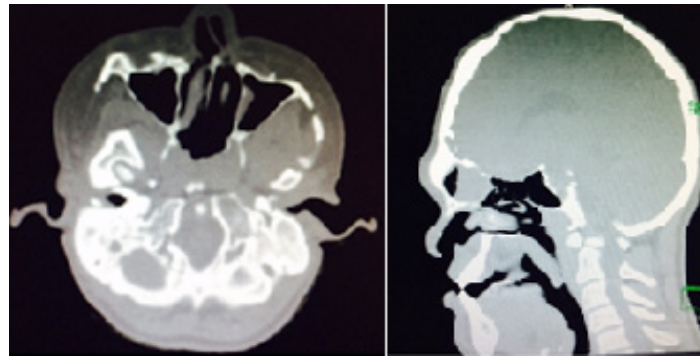


Figure 1

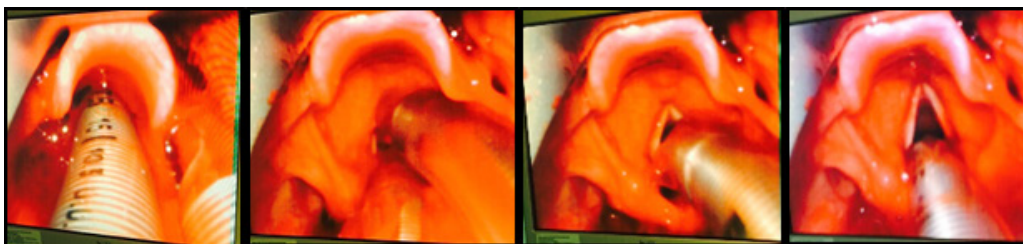


Figure 2

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Chairs: Ahmet Eroğlu, Derya Özkan

PNEUMOCEPHALUS FOLLOWING EPIDURAL BLOCK FOR LABOR ANALGESIA

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Objective

Lumbar epidural block is a popular and efficient technique for providing labor analgesia. Pneumocephalus is a rare complication of epidural blocks and can be

described as existence of air bubbles in cranial spaces. Our purpose is to report a case who had newly onset headache during epidural block for labor analgesia and diagnosed with pneumocephalus after initial CT scans.

Case Report

A 29 year old, 39 weeks pregnant G1 P0 female with no accompanying systemic diseases was admitted to delivery room and prepared for epidural block. After sterilisation of the injection site, the injection of lidocain 1% and providing local anesthesia, 18G Tuohy needle advanced to L4-5 epidural space with "loss of resistance" technique. Dural puncture occurred at this level and patient had severe frontal headache so the procedure has been terminated immediately. Another attempt was made from one upper intervertebral space, between L3-4 vertebrae. Epidural space was reached at first attempt. Epidural catheter has been fixated at the 5th centimeter inside epidural space. Vaginal delivery occurred after 4 hours without any complication. The day following delivery, patient has been consulted to us due to development of occipital headache. Bed rest, intravenous hydration, analgesia and aminophylline infusion has been prescribed by our department after first evaluation. Patient has been consulted to Algology and Neurology clinics on the 2nd day of delivery due to non-regressing headache, and onset of nausea and vomiting. Following second consultation, a CT scan was performed and air consistent with pneumocephalus was observed in lateral peripheral cerebrospinal fluid circulation zones, basal cisterns, and in the frontal and parietal horns of both lateral ventricles (Fig. 1 and 2). Head lift, bed rest, opioid and paracetamol analgesics, antibiotic treatment and hydration was prescribed. Patient has been discharged following regression of symptoms on the 7th day of treatment. After 1 month, no pneumocephalus findings were observed on CT scans.

Discussion

Increasing usage of epidural blocks for analgesia and anesthesia has brought complications along with and headache is a common symptom following spinal or epidural blocks. We suggest that, as a complication, pneumocephalus should be kept in mind although it is a rare complication following epidural and spinal blocks.

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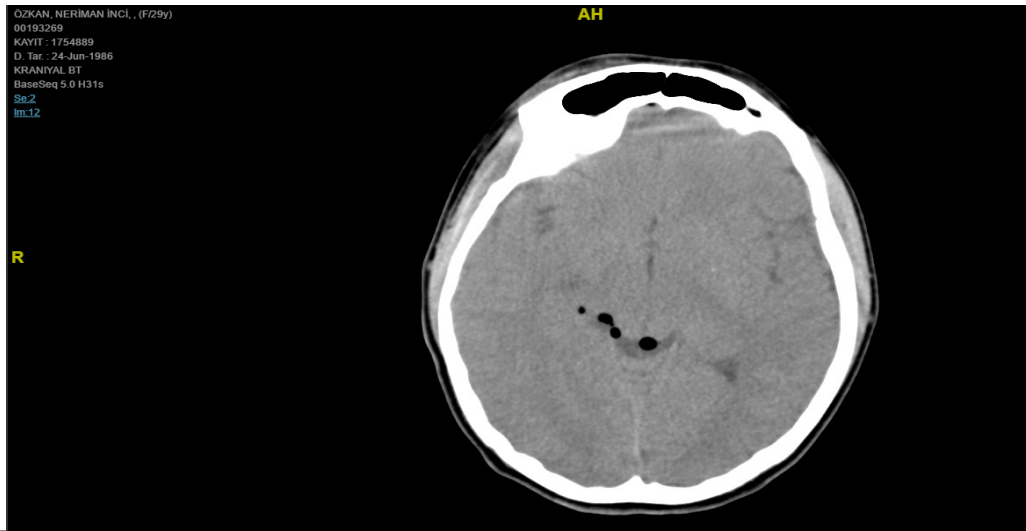


Figure 1

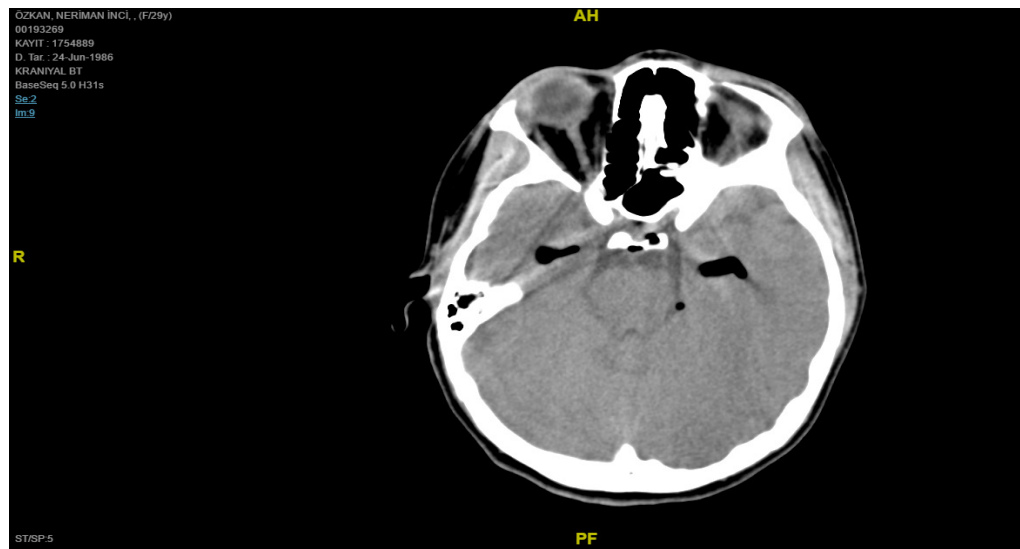


Figure 2

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Chairs: Ahmet Eroğlu, Derya Özkan

RETROSPECTIVE REVIEW OF AIRWAY MANAGEMENT IN PATIENTS WITH ACROMEGALY UNDERGOING PITUITARY SURGERY

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Objective

Acromegaly is an endocrinological disease that has morbidity and mortality characterised by high levels of growth hormone (GH) and insulin like growth factor-I (IGF-I). Due to acral changes, typical big nose and lips, macroglossia, enlargement of mandible may occur. Acromegaly may be associated with hypertrophy of pharynx, larynx, tonsils, vocal cords, mucosa and soft tissue (1). In this study, we aimed to report the challenges and methods used in airway management in acromegaly patients undergoing transsphenoidal pituitary surgery and to compare the success rates of these methods. Also, we evaluated the importance of mallampati classification to estimate airway difficulty in patients with acromegaly.

Method

120 retrospective cases are reviewed that had underwent surgery by neurosurgery department of Hacettepe University between 2000-2013.

Results

%10 of patients evaluated as difficult intubation and our results were related with other similar studies. Patients with difficult laryngoscopy were intubated by changing blade, external cricoid pressure (sellick maneuver) or using guide. We found that intubation can be more difficult when mallampati score is higher. Also obstructive sleep apnea syndrome can be associated with acromegaly and in these patients airway management can be difficult.

Conclusion

We reported that especially in acromegaly patients who have high grade of mallampati score and have OSAS associated with, airway management can be difficult and more cautions and attention may be required for these patients.

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Keywords. Acromegaly, pituitary surgery, difficult airway

May 20, 2016, Friday
SESSION-9

15: 45-17: 00
Chairs: Ahmet Eroğlu, Derya Özkan

MOTOR DEFICIT DEVELOPED IN PATIENT UNDERWENT VATS SYMPATECTOMY: CASE REPORT

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INTRODUCTION

VATS sympathectomy procedure is a minimally invasive procedure performed in patients who have sweating complaint(1, 2). Although, brachial plexus injury is generally seen after cardiac surgery performed through median sternotomy, it can be seen after thoracoscopic sympathectomy, although it is rare(3).

CASE REPORT

23 year old male patient was taken to the operating room to undergo a bilateral videothoroscopic thoracic sympathectomy surgery due to his complaint of sweating in hands. Following the induction, patient was intubated as left selective with 39CH selective intubation tube. Then patient was positioned with his arms opened to 90 degrees and sitting in about 45 degrees angle. T2-4 sympathectomy procedure was performed to the patient by entering from right axillary regain at first and then from left axillary regain. Patient was woken up from surgery without problem, then he was transferred to thoracic surgery intensive care unit. After completion of the patient's evaluation, motor deficit in the bilateral upper extremity was noticed. The physical examination, the muscle power of the patient was evaluated as 1/5. The patient was referred to the department of orthopedics and had brachial plexus MRI. MRI result were interpreted as "There was no monitored edema and hemorrhage along the right C5-6 foraminal extraforaminal nerve sheath, minimal cystic expansion in the neural foramen, the right front root damage?, no signs of C6-7 level acute phase changes". There were no significant changes explaining bilateral motor deficit. Dexametazone treatment was started. Motor strength was evaluated as 3/5 on the third post-

operative day; which had been 1/5 previously. As improvement was detected, he was discharged and outpatient control advised.

DISCUSSION

In the studies conducted, after VATS sympathectomy, which is a minimal invasive intervention; however, it should be kept in mind that although it is rare, motor deficit, which might also be caused by brachial plexus injury, can occur(2). In order to minimize the complications, the operation time must be shortened as much as possible and arm hyperabduction should be avoided(3). It should be kept in mind that motor deficits have no signs with radiological examinations that can occur after VATS sympathectomy surgery and it can be treated with conservative treatment.

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Chairs: Ahmet Eroğlu, Derya Özkan

AIRWAY MANAGEMENT IN A PATIENT WITH SHORT RESIDUAL TRACHEA AFTER TRACHEAL RESECTION

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INTRODUCTION

Tracheal resection length longer than 4.5 cm due to primary tracheal tumors or locally advanced esophageal tumors may increase the risk of airway compli-

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cations during or after the surgery, (1, 2) In this case report, we aimed to share airway management in a patient operated due to hypopharynx tumor.

CASE REPORT

A 49-year old patient with the diagnosis of carcinoma of the hypopharynx (post-cricoid) was scheduled for total laryngectomy, bilateral neck dissection and jejunum free flap due to tracheal invasion restricting the airway severely. Following standard anesthesia induction, the patient's trachea was intubated through already existent tracheotomy. During the operation, in advance to guide jejunal flap towards the distal esophagus, resection of 7 tracheal cartilage rings was performed. The residue trachea part was too short that cuff of the endotracheal tube (ETT) either remained outside or intubation became right selective. The cuff of the double-lumen intubation tube (DLT) also remained outside the residue trachea. Without inflating the cuff, air leakage was preventing adequate ventilation both with ETT and DLT. We intubated two main bronchial branches with two separate spiral, cuffed, small sized (number 6) ETTs and connected them with the main connector of a DLT. By this way, both lungs were equally ventilated manually at first and later with mechanical ventilator. Operation was terminated by regenerating stoma in the form of mediastinal tracheostomy with manubrium resection due to lack of adequate tracheal length. The reconstruction with jejunostomy was postponed to 2nd session. The patient was transferred to intensive care unit after placement of a tracheostomy cannula through stoma. Patient was extubated two hours later since she had no airway problems in the follow-up and discharged to the inpatient service next morning.

RESULTS/DISCUSSION

After total laryngectomy; appropriate sized intubation tube rarely may be relatively long compared to the remaining short segment and it may not be possible to ventilate the patient. In such unexpected situations, bronchial intubation with two separate small sized endotracheal tubes and combining them with the connector of a double-lumen tube can be considered an alternative method of ventilation.

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CENTRAL VENOUS CATHETERISATION IN CHILDREN BURN CASES: THE RESULTS OF A SIX YEAR EXPERIENCE

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Objective

Serious burns in pediatric age groups is an important source of morbidity and mortality in developing countries. As an efficient and reliable venous route central venous (CV) catheterisation is frequently necessary in the treatment and follow up of hospitalised cases. Due its invasive nature and relatively higher complication rates in pediatric cases this procedure should be accomplished by experienced persons. There is few investigations in central venous catheterisations in small burned patients.

In this study we evaluated the duration of catheterisation, complication rates and culture results in our series for the last six years.

Material and Methods

The central venous catheterisation practice results were retrospectively evaluated between January 2009 and December 2015 in Ankara Child Health and Diseases Hematology and Oncology Education and Research Hospital childrens burns unit. The demographic values, burn percentages, the region of CV catheterisation, major and minor complications and culture results were simultaneously obtained from catheter were noted. CV catheters were introduced under sterile conditions by an experienced anesthesiologist using seldinger technique. The wound care of catheter insertion area was performed by application of 2% chlorehexidine solution on alternate days.

Results

Between January 2009 and December 2015 a total of 122 catheters were introduced in 84 children burn cases of ages ranging 15 days to 17 years. In 73 cases (%59. 8) internal jugular vein and in 49 cases(40. 2%) femoral vein were selected for placement of catheter. Of these, in 55 cases ranging 0 to 5 years we used internal jugular vein in 44 cases (58. 7%) and femoral vein in 11 (41. 3%) cases. We did not encounter any major or minor complication during the procedure or

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followup examinations. Most frequently Acinetobacter was isolated at cultures of catheter.

Conclusion

The site of catheterisation should be decided by an experienced anesthesiologist according to the burn location. Since infectious complications are still the most frequent cause of mortality in burn cases this procedure should be performed under sterile conditions preferably in the operation room by experienced staff. The insertion site should be cultured periodically and the catheter should be removed as soon as the treatment is completed.

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Chairs: Ahmet Eroğlu, Derya Özkan

WHAT IS THE BEST PULMONARY PHYSIOTHERAPY METHOD IN ICU?

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Objective: Effects of high frequency chest wall oscillation technique were investigated on intubated-ICU patients.

Background: Thirty intubated patients were included in the study. The control group (n=15) received routine pulmonary rehabilitation technique. In addition to the pulmonary rehabilitation technique; the study group (n=15) was administered high frequency chest wall oscillation (HFCWO). APACHE-II, dry sputum weight, Lung Collapse Index and blood gas values were measured at 24th, 48th and 72nd hours and endotracheal aspirate culture was studied at initial and 72nd hours. The days of ventilation and days in ICU were evaluated

Results: There is no significant difference between APACHE-II scores of groups. The dry sputum weights increased in the study group at 72nd hour

($p=0.001$). The Lung Collapse Index decreased in study group at 48th ($p=0.003$) and 72th hours ($p<0.001$). The PO₂ levels increased in the study group at 72nd hour ($p=0.015$). The culture positivity at 72th hour was decreased to 20 %. The days of ventilation and staying ICU did not differ between the groups.

Discussion & Conclusions: Although HFCWO is very expensive equipment, combined technique may prevent the development of lung atelectasis or hospital-acquired pneumonia more than routine pulmonary rehabilitation. It does not change intubated period and length of stay in ICU. However, more further controlled clinical studies are needed to use it in ICU.

May 20, 2016, Friday
SESSION-9

15: 45-17: 00
Chairs: Ahmet Eroğlu, Derya Özkan

SUPERIOR SAGITTAL SINUS THROMBOSIS, POSSIBLE DEVASTATING COMPLICATION OF TRAUMATIC HEAD INJURY

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Introduction: Cerebral sagittal sinus thrombosis is an elusive diagnosis, because of its nonspecific presentation and its numerous predisposing factors. It is believed to be an uncommon cause of stroke. It occurs when a blood clot forms in the brain's venous sinuses, which prevents blood from draining out of the brain. As a result, blood cells may break and leak blood into the brain tissues, forming a hemorrhage. Dural sinus thromboses usually involve the sagittal, transverse and sigmoid sinuses.

Aim: The aim of the study is to present the contribution of a traumatic head injury in the development of superior sagittal sinus thrombosis as a possible devastating factor in stroke and hemorrhage development.

This case report presents a 48-years old male with a gross head injury as a predisposing factor for the development of a superior sagittal sinus thrombosis. The injury was gained by hitting the head on the wall (automutilation), which resulted in parietal scalp defect and a linear depressive fracture on the posterior part of the sagittal sulci. On arrival at the emergency room he was fully conscious, oriented and responsive (GCS 15), with head concussion, insignificant bleeding from the injured site, partially debrided and sutured because of the missing parts of skin and underlying soft tissues and well packed with bandages. Computed tomography of the head was made and because of the pos-

Orthopedic Anaesthesia and Intensive Care

sibility of damage of the superior sagittal sinus, he was immediately prepared and transferred to the operating room (laboratory testing, blood type, units of blood). There were no signs of cardio-circulatory instability or compensated shock on the admittance or during the surgery. No complications developed and the patient was transferred awake and conscious to the intensive care unit on post-operative monitoring. Anticoagulation therapy in high prophylactic doses were prescribed.

Results: Depressed skull fractures or skull fractures that cross the sinus can obstruct the blood flow in the sinus. Our case had no complications from the injury, even though there was a great possibility that obstruction or rupture of the sinus might be the consequence of the localization of the fracture during the surgery. Obstruction of the sinus may result in serious consequences for the brain tissues, deteriorating the conscious state of the patient. Because of the undefinitive pathophysiology, a consensus was not obtained on overall strategy concerning conservative, radiosurgical or surgical treatment yet.

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Poster presentations

May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

MOTOR EVOKED POTENTIAL MONITORING IN A SCOLIOSIS SURGERY PATIENT

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Introduction: Scoliosis surgery in the adolescent is a major orthopedic operation that can involve substantial blood loss, transfusion requirement, and neurophysiological monitoring. Despite the use of optimal surgical and anesthetic techniques, neurologic complications nevertheless may develop during scoliosis surgery. So, intraoperative neurophysiological monitoring during scoliosis surgery should be used. We reported motor evoked potential monitoring of a patient under propofol anesthesia in scoliosis surgery.

Case: A 14-year-old boy was scheduled to undergo scoliosis surgery. After hemodynamic monitoring, anesthesia was induced with propofol and remifentanyl and was maintained with infusions. Intraoperative monitoring of spinal cord function was performed with motor evoked potentials (MEPs). Baseline MEPs were recorded during the induction of propofol and remifentanyl. After correction of deformity, similar MEPs were recorded and compared baseline values (Figure 1-2). Intraoperative MEPs were evaluated as normal. At the end of the surgery, patient was awakened and neurologic examination was normal. Post-operative pain was managed with IV fentanyl using patient-controlled analgesia.

Discussion: Intraoperative monitoring of spinal cord function can be done in three ways: via somatosensory evoked potentials (SSEPs), motor-evoked potentials (MEPs), or wake-up tests. Successful monitoring during scoliosis surgery requires careful coordination between the neurophysiologist, anesthesiologist and surgeon. MEPs can be affected by anesthetic drugs and neuromuscular blocking agents. In this case, propofol anesthesia is preferred during scoliosis surgery because it may suppress motor evoked potentials less than other drugs including inhalation anesthetics.

Conclusion: We conclude that motor evoked potentials can be performed successfully under propofol anesthesia without to need a wake-up test in a scoliosis surgery.



Figures 1-2, MEPs monitoring.

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SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

UPPER AIRWAY INJURY CAUSED BY GUM ELASTIC BOUGIE

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INTRODUCTION

The most important cause of increased perioperative mortality in obstructive sleep apnea syndrome and obesity is intubation difficulty (1). The gum elastic bougie is a widely used device for facilitating tracheal intubation when a grade 2 or 3 view of the larynx is seen during direct laryngoscopy.

CASE

The 46 year-old ASA II patient was assessed preoperatively for uvuloplasty. The patient history showed that he smoked 7 packages of cigarette per year. His BMI was 34, 7. Preparation was completed for the difficult intubation. The patient couldn't directly intubated with laryngoscopy but was intubated with bougie in the second trial. After the intubation, there was distinct bilateral leakage sound, particularly in left superior zone. After the surgery 200 mg Bridion was administered, and the patient was extubated. He was then followed up in PACU. Due to the stridor, it was thought that there was edema in his upper airway. At minute 45 of PACU follow-up, it was noticed that upper airway edema regressed but there was subcutaneous emphysema giving a sense of rattle during palpation in the periphery of the right eye. It spread rapidly over the face. Afterwards, he was intubated again through video laryngoscopy due to the risk of upper airway obstruction. Fiber optic examination and thorax tomography revealed that the

fistula line was on the left lateral wall following cricoid cartilage. Mucosal damage of the patient healed spontaneously and weaning was conducted four days later in ICU.

DISCUSSION

It was reported that tracheal injury and rupture occurs due to “blind” advancement of the bougie during intubation (2). It was indicated that use of bougie along with lubricant, advancing it gently, and withdrawing it a few centimeters or asking for help to stabilize it while placing tracheal tube could reduce airway injury associated with bougie (3). Due to the identification of subcutaneous emphysema at minute 45 during follow-up, it was thought that the bougie caused injury in the patient.

We believe that a close long-term postoperative follow-up is important in cases where difficult intubation is conducted with bougie and intubation is achieved through multiple trials.

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May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

POSTOPERATIVE ADRENAL CRISIS IN A CHILD WITH ISOLATED GLUCOCORTICOID DEFICIENCY DESPITE SUPPLEMENTAL STRESS-DOSE

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Introduction: Patients with adrenal insufficiency or suppression due to chronic steroid usage are prone to perioperative adrenal crisis triggered by surgical stress (1). The aim of this report is to present a pediatric case suffering postoperative adrenal crisis despite administration of supplemental steroids.

Case Report: An 11 year-old, 36 kg male patient with a diagnosis of isolated glucocorticoid deficiency was scheduled for embedded tooth extraction under general anesthesia. He was on 10 mg/m²/d oral hydrocortisone therapy and presented characteristic features of chronic steroid replacement treatment including obesity and moon facies. He had a history of adrenal crisis with hypo-

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tension, hypoglycemia and meaningless speech during a respiratory infection last year. The patient was consulted to pediatric endocrinology department and prescribed a multi-dose perioperative supplemental steroid regimen starting from the day before surgery. Following standard monitoring and uneventful anesthesia induction with propofol, fentanyl and rocuronium, an intraoperative 20 mg methylprednisolone was also administered by intravenous infusion. His intraoperative blood glucose levels measured at 30-minute intervals were 108 gr/dl and 90 gr/dl. Despite adequate fluid resuscitation, he was slightly hypotensive with a systolic blood pressure of approximately 70 mmHg during the operation. Just after recovery from the dental procedure lasting about 40 minutes, he started suffering hallucinations and agitation. His blood pressure and glucose was 69/45 mmHg and 69 mg/dl. We administered an additional dose of 1 mg/kg methylprednisolone together with intravenous 10% dextrose and fluid infusion. The symptoms ceased totally within 20 minutes and the patient was discharged from hospital without any complications after a 24-hour follow-up period.

Discussion: Preoperative dose recommendations for corticosteroids are controversial. Major endocrine guidelines recommend stress dose although some recent studies suggest that routine supraphysiologic doses are not necessary preoperatively and rescue dose should be considered in case of unexplained hypotension (2, 3). Adrenal crisis triggered by surgical stress has been reported up to the postoperative 18th hour despite stress dose regimen. Our patient developed adrenal crisis despite a supplemental stress-dose; which exemplifies the need for close monitoring and at least 24-hour hospitalization for patients with adrenal insufficiency even in day-case surgeries.

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May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

POSTOPERATIVE PERSISTENT BLEEDING FOLLOWING TOOTH EXTRACTION IN A PATIENT WITH NOONAN SYNDROME

Aysun Ankay Yilbas, Coskun Cifci, Filiz Uzunçugil, Basak Akca, Banu Kilicaslan

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Introduction: Noonan syndrome is known to be challenging due to airway problems, heart diseases and bleeding diathesis during anesthetic management (1-4). We present a patient with Noonan Syndrome diagnosed to have platelet dysfunction, scheduled for dental extraction under general anesthesia.

Case report: An eight-year-old, 17 kg patient with Noonan syndrome was scheduled for dental procedure under general anesthesia. Patient's physical examination revealed no signs of difficult airway. His blood count was normal; however, he was diagnosed to have platelet dysfunction due to recurrent bruising 2 years ago. His medical history included surgical repairment for atrial septal defect and pulmonary stenosis. In consultation with pediatric cardiology, genetics and hematology departments; preparations for difficult airway, prophylaxis for infective endocarditis and administration of 2 units of platelet concentrates (PC) were planned preoperatively. After anesthesia induction and easy intubation, the procedure was completed uneventfully and the patient's trachea was extubated. Before leaving the operating room, we noticed a mild bleeding in tooth extraction sockets. Due to persistent bleeding despite 30 minutes of compression on the bleeding site, we re-intubated the patient's trachea to secure the airway and to avoid pulmonary aspiration and transferred him to postanesthesia care unit. Following administration of additional 2 units of PC; tranexamic acid was given both intravenously and applied directly on the bleeding sites. Bleeding stopped in the end of 3 hours of continuous compression; and the trachea was extubated 2 hours after cessation of bleeding. In the following 8-10 hour period, severe wheezing and cyanosis developed while crying and resolved completely with bronchodilator therapy. Thorax CT scan revealed a subglottic tracheal stenosis but no emergency treatment was required. The patient was discharged with a regular follow-up plan in department of ENT surgery.

Conclusion: Difficult airway and cardiac complications are the most commonly anticipated problems during anesthetic management of a patient with Noonan syndrome. Although bleeding diathesis is a major component of this syndrome, there are very few reports regarding postoperative bleeding. Our patient's anesthetic management became challenging due to persistent bleeding refractory to treatment. We suggest detailed preoperative hematological assessment for these patients scheduled for procedures with a potential for bleeding.

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May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

UNEXPECTED DIFFICULT AIRWAY IN A CHILD DUE TO RESIDUAL MASS AFTER OPERATED PHARYNGEAL TERATOMA

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Introduction: Pharyngeal teratomas, which are rare causes of congenital neoplasms, can cause airway and feeding problems in neonates^{1,2,3}. The aim of this report is to present a case of unexpected difficult airway due to operated pharyngeal teratoma in a child scheduled for cleft palate correction under general anesthesia.

Case report: An 15 month-old, male patient was scheduled for cleft palate correction under general anesthesia. The patient's medical history included surgical excision of teratoma that was blocking oropharynx and invading the base of tongue when he was one month old. His physical examination and consultation with ENT surgeons revealed no signs of difficult airway. After anesthesia induction and easy mask ventilation, the first attempt of intubation with direct laryngoscopy using Macintosh 2 blade was unsuccessful. His Cormack-Lehane score was three, and it was difficult to direct the endotracheal tube towards the vocal cords due to a residue mass on the right side of pharynx. We performed the second attempt of intubation by using videolaryngoscopy with an acute angled blade. Cormack-Lehane score was two and the patient's trachea was intubated with 4.0 spiral endotracheal tube. At the end of the surgery, the patient's trachea was extubated uneventfully following reversal of neuromuscular blockade with sugammadex. He had no airway problems during his follow-up period in the plastic and reconstructive surgery clinic and was discharged two days after

surgery. A QR code was created by anesthesiology department for difficult airway management.

Conclusion: In patients with oronasopharyngeal teratomas, detailed preoperative airway assessment and being prepared for challenging airway management remains important even after surgery concerning that difficult airway problems can be encountered despite surgical excision as in our case.

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May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

A RARE CASE OF MADELUNG'S DISEASE

Diğdem ALBASAN, Ezgi ERKILIÇ, Hülya KAŞIKARA, Fatma BERÇİN, Mustafa AKSOY

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Background and Aim: Madelung's disease (Launois Bensaude Syndrome, benign symmetric lipomatosis or multiple symmetric lipomatosis) is a rare disease characterized by asymmetric collection of adipose tissue, mostly unencapsulated lipomas, in the head, posterior neck and upper trunk (1). While it usually occurs in middle-aged men between 30 to 60 years of age with a history of alcoholism exact pathogenesis is still unknown (2). Impaired lipid metabolism and inhibition of lipolysis result proliferation of adipose tissue mainly around neck (Type 1), shoulders (Type 2) and abdomen (Type 3). Patients especially with Type 1 Madelung's disease may have difficulties in swallowing, head movement and pain in the neck or larynx. These patients may also present with a difficult airway. We would like to present a case with Madelung's disease that underwent an emergent craniotomy.

Case: 56 years old male patient presented to the emergency department with persistent severe headache. A CT scan was performed and upon seeing subdu-

Orthopedic Anaesthesia and Intensive Care

ral hematoma, the patient was immediately brought to the OR. He was evaluated as Mallampati III however was intubated uneventfully. His medical history revealed Madelung's disease with multiple operations for the axillary and abdominal regions. In one of those operations he was diagnosed as difficult intubation other than that he had been intubated uneventfully. After the operation the patient was extubated and taken to the surgical ICU department. Two weeks later the patient had a cardiac arrest in the ICU and didn't respond to CPR and died.

Discussion: Although Madelung's disease is a rare disorder our encounter may be either in the elective or in the emergency settings. These patients may have challenging airways because of the adipose tissue collection in the head and neck region. Progressive fatty tissue accumulation may even cause severe inspiratory dyspnea, which may require tracheotomy (1).

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May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

ULTRASOUND-GUIDED PERIPHERAL NERVE BLOCK FOR LOWER EXTREMITY AMPUTATION, TO THE LIFE HANGING ON BY A THREAD

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Trabzon, Turkey.**

Introduction

Lower extremity amputations are surgical procedures performed on cases who have serious comorbidities and need for intensive care support. In these patients whose life is hanging on by a thread, chosen anesthesia method requires specification. All of their systems as well as hemodynamics may be severely affected under general anesthesia and central blocks. Femoral (along with lateral cutaneous femoral) and sciatic nerve blocks may provide adequate anesthesia for amputation. In this case, we presented our anesthesia method performed

for left limb amputation to a critically ill patient monitored in our anesthesia intensive care unit.

Case

Amputation from the proximal tibia of left limb due to necrotized foot (diabetic foot) at 3rd day of hospitalization was planned in a 62-year old; morbid obese female who had been followed in anesthesia intensive care unit with diagnoses of diabetes mellitus, hypertension (for 25 years), congestive heart failure, renal failure, cardiogenic pulmonary edema, malnutrition and peripheral circulation failure. In pre-operative evaluation; blood pressure was 145/70 mmHg, heart rate was 80/min, SpO₂ was 92%, respiratory rate was 22/min. Patient was breathing spontaneously with the O₂ support (6lt/min) via mask. In laboratory parameters; HbA_{1c} was 15, Hgb was 8, 7gr/dl, aPTT was 44, 7sec, PT was 14, 3sec and INR was 1, 12. In auscultation; S₁-S₂ were positive and there were diffuse rales in bilateral lungs. There was bilateral (++) pretibial edema. CPAP with mask was intermittantly performed.

After obtaining anesthesia consent from ASA 4 patient; performing peripheral nerve block under ultrasound assistance was decided due to considered as having high risk for general anesthesia and central block as well as having problematic position. Sedation was achieved by administration of 30mg (iv) ketamine to monitored patient. First left femoral nerve, then anterior sciatic nerve was visualized with ultrasound. After visualization; a mixture of equal doses of 0, 5% bupivacain (15ml) and 2% lidocain (5ml) was injected to tissues surrounding these nerves. Surgical procedure was initiated at 30 minutes later after block. 30mg (iv) ketamine doses were administered to patient during the procedure lasting approximately 2 hours. 2 units of erythrocyte and 1 unit of TDP were replaced intraoperatively. Hemodynamically stable patient was transferred to post-operative intensive care unit.



Figure1; necrotized foot **Figure2;** sciatic nerve **Figure3;** femoral nerve

Conclusion

Sciatic, femoral and lateral femoral cutaneous nerve blocks were useful for amputation of a critically ill patient monitored and treated in intensive care unit.

EMERGENT REIMPLANTATION OF ARM WITH INTERSCALENE BLOCK

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Background: Interscalene block (ISB) can be used by self or be combined with general anaesthesia for surgery of upper extremity especially for postoperative analgesia and revascularization of the arm.

Case: A 44-year-old male patient admitted to our hospital with severe arm injury. The patient's arm was completely cut down from shoulder. When he was transported to emergency hall, he was agitated and his arterial blood pressure: 90/45 mmHg, heart rate: 95/min. He stated that he had excessive bleeding. His laboratory findings were normal except hemoglobin (Hb: 11mg/dl). He was sedated with 2 mg of midazolam and was transferred to operating theatre for re-implantation of the extremity. After the 75 µg of intravenous fentanyl and local anaesthesia, interscalene catheter was inserted at right side. Then 450 mg of thiopental and 8 mg of vecuronium were administered for anaesthesia induction. Anaesthesia was maintained with 2-3% of sevoflurane in 40/60% of O₂/N₂O mixture after tracheal intubation. The cut extremity was reimplanted at the end of 5.5 hours (Picture a, b). The patient's vital parameters were stable throughout the operation. The patient was administered total 2500 ml of isotonic saline, 1000 ml of 5% dextrose ringer lactate and 2 units of plasma. The solution of dextran (Rheomacrodex 500 ml) was started for 24 hours intravenous infusion. 5ml of 0.5% of plain bupivacaine was administered as a bolus via interscalene catheter and it was infused 2ml/hours as same concentration for later 72 hours. 8.4% of sodium bicarbonate was infused as a dose of 10ml/h. After the ending the operation the patient was extubated and transferred to the ward.

Discussion and Conclusion: ISB is used for upper extremity surgery. But whatever it hasn't been known as a long term of postoperative care. ISB may help perfusion and revascularization of the reimplanted arm by blocking the sympa-

thetic system alongside the providing of excellent analgesia for such cases. Thus ISB may contribute to success rate of extremity reimplantation.



a)



b)

Pictures: Appearance of reimplanted arm a) from below b) from above

May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

UPPER AIRWAY OBSTRUCTION CAUSED BY USE OF CLASSIC LMA WITH CUFF PRESSURE AT VERY HIGH VOLUME

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LMAs are instruments conventionally suitable for spontaneous respiration used to provide airway in cases requiring general anesthesia with short surgical duration (1). They might lead to different complications related with airway. The literature review shows that LMA usages causing upper airway obstruction usually occurred in new type of instruments. We attempted to review the airway obstruction case faced due to classic LMA use, along with points requiring attention in this regard.

83 year-old male ASA II patient was preoperatively assessed in order to conduct TUR-MT due to bladder tumor. The examination showed a normal BMI and systemic condition with no additional disease. He had no previous anesthesia and allergy history. Due to the short operation duration, we planned to fix a LMA. Once taken to the operating room, the patient was given standard monitoring

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procedure. Afterwards, standard classic LMA size 5 was initially tried with IV 120 mg Propofol, 40 mg Lidocaine, 0, 5 µg/kg Remifentanyl. Seeing this was larger, LMA size 4 was fixed at the second trial. Shortly afterwards ETCO₂ rapidly reached the value 52. Peak inspiratory pressure increased. The machine was checked and no leakage was found. The procedure proceeded with manual ventilation. Rales/rhonchi were not heard during auscultation. The surgical team announced the end of operation while intubation was being planned. When LMA was removed, there was cambering due to excessive inflating. The patient in recovery room was then sent to the care unit without problem.

Airway problems associated with LMA use might occur in clinical use. Kleine-Brueggeney *et al* stated in a case presentation that they came across with unpredicted acute airway obstruction using Laryngeal Mask Airway ProSeal™ (LMA-P™), and mentioned multiple possible causes (2). They reported that hyperinflation must be avoided when using supraglottic airway devices. Additionally, such an obstruction might cause nerve injury (3). Hyperinflation might clinically result in compression by narrowing the glottic entrance. Thus, use of LMA with a proper size is crucial. Since the sizes of different brands in use might be incompatible, attention must be paid to use LMAs of the same brand. LMAs must be held in series (with intermediate sizes). The ml level of the optimal pressure must be definitely checked before fixing.

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May 18, 2016, Wednesday
SESSION-1

12: 00-13: 00
Chairs: Feray Gürsoy, Işıl Özkoçak Turan

CRITICAL ILLNESS POLYNEUROPATHY IS NOT A RARE CONDITION.

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Istanbul**

Introduction

Critical illness polyneuropathy (CIP) is a complication of critical illness that present with muscle weakness and failure to wean from the ventilator (1). The diag-

nosis is usually made by history and physical examination but needle EMG is essential for making an accurate diagnosis (2).

Case Presentation

A 50 years old woman presented with fever, hypotension and respiratory distress at 5th day of total abdominal hysterectomy. Her vital signs were temperature of 38 °C, pulse rate 102/min, blood pressure 100/50 mmHg, respiratory rate 38 breath/min. Laboratory examinations and arterial blood gas analysis were as follows: WBC 15600 K/mL, CRP: 178 mg/L, Procalcitonin 47.26 ng/mL, pH: 7.23, PO₂: 55 mm/Hg, PCO₂: 65 mm/Hg, HCO₃: 20.6, SpO₂: 87%, lactate: 4.8 mmol/L, BE: -11. She was intubated and mechanically ventilated with PressureRegulatedVolumeControl mode. Empirical antimicrobial treatment with piperacillin+ tazobactam and vancomycin were applicated. Both blood cultures were positive for gram negative bacteria and sensitive to colymycin. Antibiotic was changed to colymycin and meropenem. Patient couldn't wean from ventilator. After 3 weeks, percutaneous tracheostomy was inserted and ventilatory support was given with ContinousPositiveAirwayPressure mode. The following days she developed weakness of all four limbs and neurological examination showed grade 2 power in lower with grade 3 power in upper limb muscles. There were no causes to explain muscle weakness. Cerebrospinal fluid samples, cranial MRI +BT and thoracolumbar MRI were normal. Electromyography demonstrated motor and sensory axonal distal polyneuropathy predominantly in lower extremities. At day 53 patient discharged from intensive care unit with homevent and sent to rehabilitation center to improve long-term recovery.

Conclusion

CIP increases morbidity via the inability or difficulty in weaning off mechanical ventilation(3). In addition to sepsis, drugs such as colymycin may also cause this clinical scenario. In our case, sepsis related ARDS and/or colymycin administration triggered CIP. Intensivists should take into consideration a diagnosis of critical illness polyneuropathy in patients with symmetric motor weakness whom have organ dysfunctions and also prolonged stay at ICU's.

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**ULTRASOUND GUIDED AXILLARY BRACHIAL PLEXUS BLOCK
APPLIED TO OPIOID DEPENDENT PATIENT**

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Introduction

The increasing use of opioids enhances the likelihood of encountering these patients in the clinical practice for anesthesiologist (1). Depending upon the chronic receptor stimulation, chronic opioid users develop cross-tolerance against the anesthetics drugs and other depressants. As a result of decreased synthesis of endogenous opioid, post-operative pain tolerance reduces (2, 3). Hyperalgesia is observed in those patients and perioperative opioid requirement increases (4). Therefore, when general anesthesia is implemented, because complications such as respiratory depression, nausea, vomiting may be observed as a result of higher doses of opioids and anesthetic requirements, regional anesthesia may be preferred. In this case, we wanted to discuss the effect of ultrasound guided axillary block implementation on a 21-year-old heroin addict patient with Bennett fracture.

Case Report

21-year-old male patient, addicted to heroin for 5 years, was taken to surgery because of Bennett fracture. It was learned that the patient, who had no systemic disease, had had received buprenorphine-naloxan for one month for treatment and his latest use of heroin was 15 days prior to the operation. There was no preoperative abnormalities in laboratory tests except the positivity of the anti-HCV ab and anti-HBs ab.) After standard monitoring, the patient, pre-medicated with 1mg iv of Midazolam, was performed ultrasound guided axillary block performed with the use of nerve stimulator and local anesthetic mixture(0. 5% 16 mL bupivacaine and 4 mL saline). After 15 minutes, appropriate analgesia and anesthesia were provided, and the patient was sent to the service without any post-operation complication for 1. 5 h, and restarting the buprenorphine-naloxan treatment was recommended.

Conclusion

As a conclusion, we think that ultrasound guided - peripheral nerve blocks to the opioid addicts are reliable, therefore complications associated with general anesthesia such as withdrawal symptoms, sepsis, hemodynamic instability can be prevented.

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CONTINUOUS VENOVENOUS HEMODIAFILTRATION IN TREATING SEPTIC PATIENT

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Introduction: The management of severe sepsis and septic shock remains to this day one of the great challenges in medical care. The release of large amounts of pro- and anti-inflammatory mediators that occurs in severe sepsis contributes to the development of multiple organ dysfunction syndrome (MODS), including ARF. Conventional Hemodialysis presents problems when used in these patients, often being unable to remove enough fluid, due to hemodynamic instability and hypotension that often results. The new CVVHDF with Prismaflex eXeed™ system has two offerings for management of critically ill patients, especially in the setting of sepsis -- septeX™ and oXiris™. The base membrane comprising the filter in the oXiris set removes larger molecular weight molecules, including inflammatory mediators.

Case Report: A 38-year-old male was hospitalized for the treatment of acute bacterial endocarditis. He was febrile, dyspneic, tachypneic and with clinical signs of left-sided heart failure. Blood cultures were positive and antimicrobial treatment was initiated. Transthoracic echocardiography and transesophageal echocardiography obtained on the day of the admission reveal endocarditis and vegetations on the aortic valve with second degree aortic regurgitation. On the seventh day of his hospital stay his condition worsened. The temperature increased to 39C. He was presenting with signs of heart failure and aortic regurgitation 4th degree. He underwent emergency aortic valve replacement. After the

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operation he was hemodynamic unstable with high dosage of catecholamines, febrile up to 40 C. He was presenting with low systemic vascular resistance even with high dosage of norepinephrine. We initiated CVVHDF with Prismaflex oXiris filter. Rapid improvement in circulatory status was observed, heralded by a significantly lower catecholamine requirement after 24 hours of CVVHDF. CVVHDF was discontinued on the fifth day after the operation. Controls of blood cultures were negative.

Conclusion

Hemofiltration and especially high volume hemofiltration is effective 'adjunctive' therapy in severe septic shock and especially refractory or catecholamine resistant hypodynamic septic shock

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FLUID RESUSCITATION AND BLOOD PRODUCTS TRANSFUSION IN PATIENTS WITH HEMORRHAGIC SHOCK AFTER SPLEEN RUPTURE

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Background: The spleen is an organ which most often is damaged by blunt abdominal trauma. 26 percent of patients suffering from blunt abdominal trauma have spleen rupture. Often the lesion is a direct spleen laceration. Careful observation is required due to the probability of second time bleeding. In most cases, the injury needs an urgent surgical treatment, intravenous fluid resuscitation and blood products transfusion in cases of uncontrolled bleeding.

Case report: The case represents splenic injury with a car accident patient. The casualty, a 50-year old male was admitted with clinical signs of shock – confusion, hypotension, tachycardia, paleness and diffuse abdominal tenderness. Coexisting diseases include hepatic cirrhosis. Through laboratory analysis, with reduction in the full blood count, and ultrasound tomography, free fluid was verified in the abdomen and exploratory laparotomy was indicated. Hemoperitoneum has been determined with 1, 500 ml blood in the abdomen, spleen rupture, and splenectomy has been performed. During intraoperative and postoperative period, resuscitation with crystalloids, colloids and blood derivatives was

performed. In further procedure, hemodynamic stability is attained, laboratory analysis corrections and improving the general condition of the patient.

Discussion: The prognosis of patients with hemorrhagic shock is directly related to the initial resuscitation. The aim of treatment is adequate provision of the tissues with oxygen and tissue perfusion. Besides the general principle of resuscitation, ABC, determining and correcting the cause of bleeding, oxygenotherapy, vascular access and fluid and blood products resuscitation is the first step in managing hemorrhagic shock. Intravenously are administered crystalloids, colloids and blood derivatives – red blood cells, fresh frozen plasma, platelets, cryoprecipitate and coagulation factors. Despite uncontrolled bleeding, fluid administration must be controlled depending on clinical and laboratory analysis, comorbidities and general state of the patient.

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PERCUTANEOUSENDOSCOPIC GASTROSTOMY (PEG) – RETROSPECTIVE ANALYSIS AND CLINICAL EXPERIENCE IN SPECIAL HOSPITAL FILIP II, SKOPJE, R. MACEDONIA

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The aim of this study is to make evaluation of the indications, complications and the benefit of PEG and the enteral nutrition. PEG is effective way to provide food, liquids and medications (when appropriate) directly into the stomach. The medical documentation and the endoscopic records shows the demographic differences between the patients, the indications for PEG, the complications and the hospital time spend.

Middle patient's age was 60 years. The indications for PEG were: cardiosurgery, terminal cardiac failure, surgery of the carotid artery, malnutrition, cardiogenic shock; cardiomyopathy disease; and esophageal carcinoma.

The study research is about the early or minor complications in the first 72 hours and the late or major complications after 72 hours. The minor complications are infection, pneumoperitoneum, ulceration, the catheter obstruction, dislocation of the gastrostomy. The major complications are necrotic fasciitis, peritonitis, stomach perforation, aspiration, sepsis, bleeding and death. (1, 2, 4, 5, 6)

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The complications are more often within the old patients, patients with previous diseases or diseases which appeared as a side effect, neurological and oncologic patients. (2, 3)

Methods and Materials

For the period of five years, between 2010 and 2015, the intensive care teams have made 313 PEG. We analyzed the patient's age, gender, indication and complication. During the procedure, a physician places an endoscope into the mouth. The endoscope is then advanced through esophagus and into the stomach. The endoscope is used to ensure the correct positioning of the PEG tube in the stomach. The PEG tube rests in the stomach and exits through the skin of the abdomen.

Results:

The results shows that the most often indication for PEG were cardiovascular operation – 171 patients, (aneurysm of thoracic and abdominal aorta – 15, ACBP – 79, Surgery of the heart valves – 77), CVI – 21, malignant disease – 2; terminal heart failure – 44 and other cases - 75.

The most often complications were bleeding – 1 %, dislocation of the stoma 2 %, peritonitis 2 %, Aspiration -1%.

Conclusion:

The analysis show that early placement of the PEG and enteral nutrition is fast and safe methods which decrease the incidence of SIRS, MODS and the hospital time spend.

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ENDOVASCULAR AND SURGICAL TREATMENT OF GIANT PELVIC TUMOR – A CASE REPORT

Stoicovski E. , Gramosli T. , Aleksovski E. , Gjorgon M. , Zafiroski G. , Mladenovski S. , Hristov N. , Atanasov Z. , Bozinovska B. , Veljakovska – Kiridzievska L. , Anguseva T. , Mitrev Z.

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Introduction: Giant cell tumor is an osteolytic tumor arising from epiphysis, commonly seen in young adults and represents 5% of all bone neoplasms. Although it is benign it is locally aggressive or malignant and has a slightly female predominance. Occurs in patients between the age of 20 and 40 years. Due to

rich neo-vascular net the treatment of this tumor requires multidisciplinary approach for prevention of expected bleeding during surgery.

Case report: A 34 years old man was admitted to our hospital for treatment. He had 2 year history of low back pain that radiated down his left leg, and treatment of discus hernia. He presented lost on weight, 20kg. We performed X Ray, which showed a typical pelvic giant cell. A 64 MSCT scan confirmed a giant tumor of the left ossis illei, with a rich neo-vascularisation. A CT-guided biopsy confirmed the diagnosis of pelvic giant cell. A multi disciplinary team of vascular and orthopaedic surgeons and radiologists performed the treatment. First an angiography and interventional coiling of the neo-vascular net of a. iliaca int. l. sin was done. Due to large lumen of the pathologic vessels – coiling was possible in combination with bio-glue Artex –vascular sealant. Preoperatively invasive arterial pressure line and central vein catheter were placed. He was in general anesthesia, with 7gr. Tranexamic acid. Vascular surgeon performed vascular preservation of the operative field. The tumor was eradicated by combination of enblock resection and curettage. Bone cement was used for remodeling of sacral and illeal bone as well as killing a residual tumor cells. At the end two Kirschner's needles were used for strengthening of the bone cement. Intra operatively diuresis was 500ml. During the surgery the patient was cardio circulatory stable. The duration of the surgery was 5 hours. The blood loss was 2. 8L, substituted with 10 units of erythrocytes, 8 units of fresh plasma and 9. 5 L of ringer lactate. He was extubated after 10 hours. Post operatively there was an early mobilization and complete functional recovery of the left leg. Control X Ray of the lungs was clean. Follow up period of 4 years.

Conclusion: Giant cells are locally malignant. Usually affect young adults and have high degree of invalidity. They are characterized with a rich neo-vascular net with topic position on pelvic bones. Multidisciplinary approach in such cases results with excellent postoperative success, even in patients with progressive disease stadium.

USE OF CEREBRAL OXIMETRY IN THROMBOENDARTERECTOMY OF THE CAROTID ARTERY

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Background: Cerebral oximetry allows continues measurement of cerebral oxygenation by the principle of non-invasive infrared spectroscopy. ¹ A monitor is connected to a patient with two electrodes placed on the left and right side of the forehead. ² Normal values of cerebral oximetry range between 60-80%.

Objective: The aim of this study was to consider the use of this monitoring during thrombendarterectomy of carotid arteries.

Methods: In a 3 year period, 297 patients were operated, 183 male and 144 women, with a mean age of 70 years. Most of the patients were with comorbidities: with coronary heart disease 161 patients, with diabetes 111 patients, with hypertension 224 patients and with hyperlipidemia 203 patients. Preoperatively all patients were pre medicated with midazolam 3-5mg. After introduction of general endotracheal anesthesia, electrodes were placed on the patients' forehead for measurement of the cerebral oximetry and the values were continuously noted.

Results: From the 297 patients in 204 patients was not observed decline in cerebral oximetry. In 75 patients was noted a decline of 10-15% of cerebral oximetry of the unilateral hemisphere during clamp time of the carotid artery, while in 20 patients a decline of unilateral cerebral oximetry for more than 15% was registered. In the last group preventive measures were taken: increase of FiO₂, increase of perfusion blood pressure with use of vasopressors (noradrenaline 0.05-0.1 µg/kg) and the vascular surgeon was informed.

Conclusion: The use of cerebral oximetry allows us timely recognition of cerebral perfusion changes and taking adequate measures to prevent long term ischemia of the brain tissue.

GENERAL ANAESTHESIA AND COCAINE ABUSE

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Introduction: Cocaine is a commonly abused drug, alkaloid extract from the leaves of the *Erythroxylon coca*. If cocaine is used for prolonged period, addiction and physical tolerance may become established, thereby creating the possibility of physiological reactions following withdrawal. These effects can profoundly change the action of other administered drugs such as anaesthetic agents.

The physiologic effects of cocaine ingestion include inhibition of norepinephrine, dopamine and serotonin transporter mechanisms. The increase in systolic, diastolic and mean arterial blood pressure, heart rate and body temperature are common. The potential for coronary artery vasospasm resulting in ischemia can induce cardiac arrhythmias. All these are considered to be caused by a sympathetic stimulation syndrome with secondary increased plasma level of norepinephrine. The main effects of stimulant drugs are increased values of MAC for anaesthetic agents and cardiovascular instability.

Case report: We are reporting a case of cardiovascular collapse in a patient with cocaine abuse, while recovering of anaesthesia. During the operation patient was presented with hemodynamic stability and slightly sinus tachycardia. Volatile anesthetic, isoflurane, was included with MAC 2%. Before the patient was extubated and the anticholinesterase agents were given he was suddenly presented with diaphoresis, heart rate raised to 130/min and blood pressure fell to 50/30mmHg. Alfa adrenergic agonist and plasma expanders were given and central catheter was placed in left jugular internal vein. After 5 minutes patient was stabilized with values of blood pressure 120/70mmHg and heart rate of 90/min. Patient's history of drug abuse was unknown until he was admitted in the ICU.

Conclusion: Cocaine abusing patients are commonly admitted to hospital as a direct result of their drug abuse but many will be admitted for other, unrelated reasons. The understanding and early recognition of cocaine interaction with drugs and cardiovascular complications are essential for adequate management.

BRONCHOPNEUMONIA IN PREGNANT PATIENT - CASE REPORT

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Introduction: Pneumonia is the most frequent cause of nonobstetric infection in the pregnant patient and is the third most common cause of indirect obstetric death. A number of physiologic and hormonal changes occur in the pregnant patient but the alteration in immune status is the major predisposing factor to pneumonia.

Case report: 17 years old patient in 33-ird gestational week is received in our Clinic from Clinic Hospital Tetovo because of bronchopneumonia and severe tachydispnea. Her condition was deteriorated during the three days she was hospitalized there and she was received in extremely difficult general condition – pulse 135/min; saturation with oxygen 84%; severe tachydispnea; high fever ($>39^{\circ}\text{C}$). Patient is immediately intubated and set on mechanical ventilation (IPPV) with 100% oxygen. Patient saturation was 91-92% despite the 100% oxygen. Cesarean section was performed after 2 hours because of fetal distress. Laboratory analysis showed extreme leucocytosis, anemia, hipoproteinemia, highly increased urea (22), creatinin (425) and CRP(246). Rtg showed bilateral bronchopneumonia with left pleural effusion. During patient stay in ICU two antibiotics (Invanz and Vancomycin) were ordained, hypoproteinemia was corrected, diuresis was continuously stimulated. The second day in our ICU patient was in better condition, with Sat 97-99% with 35% oxygen, afebrile with constant improve in laboratory analysis. Fifth day patient is extubated, she is cardio circulatory stable and is feeling much better. Transferred the sixth day to the department in excellent condition.

Conclusion: All diseases in the pregnant host can have an impact on mother and fetus, contributing to morbidity and mortality. The main focus of management is prevention and early and multimodal approach in treatment.

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PULMONARY ATELECTASIS AFTER LAPAROSCOPIC CHOLECYSTECTOMY: CASE REPORT

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Introduction: Respiratory complications after laparoscopic surgery are an important area of concern because they are a major cause of morbidity and mortality. Multiple factors, including surgical, anesthetic and patient variables, contribute to the etiology of postoperative respiratory complications. The changes with pneumoperitoneum to the mechanical properties of the respiratory system predispose patients to airway closure and collapse of dependent lung regions which can lead to atelectasis.

Case Report: A 50 year old patient, 75kg weight, smoker (20-30 cigarettes per day) was scheduled for elective laparoscopic cholecystectomy. The anesthetics, thiopental sodium, succinylcholine, fentanyl and pancuronium bromide were used for the induction and maintenance of anesthesia. Volume control ventilation was used during the surgery with TV of 550ml, RR of 12/min and PEEP – 5cmH₂O. During the intraoperative and early postoperative periods the patient was hemodynamically and respiratory stable, without significant changes. Two days after surgery the patient presented dyspnea, tachypnea and tachycardia. The results from the repeated chest x-ray showed pulmonary atelectasis. The treatment included vigorous chest physiotherapy, nebulized bronchodilators, intravenous antibiotics and continuous positive airway pressure via facemask.

Conclusion: Protective mechanical ventilation during general anaesthesia, for laparoscopic surgery, as provided by lower VT, adequate PEEP and recruitment maneuver, might improve respiratory function in the intraoperative period and have beneficial effects continuing in the post-operative period.

HEMOSTATIC RESUSCITATION, CASE REPORT OF OPTIMAL RESUSCITATION AND SURVIVAL

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Introduction: Damage control resuscitation (DCR) focuses on initial haemostatic resuscitation and early use of blood products to prevent the lethal triad of acidosis, coagulopathy, and hypothermia. The use of DCR and DCS (damage control surgery) have been associated with improved outcomes for the severely injured and wider adoption of these principles where appropriate and may allow this trend of improved survival to continue. In particular, DCR may allow borderline patients, who would previously have required DCS, to undergo early definitive surgery as their physiological derangement is corrected earlier.

Case description: 19 year old male got hurt by accidental falling on a iron rods of a pedals on a lake boat. He got multiple visceral injuries with extensive blood loss. He was brought to the hospital with profound hypotension, high heart rate and low level of consciousness. Emergency CT scan was made and found that he had lesion on pars anterior and pars posterior vesicae urinariae, lacero –contusion of the rectum and ongoing haematuria. Laboratory Test shows: RBC $2.05 \times 10^6/\mu\text{L}$; HGB 65 g/L; Hct 0. 25; PLT $95 \times 10^9 /\text{L}$; WBC; hypoalbuminemia, hypocalcemia and high CRP. Decision for administration of transfusion was made and the patient received 4 pack of RBC and 2 pack of FFP, Calcium gluconate 10 ml and 500 ml of NaCl 0. 9%. The blood pressure and heart rate were near normal level and after that the patient went under General anesthesia and repair of the lesions were made. The patient recovered well and after 2 months he was fully continent with restored function of the v. urinaria, ureters and intestinal system.

Conclusion: Haemostatic resuscitation is a key component of damage control resuscitation and forms the basis of most massive transfusion protocols. The early administration of red blood cells (RBC) and fresh frozen plasma (FFP) is a priority to maintain arterial oxygen delivery and restore an effective coagulation. It is not possible to determine the optimal hemoglobin levels in patients with traumatic hemorrhagic shock, because no studies have assessed the relationship between hemoglobin levels and the adverse outcomes in patients with critical bleeding. In addition, the hemoglobin level target may depend on the patient's medical history (age, history of cardiovascular diseases) and the type of trauma (presence or absence of brain injury). The administration of RBC is considered indispensable when the hemoglobin level is $<7 \text{ g/dL}$. This recommendation is based mainly on the results of the Transfusion Requirements in Critical Care (TRICC) study.

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ANAESTHETIC MANAGEMENT FOR TRANSCATHETER AORTIC VALVE IMPLANTATION (TAVI): AN OVERVIEW OF OUR EXPERIENCE

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INTRODUCTION: Transcatheter aortic valve implantation (TAVI) is a valid therapeutic alternative for patients with severe aortic stenosis and high surgical risk. It is a new development that potentially offers a number of advantages to patients and healthcare providers. These include the avoidance of sternotomy and cardiopulmonary bypass, and much faster discharge from hospital and return to functional status.

However, many aspects about perioperative anesthetic management for TAVI are still to be defined because there is no general consensus regarding the role of anaesthesia choice in TAVI management.

GOAL OF STUDY: The goal of this study was to assess the benefits and disadvantages of local anaesthesia (LA) versus general anaesthesia (GA) in patients undergoing TAVI.

MATERIALS AND METHODS: Four patients, older than 60 years, were analysed at University Clinical Center "Mother Theresa". Three of the cases, we performed, received GA, using Midazolam, Fentanyl, Roccuronium and Propofol, leaving a completely immobile patients, so the incidence of vascular complications could be lowered to minimum. Only one patient received LA with intravenous sedation with Midazolam and analgesia with low dose of Fentanyl, and the reason for this choice were the patient's comorbidities and age.

RESULTS: Compared with GA, LA gives the anaesthesiologist hemodynamical stability with reduced need for intraprocedural vasopressor support, reduced procedure time, shorter ICU length of stay and avoiding a mechanical ventilation, but leaves a possibility for emergency intubation, difficult airway management, aspiration, large uncontrolled bleeding, arrhythmias, tamponade.

DISCUSSION: TAVI poses significant challenges about its management because of the procedure itself and the population who undergo the implantation. Anesthetic strategies vary in different centers. Local anesthesia or general anesthesia are both valid alternatives and can be applied according to the patient's characteristics and procedural instances.

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CONCLUSION: The perioperative strategies keep on evolving. The strategy depends on the experience of the anesthesiologist and of the cardiologist. After the initial experiences, many groups began to employ, routinely, sedation plus local anesthesia and their procedural and periprocedural success demonstrates that it is feasible.

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SUGAMMADEX USE FOR DIRECT LARYNGOSCOPY IN PATIENTS WITH VACTERL SYNDROME

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INTRODUCTION AND AIM: Vacterl Syndrome; V: vertebral anomaly, A: anal atresia, C: cardiac anomalies, TE: tracheoesophageal anomaly, R: renal anomalies and L: a syndrome arising from upper extremities¹. In this case, we share the use sugammadex and apneic ventilation in patients undergoing direct Laryngoscope for tracheoesophageal fistula examination.

CASE: 6300 gram, 11 months old patient with VACTERL syndrome had been admitted to ENT department for repaired tracheoesophageal fistula examination via direct laryngoscopy. In the patient's past history, patient was recorded to be born via cesarean, in first minute of the birth; the APGAR score was 5 and the patient was intubated. In the first day of the birth, the patient was urgently operated due to tracheoesophageal fistula, oesophageal stenosis and anal atresia. Since birth, the patient has been observed with NIV CPAP in the pediatric ICU because of respiratory insufficiency. The baby also had secundum ASD, sacral agenesis in the bone, and neurogenic bladder.

In preoperative evaluation of the patient; tachypnea, dyspnea, wheezing, coarse breath sounds were observed. For diagnosis and evaluation, intermittent mask ventilation (apneic ventilation) was planned, without intubation. Patient's heart rate was 138 bpm, SpO₂ was 89% and blood pressure was 80/40 mmHg. Anaesthesia was induced with 8% sevoflurane in 50% oxygen and 50% N₂O mixture. Adequate ventilation settings was adjusted by ET-CO₂ monitoring. After SpO₂ 100% has reached, direct laryngoscopy was permitted. During the endoscopic imaging, there were no fistula but a probable compress to the trachea from a diverticulum of the esophagus was observed. As soon as the SpO₂ has fallen below 95%, mask ventilation was launched. While ET-CO₂ was being observed, the trace was suddenly disappeared on capnography and the patient could not be

ventilated. Then 3 mg rocuronium bromide was given intravenously, and intubation was attempted but the patient could not be intubated. Mask ventilation was continued and sugammadex 24 mg was given intravenously. Spontaneous ventilation was regained in one minute. ETCO₂ traces reappeared on capnography and the oxygen saturation quickly reached up to 100%. Ten minutes after return of spontaneous breathing, the patient was transferred to the pediatric intensive care as active, motile and awake.

DISCUSSION AND CONCLUSION: Sugammadex is new agent for neuromuscular block reversal, which encapsulates rocuronium molecule². It is known that Sugammadex is used for patients, under 2 years old, who could neither be intubated nor ventilated³. Hereby, we used Sugammadex safely in the patient with VACTERL syndrome that was hard to secure respiratory gateway.

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SESSION-3

12: 00-13: 00
Chairs: Jülide Ergil, Aslı Dönmez

VIEW OF VIDEOLARYNGOSCOPE MAY BE OBSTRUCTED BY THE DOUBLE-LUMEN TUBE: DIFFICULT AIRWAY MANAGEMENT AND DOUBLE-LUMEN TUBE PLACEMENT VIA AN AIRWAY EXCHANGE CATHETER IN A PATIENT WITH UNANTICIPATED DIFFICULT AIRWAY

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Background: The placement of double-lumen tube (DLT) by using various video-assisted devices, in patients with difficult airway, was reported before^{1, 2}. We

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present DLT insertion via airway exchange catheter due to obstructed view of videolaryngoscope by the DLT itself, in a patient with difficult airway.

Case Report: 47-year-old ASA-I patient was scheduled for excision of mid-esophageal leiomyoma. One-lung-ventilation (OLV) was planned. The patient's Mallampati score was II; head-neck anatomy and mobility did not suggest difficult airway. Following anesthetic induction the ventilation via face mask was not difficult; however, the Cormack-Lehane laryngoscopic view was grade 3. The DLT was not suitable to be used with a stylet due to its rigid structure, to facilitate either direct laryngoscopy or videolaryngoscopy. Besides, in its own structure the DLT could not be advanced alongside the videolaryngoscope; because it obstructed the view. The trachea was intubated by a single lumen endotracheal tube (ETT) via videolaryngoscope. An airway exchange catheter was advanced through ETT. Exchanger was advanced until it matches the distance of ETT, to verify its location in carina. The tube was pulled out and DLT was advanced over the exchanger through its bronchial lumen. The distances of both exchanger and DLT were checked to be matched during exchange in order to prevent any injury to the walls of trachea and bronchus. On reaching carina, DLT was advanced into the left main bronchus. Exchange catheter was pulled out to verify placement of DLT by FOB. The surgery was completed without complication.

Discussion: In patients with difficult airway, the DLT placement was reported to be facilitated with various airway management devices, mostly comprised of video assistance¹. Videolaryngoscope is an effective and safe device to be used in difficult airway management, also for DLT placement. However, in our patient the DLT could not be flexed to suit the structure of the blade; and it obstructed the view of the videolaryngoscope. An orally advanced FOB loaded by DLT could be an alternative; however, the manipulation of the pediatric FOB could be difficult through the oral passage.

Conclusion: The exchange catheter should be considered as an effective device to be used for the placement of a DLT in patients with difficult airway.

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SESSION-3

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ANESTHETIC CONSIDERATION FOR A PATIENT WITH TRACHEAL OBSTRUCTION CAUSED BY GIANT MULTI-NODULAR GOITER: A CASE REPORT

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Introduction

In practice, it is important to predict possible ventilation and intubation difficulties in the preoperative period. An enlarged thyroid mass can produce tracheal obstruction by compression or intraluminal invasion or both. We report the anesthetic management of a patient with giant diffuse multi-nodular goiter undergoing thyroidectomy.

Case

41-years-old, 150 cm, 47kg female patient referred to the general surgery clinic with a neck mass that caused pain, dyspnea, and hoarseness. She had no specific past medical history. Neck CT revealed 103x86x117mm right thyroid gland and 65x62x120mm left thyroid gland extending to the anterior mediastinum and retropharynx with bilateral tracheal stenosis and a short narrowed hypopharyngeal segment due to compression. Videolaryngostroboscopy showed a narrow airway segment at the oropharyngeal level and edematous arytenoid cartilages. Surgical thyroidectomy was planned. At the preoperative anesthetic evaluation, the patient's airway was notable for a short neck with good range of motion, a giant neck mass and a Mallampati class II score. No premedication was given. Preparation for a possible difficult airway management and standard monitoring including ECG, SpO₂ and NIBP were done. Denitrogenation was induced with 100% oxygenation at 6.0 L/min for 5 minutes. After induction of anesthesia with propofol 2mg. kg⁻¹, and lidocaine 1mg/kg⁻¹, assisted ventilation with 100% oxygen was confirmed to function well and rocuronium 0.5mg/kg⁻¹, and fentanyl 1mcg/kg⁻¹ were administered. Endotracheal intubation was performed by direct laryngoscopy using a 6.0mm cuffed tracheal tube without any problem. The operation was started after placing a catheter into the left dorsalis pedis artery for continuously monitoring of the arterial blood pressure. The operation was uneventful. Extubation was performed after giving 4mg. kg⁻¹ iv Sugammadex and confirming that the patient's spontaneous breathing was restored. The patient was transferred the post-anesthesia recovery unit.

Conclusion

Patients with goiter are common and, in extreme cases with giant thyroid masses, may present a unique set of challenges to the anesthetist. History taking and assessment should focus on the patient's thyroid status, predictors of possible difficult airway, and symptoms and signs secondary to the goiter. A multidisciplinary team approach with surgical colleagues allows safe management.

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MANAGEMENT OF DIFFICULT AIRWAY IN A PATIENT WITH MUCOPOLYSACCHARIDOSIS TYPE 6

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INTRODUCTION / BACKGROUND

Mucopolysaccharidosis (MPS) type 6 or Maroteaux -Lamy syndrome is characterized by the accumulation of chondroitin sulfate and dermatan sulfate in tissues because of lack of N- acetylgalactosamine -4 -sulfatase enzyme. Short neck, macroglossia, gingival hyperplasia, mandibular abnormalities, airway obstruction and cervical instability complicates the airway management. Also togetherness of comorbidities like restrictive lung diseases and cardiovascular abnormalities hardens the anesthesia management. In this case report; the anesthetic management of patient who underwent adenotonsillectomy and bilateral ear tube insertion with MPS type 6 is discussed.

CASE PRESENTATION

Five -year-old male patient with MPS type 6 was operated for adenotonsillectomy and bilateral ear tube insertion. In preoperative evaluation, enzyme replacement therapy (Naglazym) and enalapril (1x25 mg) plus digoxin (2x3 drops) for heart failure. The patient displayed coarse facies, macroglossia, short neck and anterior chest wall deformity with Mallampati 3 and classified as ASA II. Following standard monitorisation and 0. 5 mg/kg midazolam premedication induction was achieved with propofol 120mg, 12. 5 mcg of fentanyl, 6% sevoflurane in 50% nitrous oxide-oxygen mixture without neuromuscular blocker. Mucous membranes of the epiglottis and vocal cords were viewed thickened in videolaryngoscopy. The patient was successfully intubated with uncuffed 4 ID endotracheal

tube. After extubation without any intraoperative complication, the patient was sent to the recovery room.

RESULTS / DISCUSSION

Consequently, pre-anesthesia evaluation is important for patients with MPS type 6. The anesthesiologist should be prepared for the possibility of difficult airway. Also the use of videolaryngoscopy avoiding head extension should be kept in mind.

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ANESTHESIA MANAGEMENT WITH A PATIENT WITH PRIMARY CILIARY DYSKINESIA

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INTRODUCTION / BACKGROUND

Primary ciliary dyskinesia (PCD) is an autosomal recessive disease in which the ciliary activity deteriorates and characterized by recurrent infections and decline in lung function for long-term. In this case we want to discuss the anesthetic management of patients with PCD who underwent for nasal polyposis resection.

CASE PRESENTATION

Seventeen-year-old male patient is operated for nasal polyposis. The patient was diagnosed as ciliary dyskinesia at neonatal period. Physical examination and laboratory values were normal. The patient evaluated as ASA 2 and was given 1 mg IV midazolam for premedication. Standard monitoring (ECG, SpO₂ and non-invasive blood pressure) and bispectral index (BIS) monitoring was performed. Before induction SpO₂: 97% HR: 117 / min and blood pressure: 106/80 mmHg, the BIS value was 95. Lidocaine 1 mg / kg propofol 2 mg / kg, fentanyl 1 mcg / kg and rocuronium 0. 6 mg / kg iv was administered for induction. The patient's Cormack-Lehane classification was 2 and the patient could be intubated with a 7. 5 cuffed endotracheal tube in trial 2. Maintenance of anesthesia was achieved with the infusion. with 50% O₂ / air and propofol 2-5 mg / kg / h and remifentanyl 0. 05-0. 2 mcg / kg / min. SpO₂ declined to 94% at the first hour of operation. Wheezing and crackles were detected by listening to the lung sounds. The patient's tube was aspirated and administered inhalation ventolin nebul.

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Then SpO₂ rised to 100%. The patient was reversed by sugammadex after 3 hours of surgery. When full alertness (BIS: 90) achieved the patient was extubated and transferred to the related service.

RESULTS / DISCUSSION

The principal objective in PCD is to reduce symptoms, fight infections, maintain lung function and prevent damage to the lungs. The choice of anesthesia methods are based on the knowledge and experience of the anesthesists. Generally, the anesthetists choose the balanced anesthesia with sevoflurane for bronchodilating effect and early awakening. TIVA may be alternative method because of the short duration of the recovery and ease of control.

Eventually, in PCD patients we want to emphasize the importance of preoperative evaluation, intraoperative monitoring, ventilation strategies and bronchodilator therapy.

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ANESTHESIA MANAGEMENT OF MASSIVE INTRA-ABDOMINAL EXTRAVASATION DURING PERCUTANEOUS NEPHROLITHOTOMY IN PEDIATRIC PATIENT: CASE REPORT

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CASE REPORT

Percutaneous nephrolithotomy (PCNL) is a minimally invasive method. But It has some fatal complications. Such as high fever (21-32. 1%), hemorrhage requiring blood transfusion (11. 2-17. 5%), extravasations of fluid used (7. 2%), sepsis (0. 3-4. 7%), colon injury (% 0. 2-4. 8) and pleural injury (0-3. 1%).

16 month of age male patient with bilateral nephrolithiasis was scheduled for left PCNL under general anesthesia. He was 10 kg of body weight. According to physical examination and laboratory results there was nothing abnormal except blood pressure (BP) (135/80 mmHg), WBC count (18800/ µL). He was medicat-

ed with antibiotic (according to urinary culture) and antihypertensive drugs. He was ASA III. Propofol, rocuronium bromide and fentanyl were administered for induction and he was intubated with 4.5 cuffed endotracheal tube. Left double J catheter was removed and left urethral catheter inserted during lithotomy then he turned into the prone position. SpO₂ started to decrease (92%) at 140th minute of anesthesia. Intraabdominal distention was suspected manually. Operation was stopped and patient positioned supine. Over abdominal distention was detected. He was cold, pale. Wet dressing and coats were removed. The SpO₂ decreased to 77%, HR was 98/min, BP was 70/35 mmHg. His body temperature was measured 33.6 °C, tympanically. The intraabdominal fluid was drained by paracentesis with USG. We tried to increase body temperature of the patient by warm blanket and iv fluid. Arterial blood gases and complete blood count analysis were revealed pH 7.24, pCO₂ 28.1 mmHg, pO₂ 62.3 mmHg, lactate 1.5 mmol/L, HCO₃ 11.7 mmol/L, BE -14.2 mmol/L, Hb 7.5 g/dL, Htc 23.5%. Metabolic acidosis was intervened with NaHCO₃. Erythrocyte suspension at dose of 10 ml/kg was administered. After correction of vital parameters of patient he was extubated and transferred to intensive care unit. Patient was discharged from hospital on postoperative 10th day without any disability.

We concluded that during especially PCNL surgery of child patients, heating of the irrigation fluid, monitoring of body temperature and electrolyte levels, intermittent abdominal examination should not be ignored to early detection of major fatal complications (eg. , intra-abdominal extravasation of irrigation fluid. ...)

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HEMORRHAGE DUE TO ENDOTRACHEAL INTUBATION IN A PATIENT WITH AMYLOIDOSIS IN THE NECK

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Introduction: Amyloidosis is a disease characterized by deposition of protein in tissues and organs, affecting mostly respiratory, urogenital, and gastrointestinal tract as well as the skin (1). When these fibril deposits disrupting organ function confine to a single organ system, it is "localized amyloidosis". Laryngeal amyloidosis affecting mostly vocal cords and ventricles is relatively rare (2).

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We herein; present a patient undergoing surgery for amyloidosis located in neck region; to provide recommendations regarding the anesthetic management and follow-up of these patients.

Case Report: A 60 years old male patient with complaints of respiratory distress was hospitalized for excision of a mass in the neck. He had been diagnosed as amyloidosis following a nasopharyngeal biopsy procedure, seven years ago. There was nothing remarkable, except for adenotonsillectomy and heavy smoking given up recently. On direct laryngoscopy, there were interarytenoepiglottic amyloid deposits, and the thoracic MR showed mediastinal conglomerated lymphadenopathy (LAP) (Figure 1).

The patient was intubated with 8 Fr endotracheal tube without any problem. At the end of operation, on aspiration of endotracheal tube and mouth, there was fresh hemorrhage. Besides the patient had serious stridor after extubation. Thus, he was re-intubated with 6.5 Fr endotracheal tube via videolaryngoscope. Mucosal bleeding observed around epiglottis was tamponed with adrenaline under direct laryngoscopy; then he was extubated again. In the recovery room, as soon as O₂ saturation reached 95% by nasal O₂ and cold steam, he was transferred to the service with a normal pattern of breathing. However, he had respiratory failure at the service after 8 hours, thus surgical tracheostomy was required to be performed under general anesthesia. On 4th day of surgery; due to development of pneumothorax and bilateral parenchymal infiltrations, he was being treated in intensive care unit (ICU) for mechanical ventilation support (Figure 2). On 24th day at ICU, he was re-transported to the service.

Conclusion: This case demonstrated the fate of a patient due to development of hemorrhage and respiratory failure following recurrent surgeries for amyloidosis. Thus, the possibility of life threatening conditions should be kept in mind and precautions should be taken.

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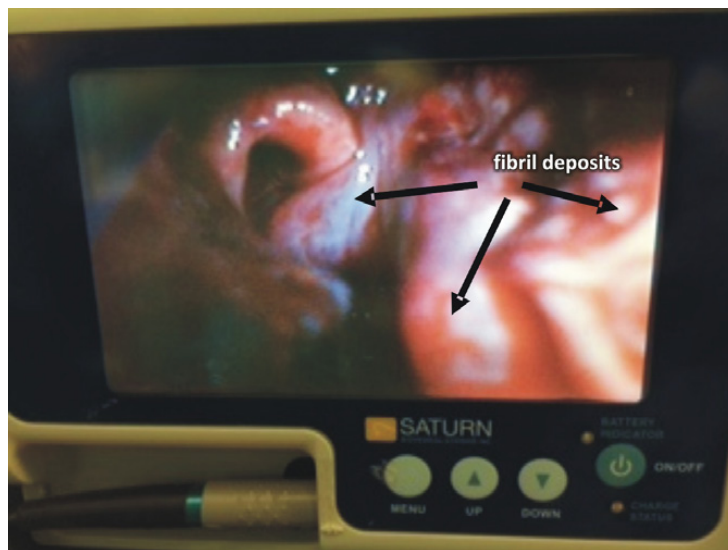


Figure 1: The view of epiglottis under videolaryngoscope



Figure 2: Bilateral parenchymal infiltrates in lung X-Ray

ANESTHETIC MANAGEMENT OF HEREDITARY METHEMOGLOBINEMIA

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INTRODUCTION

Methemoglobinemia is a severe clinical disorder characterized with cyanosis and respiratory insufficiency resulting from decreased oxygen carrying capacity to the tissues because of the increased blood level of methemoglobin (1-3). Methemoglobinemia is mostly an acquired disorder which appears after toxic exposition; however rarely it is hereditary (4). In this study, anesthesia management of a patient with hereditary methemoglobinemia who has undergone a thyroidectomy is presented as a case report.

CASE: 45 years old female patient who would undergo a total thyroidectomy surgery was evaluated preoperatively and mild cyanosis of the extremities and lips were detected. However the patient had no respiratory complaint. She was taken into the OR and monitored. NIBP was 167/75mmHg and HR was 74 (BPM). Arterial blood gas revealed a pH 7. 41, pCO₂: 35 mmHg, pO₂ 28 mmHg, SpO₂ 28. 5 % and metHb 10. 9%. The patient's respiration was at ease and she was stable. In order to raise sPO₂ 100% O₂ was given. When SpO₂ was around 45-50 % induction began. Anesthesia was maintained with 75 % O₂ + 25 % air and 6% desflurane and 0. 15-0. 25 mcg. kg⁻¹. min⁻¹ remifentanyl infusion. peroperative arterial blood gas analysis revealed a pH 7. 40, pCO₂ 30. 9 mmHg, pO₂ 212 mmHg, SpO₂ 76 %, metHb 11. 8 %. After the extubation SpO₂ was 42 % and ABG sample revealed a pH 7. 38, pCO₂ 31. 3 mmHg, pO₂ 244 mmHg and SpO₂ 77 %. The patient was sent to the surgical ward as conscious, comfortably breathing and hemodynamically stable.

DISCUSSION: In methemoglobinemia cases using higher concentrations of oxygen because of the reduction of the oxygen carrying capacity, using co-oxymeter instead of pulseoxymeter and avoiding oxidative agents such as lidocain, prilocain and nitroglycerine are particularly important. Accurate evaluation of the parameters preoperatively and recording them will be guiding us through the intraoperative and postoperative periods.

RESULT

Using higher concentrations of oxygen because of the decreased oxygen carrying capacity, using co-oxymeter instead of pulseoxymeter for determining peripheral oxygen saturation and avoiding oxydative agents are some of the perioperative precautions that should be taken in congenital methemoglobinemia.

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USE OF INFRACLAVICULAR TEMPORARY PERINEURAL CATHETER IN THE EXERCISE FOR RANGE OF JOINT MOTION – CASE REPORT

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Abstract

Olecranon fractures are the most common type of injury seen in the upper extremities and restricted joint mobility may be developed due to the long plaster cast time. Most of these patients will have to exercise to increase range of motion in the early period. This physiotherapy process is a serious stressor for these patients because of pain. In addition to several modalities such as systemic administration of opioids, permanent/temporary perineural catheters are used in order to decrease pain and allow patients to exercise more comfortably. Local anesthetic administration through perineural catheter has been proven to improve patients' rehabilitation and healing. Herein, we present a 41 year old

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male patient with restricted motion of the elbow following treatment of olecranon fracture, in which infraclavicular temporary perineural catheter decreased pain and eased exercise during physiotherapy.

Temporary peripheral nerve catheter can be used for a short time or intermittently in order to provide a postoperative pain free physiotherapy course and to accelerate rehabilitation and healing providing a good maintenance and control processes.

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IS ACUTE ANEMIA SPENDING TIME AS IMPORTANT AS THE AMOUNT OF HEMOGLOBIN? ANOTHER PERSPECTIVE TO NEUROPROTECTION.

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Introduction: In our case we presented the massive bleeding trauma patient whose femoral artery was interrupted by log fell over his left leg.

Case: 35 yo, male, healthy patient was transferred our hospital emergency service by health providers. He was conscious, pale, Glasgow coma scale (GCS) 15, cooperative, tachycardic, hypotensive. Lung auscultation was normal. There were multiple, displaced and open fractures of his tibia, fibula and femur bones and femoral vein and artery was ruptured. All the soft tissues and muscles were crushed and protruded from the lacerated skin area of the left leg. Hemoglobin (Hb) levels were measured 7 gr/dL and 3 unit (IU) erythrocyte suspension (ES), crystalloid and colloidal solutions were given immediately. Central venous catheter was placed on right vein subclavia. Cardiac arrest occurred. Cardiopulmonary resuscitation (CPR) was started, responded CPR in five minutes and transferred to the operating room for the high level over knee amputation procedure by orthopedics and cardiovascular surgery. Hb level was detected 4 gr/dL. In the operating room patient was unconscious, GCS: 3, ASA- 4E status, pulseless, pupils dilated, light reflexes were negative bilaterally. Norepinephrine and dopamine infusion was continued. Anesthetic induction performed with ketamine and sevoflurane. After induction of anesthesia blood samples were collected

and observed that haemoglobine level was 2 gr/dL. There were 5IU ES, 6 IU fresh frozen plasma, 8 IU thrombocyte given. Arterial cannula was inserted to the right axillary artery and invasive arterial monitorisation was performed urgently. Operation time was two hours. Hb was stood 2 gr/dL level for 1hour. After the operation entubated patient was transferred to ICU unit under nor-epinephrine (NE)and dopamine(DA) infusion. Transamine, sodyum bicarbonate, calcium gluconate, dexametasone 8mg, albumine, vitamin K were done. Four hours after the operation patient had been conscious and GCS: 14. One day after, NE and DA infusion were stopped and extubated with spontaneus breathing in room air. On 5th day he was discharge to orthopedic surgery unit because of the haemodynamic stability without any neurologic sequela.

Conclusion: Massive bleeding leads to lock of oxygen carrying to the tissues. If we improve the brain perfusion protection during massive blood transfusion needs bleeding traumas, replacement of the oxygen carrying system elements must be corrected immediately and adequetly.

Key words: Massive blood transfusion, anesthesia, femoral artery rupture,

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UNDEFINED MULTINODULAR GUATR AGGREGATED TO ACUTE CARBONDIOXIDE RETANSION WITH SEVERE CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS.

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Background: The acute respiratory deficieny and cognitive impairment may develope associated carbondioxide retansion at severe chronic obstructive pulmonary disease (COPD) patients. In our case we observed that the carbondioxide retansion may occurs not only as a part of COPD, but also the upper airway obstruction results. This case pointed that upper airway obstructions may hidden with COPD symptoms and must be evaluated by the physician early stages of the disease.

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Case report: 70 years old, male patient who was taken medication because of the severe COPD and hypertension in pulmonary diseases department service(PDS). In PDS the carbondioxide retention was worsened despite of under noninvasive mechanic ventilation(NIMV), consciousness was closed. The patient were transferred to our intensive care unit such as depressed mental status with confusion, lethargy, superficial spontaneous ventilation 36 breath/min; hemodynamic instability and tachycardia. Partial carbondioxide pressure(PaCO₂) 80 mmHg, end tidal carbondioxide pressure (EtCO₂) 75 mmHg were (Capnostream, Covidien, Medtronic, Israel) detected with main- micro stream apparatus. The blood gas samples analysed pH: 7.343, pCO₂: 70mmHg, pO₂: 73.9mmHg, sO₂: 98%, HCO₃: 35.8 mEq/L. During the physical examination we observed that despite of there wasn't any evident pathology on neck and throat, the breathing pattern was abnormal. During the auscultation delayed insufflation without wheezing was noticed and computer tomographic evaluation performed for suspicious upper airway obstruction. We observed that multinodular goiter (MNG) was made a significant compressing effect on trachea (figure1). Noninvasive mechanical ventilation continued. Vital signs were stabilised in first 24 hour. Et CO₂ and PaCO₂ levels reduced under 50mmHg levels, GKS became 15 and haemodynamic stabilisation occurred. Patient was transferred to the service.

Conclusion: The carbondioxide retention may become manifest easily and refractory in severe COPD patients with togetherness of upper airway obstructions such as mass, obstructive sleep apnea syndrome, tracheomalacia and (MNG). Upper airway pathologies must be evaluated carefully before routine COPD medication and especially major operations. We suggested that this founded and improved etiologies may facilitate to optimise, reduce the medication and ICU stay for this kind of patients.

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Chairs: Dr. J. Bushinowska

REGIONAL ANESTHESIA FOR SURGICAL TREATMENT OF UMBILICAL HERNIA IN MORBID OBESITY PATIENT, A CASE REPORT

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INTRODUCTION AND AIM: There is increased prevalence of obesity in the general population and it represents significant risk factor for mortality and morbidity in patients that are planned for surgical treatments and anesthesia. The

aim of this study is to report the perioperative management of morbidly obese patients undergoing regional anesthesia for surgical treatment.

MATERIAL and METHODS: We present a case of 63 year old female admitted for surgical treatment for umbilical hernia. She is treated for high blood pressure, chronic obstructive pulmonary disease and diabetes mellitus type 2 without prior medical history for surgical treatment and her body mass index is 62.9 kg/m². Evaluation of the airway proposed difficult intubation because of short neck, limited mobility of the neck and mallampati class 4. The patient signed informed consent after she was informed of the high risk and possible complications. Epidural anesthesia was the best choice for the patient and as well for the anesthesiologist. In the operating theater the patient was placed on non invasive blood pressure measurement, electrocardiography (ECG), peripheral oxygen saturation. Her blood pressure was 150/90 mm/Hg, heart rate 100/min, SpO₂ 91%. Lung auscultation revealed prolonged expiration with wheezing sounds. Ampule metoclopramide and ampule ranitidine were given as premedication because of the high risk of gastric aspiration. Two intravenous cannulas were placed. The epidural block was placed in sitting position, at L2-L3 level, with spinal needle 100 mm and epidural needle 88 mm. The patient received 3 ml Ropivacain 7.5% in the spinal space and continuously Bupivacain 0.5% on perfusor pump in the epidural space.

RESULTS: The epidural anesthesia achieved adequate motor block to level Th12-L1 and sensory block to level Th9-Th10. The surgical intervention lasted for 70 minutes. The continuous dose of the Bupivacain 0.5% was changing according to the patient hemodynamic stability. The patient was transferred to postoperative recovery room in stable condition. She was discharged 48 hours after surgery.

CONCLUSION: Preoperative anesthetic assessment is very important because difficult airway and impossible intubation is common in obese patients, so regional anesthesia, if possible, is the best choice for the patient, as well for the anesthesiologist.

**COMPARATIVE STUDY OF REGIONAL ANESTHESIA FOR
CAESAREAN SECTION AND DROP OF ARTERIAL BLOOD
PRESSURE DURING USAGE OF MARCAIN 0, 5% AND HEAVY
MARCAIN 0, 5%**

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Introduction: There are used two different type of local anesthetics during regional anesthesia for caesarean section and comperation of side effects: drop of artherial blood pressure at both grouos after applicatikn of anesthetics.

Method and Material: There examined 120 patients sepaeted into two groups and led with two anesthetixs: Marcain 0, 5% and Heavy Marcain 0, 5% during six months period from 2015/2016.

Case Report: 120 patients with regional anesthesia separeted itno two groups, one group got applicated Marcain 0, 5% and the second group Heavy Marcain 0, 5%. At both groups are included measurment of artherial blood pressure before application and every five minutes after the application with duration until the end od anesthesia. There are also included: age, weight, height, heart rate and oxygen saturation.

Results: They are entered in columns and graphs. Graphically is shown artherial blood pressure of both groups. It is clear that there is drop of blood pressure at both groups, but there is a difference. The group with application of Marcain 0, 5% has shown drop of blood pressure at 20% of all tested patients and the group with application of Heavy Marcain 0, 5% has shown drop of only 5% of all tested patients.

Conclusion: Thus has given us a conclusion that usage of Heavy Marcain 0, 5% is more safe during regional anesthesia at patiens with caeserian section because of higher percentage of cardio-respiratory safety.

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Chairs: Dr. J. Bushinovska

POSTOPERATIVE EPIDURAL ANALGESIA AFTER RADICAL ABDOMINAL HYSTERECTOMY

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INTRODUCTION-AIM: A radical hysterectomy or Wertheim's Hysterectomy is an operation performed to treat cancer affecting tissue mass. Radical hysterectomy induce postoperative pain, organ dysfunction and prolonged hospital stay. The choice of analgesia in unit of intensive care depend on the type of surgery the patient is having. Different type of analgesia can be combined for additive or synergistic pain relief including regional analgesic techniques. Ideal epidural technique provide effective pain relief in patients recovering from radical hysterectomy with minimal side effects and high level of patients satisfaction.

MATERIALS AND METHODS: In this study was include 20 female patients ASA I or ASAII, from 20-60 years, who had diagnosis of cervical cancer, clinically staged IA or IB classification with lymph vascular invasion. All of them had radical hysterectomy.

Lumbar epidural catheter was input preoperative. Postoperative epidural analgesia was administered via a continuous infusion of local anesthetic LA and opioid.

Bupivacain 0, 125 % 10-20 mg/h with fentanyl 10 microgram/ ml was infused epidural

RESULTS: Pain is a complex, subjective experience witch has provide difficult to measure in a reproducible way. Postoperative pain was assessed over 24h using visual analogue scale VAS or numerical pain rating scale NPRS. On scale of 0-10, with 0 being no pain at all and 10 being the worst pain imaginable. All of them had score 3 or less out of 10 on VAS or NPRS. That means they had adequate postoperative pain relief.

DISCUSSION AND CONCLUSION: From this study, we concluded that using of epidural analgesia, with local anesthetic and an opioid after radical hysterectomy were effective in pain relief.

This level of pain relief is central to early mobilization, rapid rehabilitation and reduced hospital stay of patients.

ACUTE THERAPY OF PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA IN PREGNANCY

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Introduction: One should question whether arrhythmias in pregnancy should be treated in the same way as they would be outside pregnancy because all commonly used antiarrhythmic drugs cross the placenta. Correct therapy based on an understanding of the cause for the arrhythmia is not only life-saving for the mother but also plays an important role for the foetus[1, 2].

Case report: We present a case of maternal SVT in a 23yearold student with a history of paroxysmal SVT from the age of 20, treated with verapamil when needed. Her pre-pregnant symptoms consisted of palpitations 2-3 times a month, lasting around 5 to 15 min, and terminated by breath holding without more serious symptoms. Full investigations revealed no cause for these episodes. During pregnancy, these episodes increased in frequency and in the third trimester were accompanied with shortness of breath and dizziness.

Because of concerns that induction of labour may exacerbate her cardiac problems, it was decided to deliver her by Caesarean section at 38 weeks gestation. The day before the delivery, the patient felt a sudden attack of palpitations with dyspnoea which ended with colaps. She was immediately transported in ICU. The ECG recorded a SVT at a rate of 230 bpm. The injection of 10mg of Verapamil i. v. was not effective and in shortage of adenosine the patient was treated with continuous infusion of 900mg amiodarone in 500ml D5W. After 20 minutes the heart rate began to fall to a 130 bpm. The amiodarone infusion was continued till the next day when the patient was transfered to a regular room.

Caesarean section took place under low-dose spinal anaesthesia, uneventfully delivering a healthy female infant. No further episodes of SVT occurred either intraoperatively or in the immediate postoperative period and she was discharged home 5 days later.

Conclusion: In general, acute therapy of arrhythmias during pregnancy is similar to that in the nonpregnant patient. However, special consideration should be given to potential teratogenic and hemodynamic adverse effects on the fetus. Optimal evidence-based management of maternal SVT in pregnancy is limited by the paucity of reported cases.

ACUTE PANCREATITIS CASE ASSOCIATED WITH THE USE OF VALPROIC ACID

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Background: Acute pancreatitis is rarely seen in children, and, compared to adults, it is often drug induced. One of the drugs that is associated with acute pancreatitis in children is the antiepileptic drug valproic acid, commonly prescribed for generalized and focal epilepsy. The less common and serious adverse effects from the use of this drug include hepatotoxicity, coagulation disorders and pancreatitis. ¹

Case report: We present a case of 12-year-old female child with 4-year history of epilepsy and valproic acid induced acute pancreatitis. The patient was admitted in our hospital for suspected acute appendicitis. After the conducted investigation it was set indication for surgical treatment. The exploration of the abdominal and retroperitoneal cavity revealed findings of hemorrhagic necrotizing pancreatitis. The patient underwent 4 days of mechanical ventilation. Number of clinical and para clinical tests were performed (laboratory, virological, hemostatic, immunological, genetic tests and CT and ultrasound of the abdomen). After excluding biliary, idiopathic, multisystem disease, trauma, infections and other causes of pancreatitis, the attending doctors concluded that the cause of pancreatitis in our patient was valproic acid. Subsequently it was conducted adequate symptomatic therapy and replacement of the valproic acid with levetiracetam, after what the patient was discharged in good general condition.

Discussion and Conclusion: Acute pancreatitis associated with the use of valproic acid is a serious and rare complication and awareness of it and early detection are very important for successful treatment. Early management includes appropriate investigation and drug withdrawal. ²

DOES THE ANESTHESIA HAVE AN EFFECT ON THE SPREAD OF THE POSTOPERATIVE DELIRIUM IN ELDERLY PATIENTS IN NON-CARDIAC SURGERY?

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GSH "8th September" Skopje, R. Macedonia

Introduction: Since the beginning of the 21st century modern clinical studies aimed at exploring the effects of the anesthesia as a factor for the postoperative delirium (PD). The postoperative delirium is defined as an acute change in the mental state resulting in impairment of the cognitive functions (orientation, memory and organizational abilities) and the inability to concentrate and maintain the attention, problems in the perception and changes in the cycle of sleeping and wakefulness.

Objective: The main objective of the paper is to analyze the impact of anesthesia, especially focusing on the type of anesthesia: the general endotracheal anesthesia (GEA) and the regional anesthesia (RA) on the occurrence of the postoperative period (48 hours).

Materials and methods: The prospective pilot study is performed on 30 patients aged over 60 years in the period of 3 months. All the patient's health state is being followed, the degree of *Кај сите пациенти е следена здравствената состојба*, being determined the risk of interventions (ASA status), the age, the type of anesthesia, the type of operation, level of education, the intraoperative fall of blood pressure and the postoperative oxygen saturation. A psychological test, Blessed orientation, memory and concentration Test (BOMC) is being used for the evaluation of PD. Statistical data analysis is being done.

Results: There is a comparison of results of the physical and mental health of the patients on the day of their admission with the results from the assessment of the mental status on the day of the operation and the second day of the operation. The results are pointing out that there are mental status changes in 5 patients out of which 3 in OEA and 2 in PA, but the difference is statistically insignificant.

Conclusion: The emergence of PD depends on the health status of the sick people, the type of surgery treatment and the anesthesia. Adult patients are most affected by this complications, and they should have their mental and neurological state carefully evaluated because of the adequate assessment of the risk and the benefit of the planned surgery. The study shows that the PD occurs less in PA than in OEA, but the difference is statistically insignificant.

May 19, 2016, Thursday
SESSION-4

12: 00-13: 00
Chairs: Dr. J. Bushinovska

IMPORTANCE OF EARLY AIRWAY MANAGEMENT IN PATIENTS WITH MAXILLOFACIAL TRAUMA

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BACKGROUND: This abstract describes the early and multidisciplinary approach of providing, maintenance and management of an adequate airway in patients with multiple facial fractures as a part of polytraumatism, during the admission in Emergency Department, ICU, intraoperative management and postoperative intensive care.

MATERIALS AND METHODS: The case report analyses a 21 year old patient injured in a car accident, with multiple maxillofacial fractures, classified as LeFort III, that is immediately admitted in the ICU. The patient is conscious with spontaneous breathing at the admission, but adequate sedation is required to perform the additional examinations (complete CT scan, arterial blood analysis) as well as putting the patient in general anesthesia for performing a surgical procedure of a forearm fracture. Vital signs are observed during the whole treatment. Traumatologists, Maxillofacial surgeons, ORL surgeons, as well as Neurosurgeons are all included in the treatment of the injuries as well as helping to maintain a proper airway.

RESULTS: The results show the importance of immediate, frequent and multidisciplinary approach, considering all the possible risks for maintaining a proper airway and avoiding any complications or treating properly the possible complications, concerning a possible difficult airway as a result of the facial fractures and swelling that can compromise the airway.

CONCLUSION: Maxillofacial injuries need special attention since it involves difficult airway due to fracture of facial bones. Safe and optimal airway management is required, and needs to undergo frequent and adequate examinations by the anesthesiologists with constant coordination with the surgeons responsible for all types of injuries of the patient and ongoing examinations and interventions. Adequate analgesia, antibiotic and fluid therapy is also important for maintaining a good general condition of the patient. Special difficult airway technique should be considered if needed for a surgical procedure and all the possible factors that can compromise the airway should be evaluated. Skillful and experienced personnel are mandatory for the treatment of these patients, as is collaboration by the anesthesiologist, maxillofacial surgeon, neurosurgeon and general surgeon, in order to have an outcome with minimal risks and maximal success.

ARDS WITH GRAVID PATIENTS IN INTENSIVE CARE (CASE REPORT)

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Republic of Macedonia**

Introduction: A 17 year old patient accepted in intensive care unit with a diagnosis Graviditas ML IX with heavy breathing, previously treated for several days in a different medical center.

Case presentation: Upon acceptance in the intensive care unit, the patient was with tachydyspnea, tachycardia, with a pale cyanosis on her lips and in forced fixed bed position. She was monitored and RTG Pulmo was performed. First TA was 145/75, heart rate 144/min, SaO₂ 85% and with O₂ supplement 90-92%, laboratory analysis LE 38. 2; CRP 270 PLT 72; TP 42 and ALB 19.

The first result from the RTG Pulmo showed the existence of ARDS. The existence of two-sided consolidation with 300-400 ml pleural effusion was confirmed with a Pulmo echocardiogram by a consultant pulmonologist.

Due to a bad general condition and the bad gas status with a high hypoxia the patient was immediately put on a respiratory IPPV with 12 respirations on 100% O₂ with PEEP 10 and a protocol therapy was ordered.

After 30 minutes due to a deteriorated CTG of the neonatus, the patient was put in an operation room for an emergency caesarian section. Intraoperatively, the patient is treated initially with esmeron 30 mg, izofloran 0, 6 %, fentanyl 0, 2 mg and ratio of oxygen and air 50: 50.

Intraoperatively TA 117/60, heart rate 122 /min and SaO₂ 90-91%. During the whole surgery there was no diuresis although 40 mg of furosemide was given. The intervention lasted 40 minutes and patient was returned to intensive care on a respirator with IPPV regime. In the same time, a double antibiotic therapy was ordered i. e. aminophylline; methylprednisolone 160 mg; furosemide 100 mg; bicarbonates; crystalloids; colloids; 400 ml plasma; 50 ml 20% albumin and 700 ml eritocytes. The next morning there was a graduate stabilization of the condition with TA 125/80, heart rate 90/ min, SaO₂ 98% with 70% O₂ and 2200 ml diuresis.

During the following 5 days in intensive care, the patient had a complete recovery with improvement of the laboratory values, the control RTG was apparently improved, LE 16, CRP 10, PLT 200 with good electrolyte and protein status that lead to a gradual liberation from the respirator.

After 5 days spent in intensive care, the patient was extubated and after 2 days the treatment was continued in the parent institution together with her newborn.

Conclusion: ARDS in a pregnant patient is a challenge to obstetric anesthesiologist. Little evidence exists regarding the management of ARDS specifically in pregnancy, so multidisciplinary approach is necessary for good maternal and fetal outcome.

May 19, 2016, Thursday
SESSION-4

12: 00-13: 00
Chairs: Dr. J. Bushinovska

THE ROLE OF NEAR-INFRARED SPECTROSCOPY (NIRS) MONITORING OF REGIONAL CEREBRAL SATURATION (rSO₂) DURING SHOULDER SURGERY IN THE SITTING POSITION

Kraleva S.

GOB, 8 September, Skopje

The proper management of brain perfusion and oxygenation is one of the principal endpoints of all anaesthesia techniques, but the brain is, still one of the least monitored organs during clinical anesthesiology. Cerebral hypoperfusion and hypoxia is a major problem and contributes to poor neurologic outcome in many clinical cases.

Continuous monitoring of the adequacy of cerebral perfusion and oxygenation (rSO₂) can provide important therapeutic information about cerebral tissue and expected cerebral ischaemia.

In clinical practice, the use of cerebral NIRS as a trend-monitoring helps to provide good cerebral oxygen saturation values, close to their individual baseline values, and has produced lower incidence of adverse clinical events in patients undergoing coronary artery bypass(CAB), carotid endarterectomy, brain aneurysm surgery, aortic arch procedures, and sitting position in shoulder surgery.

The advantages of the sitting position for shoulder surgery includes good anatomy of shoulder without distortion, reduced use of arm traction, and less bleeding. But, use of the operative sitting position is associated with several physiological changes:

-Cardiovascular system: cardiovascular instability and arterial hypotension due to depressant effects of anesthetic agents, positive intermittent pressure ventilation and venous pooling in the lower extremities,

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-Respiratory system: diaphragmatic excursion is greater and an increase in FRC, but associated reduction in perfusion may obviate the expected benefits in oxygenation,

-Cerebral perfusion and intracranial pressure: reduction in arterial and venous pressure as a result of the gravitational effect of positioning the head above heart level, and reduction in cerebral blood flow.

Patients undergoing shoulder surgery in the sitting position may be at risk for adverse neurologic events due to cerebral ischemia. Were reported a few cases of ischemic brain and cord injury after shoulder surgery in the sitting position.

Investigation of the use of functional NIRS as a method for monitoring of cerebral oxygenation has started to be conducted. Standard of care guidelines published by ASA, monitoring of pulse oximetry, HR, BP, etCO₂ during anesthesia sometimes are not specific to the effect of anesthetics on the brain.

May 19, 2016, Thursday
SESSION-4

12: 00-13: 00
Chairs: Dr. J. Bushinovska

PREVENTION OF SIH (SPINAL INDUCED HYPOTENSION) IN ELDERLY PATIENTS UNDERGOING KNEE ARTHROSCOPY WITH EPHEDRINE VS PHENYLEPHRINE

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INTRODUCTION: Spinal technique is popular for knee arthroscopy special in elderly patients with lot of co morbidity, such as cardiovascular, pulmonary, endocrine disease. Spinal anesthesia is associated with hypotension and cardiovascular instability and it could be managed with colloids, vasopressors such as ephedrine or phenylephrine.

MATERIAL AND METHODS: We separated 20 elderly patients, between 60 and 70 years into two groups. In group A (10 patients), 1 min. after spinal anesthesia in lateral decubitus position, with 2, 8ml of hyperbaric bupivacaine and 20mg fentanyl we give bolus infusion 5mg/min ephedrine. In group B (10 patients), 1 min. after spinal anesthesia patients are in supine position and we give 0, 1 mg/min phenylephrine. The complication such as hypotension bradycardia and vasopressor need are recorded. Hypotension was definite when MAP was decrease 20% from baseline MAP pressure, before induction of anesthesia.

RESULTS: Hemodynamic parameters

MBP(mm Hg)	A(ephedrine)group	B(phenyleph.)group
0min	127 ± 4	128 ± 3
5 min.	85 ± 7	97 ± 7
10 min.	110 ± 3	112 ± 5
15 min.	115 ± 3	126 ± 3
30 min.	124 ± 3	121 ± 5
HR	A (ephedrine)group	B(phenyleph.)group
0 min	65 ± 5	68 ± 3
5 min	95 ± 15	55 ± 17
10 min	89 ± 5	58 ± 8
15 min	72 ± 3	61 ± 2
30min	64 ± 3	66 ± 2

In group A we have 3 patients with tachycardia above 120b/min. with spontaneously recovering, after 15 min. In group B we have 2 patients with severe bradycardia under 40b/min. One of those patients doesn't have positive response of repeated bolus atropine 0, 5 mg, and adrenaline was given iv.

DISCUSSION AND CONCLUSION: Ephedrine is non selective α and β agonist and increases arterial pressure by activation those receptors, by increasing cardiac output. His disadvantage is tachycardia because of strong affinity of β_1 receptors. Phenylephrine in other side is a direct -acting to α_2 receptors and is approved the systemic vascular tone, but high blood pressure activated (likely carotid) baroreceptors caused reflexes bradycardia in some causes severe bradycardia with severe consequences specially in elderly with coronary disease. That is the reason why we don't recommend phenylephrine as iv bolus for prevention of spinal induced hypotension in elderly patients.

May 19, 2016, Thursday
SESSION-4

12: 00-13: 00
Chairs: Dr. J. Bushinovska

INTRAOPERATIVE MANAGEMENT OF AIR EMBOLISM DURING NEUROSURGERY IN SITTING POSITION

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Introduction: The sitting position in neurosurgery imposes increased risk of venous air embolism because of the elevation of the surgical field above the heart and the inability of the dural venous sinuses to collapse because of their bony

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attachments, so the risk of this complication is a constant concern. Its incidence in neurosurgery operation can go from 10% up to 80%.

Methods: We present a case of a 50-year-old patient diagnosed with Cysta trunci cerebri regio pontis. Standard preoperative evaluation was made, appropriate intraoperative monitoring was used (ECG, SaO₂, end-tidal CO₂, NIBP, bis monitor), a central venous catheter was placed in the right jugular vein and arterial line in the right radial artery. During the operation, before opening the dura, a sudden decrease in the end-tidal carbon dioxide concentration was noted on the monitor, followed by increase of the heartbeat, which is a sign of air embolism. The patient was treated immediately and did not suffer serious complication as a result of the venous air embolism.

Results: Sitting position in neurosurgery offers advantages to the surgeon in approaching the posterior cervical spine and the posterior fossa, but at same time poses physiological challenges to the anesthesiologist due to the risk of serious complication.

Discussion: Suitable intraoperative monitoring for early detection of air embolism and the routine use of central venous catheter during neurosurgery in sitting position is recommended, because of the high neurologic, respiratory, and cardiovascular morbidity and mortality that this complication brings.

Conclusion: The reason we present this case is the increased number of elective surgeries performed in sitting position in our clinic. The importance of preoperative preparation and taking into account the anesthetic considerations can help in proper diagnosis and treatment of air embolism during surgery.

May 20, 2016, Friday
SESSION-4

12: 00-13: 00
Chairs: Dr Tülin Gümüş, Pınar Zeyneloğlu,

REVERSAL OF PARADOXICAL EFFECT OF MIDAZOLAM WITH FLUMAZENIL

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Introduction: Midazolam, one of the most popular sedative agents, provides amnesia, sedation and anxiolysis with a short recovery time. However some paradoxical reactions like agitation, headache, confusion, myalgia, hyperactivity and hostility can be seen rarely (1). Flumazenil, the first benzodiazepine antago-

nist, is currently used widely as an emergency reversal drug (2). In this case report, we present the reversal of paradoxical effect of midazolam with flumazenil in a patient undergoing arthroscopic surgery.

Case Report: A 44 year-old female patient was scheduled for arthroscopic surgery for medial meniscus rupture. Her physical status was ASA II and preoperative laboratory results were between normal limits. Following successful spinal anaesthesia with a sensory block level at T10, blood pressure and heart rate were 140/80 mmHg and 90 beats/min. Sedation was achieved with 2 mg intravenous midazolam. A few minutes after midazolam injection, the patient complained of weakness, myalgia, headache, drowsiness and agitation. She was responsive to verbal commands, therefore we assessed her Ramsey Sedation Score as 3. The surgery was completed in 30 minutes. At the postoperative 2.5th hour, the complaints of the patient were still continuing. We attributed these symptoms to a paradoxical reaction to midazolam and decided to reverse it with flumazenil. Following intravenous 0.5 mg flumazenil, the patient completely recovered in 20 minutes period. The patient also had similar symptoms repeated after 100 mg of iv tramadol given at night and lasted till morning.

Discussion: Paradoxical reactions of midazolam, as in our patient, are usually attributed to genetic variability in the benzodiazepine receptors of GABA_A channels. But still the exact mechanism remains unclear (3). In our patient, we also saw a prolonged effect lasting up to 3 hours. Slow elimination of benzodiazepines can also be seen in 1-6% of the population and any inhibitor factors on the CYP3A4 enzyme in liver can cause prolongation of effects (3, 4). Although paradoxical and prolonged reactions are rare, anesthesiologists using benzodiazepine sedation should be well-prepared for early recognition and pharmacological treatment.

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PRECIPITATION OF SODIUM BICARBONATE AND FENTANYL ADDED TO BUPIVACAINE FOR EPIDURAL USAGE

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Introduction: While performing regional blocks; adding dextran, heating or alkalization is used to accelerate the onset of local anesthetics. The aims of alkalization of local anesthetics are to hasten the onset time, to extend the duration of action and to improve the quality of anesthesia (1). In this case, we aimed to present the precipitation of solution prepared for epidural injection consisted of bupivacaine, fentanyl and sodium bicarbonate.

Case Report: A 49 year old male patient was scheduled for revision of left total hip prosthesis by orthopedists. His physical status was ASA II and preoperative laboratory results were within normal limits. We preferred pure epidural anesthesia for this case. After epidural catheterization, 5 ml 2% lidocaine was injected for test dose, and then we prepared the solution for epidural injection by 15 ml 0, 5% bupivacaine, 2 ml fentanyl (50mcg/ml), 2 ml 8, 4% sodium bicarbonate and 1 ml 0, 9% isotonic. 5 minutes later, we started to give the solution from the epidural catheter, after 10 ml was given, we saw precipitants in the syringe, stopped the procedure, removed the syringe from the catheter and added 10 ml 0, 9% isotonic through the catheter for dilution of solution in the interspace of epidural. We waited for 20 minutes and checked if the blockage was successful or not and the result was negative. No neurological deficits identified, and then we decided to give general anesthesia. After recovery from general anesthesia, his neurological examination was totally normal. There were no neurological deficits during a follow-up of one week.

Discussion: The addition of sodium bicarbonate to various local anesthetics has been studied for a long time (1). It is proposed that this modification improves the speed of onset of epidural anesthesia by increasing the pH of the acidic local anesthetic, thus increasing the proportion of drug in the unionized state (2). Although most anesthetists prefer alkalizations of local anesthetics, we have found a few literature related to precipitation. Anesthetists should remain aware that bicarbonate might result in precipitation in mixture with bupivacaine (3).

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May 20, 2016, Friday
SESSION-4

12: 00-13: 00
Chairs: Dr Tülin Gümüő, Pınar Zeyneloğlu,

SUSPECTED MALIGNANT HYPERTHERMIA IN AN ADULT PATIENT DURING ORTHOPEDIC SURGERY FOR PES EQUINOVARUS DEFORMITY

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INTRODUCTION

Malignant hyperthermia is an autosomal dominant disease which is triggered by the use of volatile agents or depolarizing muscle relaxants during general anesthesia. It's an hypermetabolic myopathy characterized with hyperthermia and acidosis(1, 2).

CASE PRESENTATION

27 years old male patient who was operated for scoliosis under general anesthesia before with no comorbidity accepted for pes equinovarus surgery. For induction; propofol (2mg/kg), remifentanyl (50mcg) and rocuronium bromur (40mg); for maintenance desflurane(6%), O₂ (30%) and nitrous oxide (70%) were used. After the induction of general anesthesia, hypercarbia and tachycardia were developed. In arterial blood gas analysis pH: 7. 18, pCO₂: 67, 2, K: 4. 77, sBE: -3. 0, HCO₃: 24, 3, Lac: 3. 9. The patient developed fever in minutes (38. 8°C). Despite the change in the ventilatory parameters and volume replacement, the symptoms did not change. Sweaty skin and petechiae were noted and malignant hyperthermia was suspected. Volatile anesthetics were stopped, soda lime

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was renewed and the respiratory circuit was changed. The patient was hyper-ventilated with %100 O₂, 1000 ml cold NaCl isotonic solution was given in 30 minutes. We couldn't give dantrolene because it wasn't available. After all, the body temperature decreased to 36. 9°C but the patient still had tachycardia. After extubation we internated the patient into the intensive care unit (ICU). In initial blood test analysis LDH was 344 and CK 1381. In the follow-up, LDH and CK values were decreased and the acidosis was regressed. Hemodynamic parameters and arterial blood gas values were improved in time and patient was transported to ward two days after.

CONCLUSION

Malign hyperthermia is a rare pharmacogenetic disease and usually develops after induction of general anaesthesia (3). In this case, we think that acute MH crisis therapy protocol is suitable for this patient with suspicion of malignant hyperthermia, even the case didn't match all of the diagnostic criteria. Early diagnosis, sudden cessation of triggering agents and starting symptomatic treatment and if available, usage of dantrolene is life saving. In centers which dantrolene is not available, early intervention along preventive measures is important.

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DIFFICULT AIRWAY MANAGEMENT IN SATELLITE LOCATIONS

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INTRODUCTION: Managing a difficult airway case in a satellite location is challenging. Due to anatomic variations, pediatric patients are more likely to encounter difficult airway management. Associated anomalies can cause anesthesia and procedure related complications.

CASE: We report a 14 day old male neonate, presented to our hospital with a 8, 5x5, 5x5, 5cm swelling in the anterior part of the neck causing respiratory distress, scheduled for magnetic resonance imaging (MRI) of the neck to confirm the diagnosis and to know the extent of the swelling. After appropriate monitoring ketamine 3mg and midazolam 0, 15mg IV was administered, as they did not suffice pentothal sodium 5mg was added, then SpO₂ dropped and CO₂ retention occurred; bag mask ventilation was started. With the MRI compatible laryngoscope Cormack Lehane score was 4. As the ancillary tools we use for difficult airway management are not MRI compatible we decided to perform the intubation in the OR. Inhalation anesthetic sevoflurane was used for induction and with McGrath® MAC Video Laryngoscope (Medtronic, USA) intubation was done successfully. MRI report came to be cystic hygroma and bleomycin was injected. Two days later the cyst got bigger; ultrasound of the neck revealed hemorrhage in the cyst. Extubation was performed after the removal of the blood.

DISCUSSION: MRI generates a powerful magnetic field that makes it difficult to perform anesthetic procedures in the MRI suite. Equipments used for anesthesia should be MRI compatible. MRI of uncooperative (pediatric and mentally challenged, etc.) patients require adequate depth. General anesthesia may be preferred for preterms and small children as depth of anesthesia is difficult to assess with deep sedation but it withholds the dangers of extubation ⁽¹⁾. Extubation in a difficult airway scenario should be carried out meticulously.

Dexmedetomidine and ketamine combination is proposed as a safe option for sedation in MRI suite ⁽²⁾.

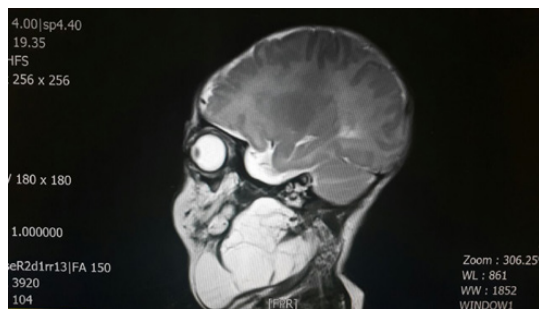
In this case report we wanted to point out that for patients safety and welfare intubation may be done in OR and than transfer to the MR suite can be an option for difficult airway management.

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Guidelines for difficult airway management outside OR especially where limited equipment is appropriate to use due to location (i. e. MRI) are needed.

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May 20, 2016, Friday
SESSION-4

12: 00-13: 00
Chairs: Dr Tülin Gümüş, Pınar Zeyneloğlu,

THE SUCCESSFUL USE OF SUGAMMADEX AND UNEVENTFUL RECOVERY FROM TOTAL INTRAVENOUS ANAESTHESIA IN A PATIENT WITH MYOTONIC DYSTROPHY.

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Introduction:

Myotonic dystrophy (MD) is an autosomal dominant disorder with an incidence of 1: 8000 the commonest of all myotonic syndromes (1). MD patients response to several anaesthetic drugs including opioids, neuromuscular blocking agents and especially reversal agents like neostigmine are unpredictable (2).

Case Presentation:

We report a case of 63 years old woman, 85 kg with myotonic dystrophy who received general anaesthesia for total abdominal hysterectomy because of acute abdomen due to over carcinoma.

Without any premedication she was taken in the OR and standard monitorization was applied. Anaesthesia was induced with propofol 2 mg. kg⁻¹ and remifentanyl 2 µg. kg⁻¹, infusions of propofol 10 mg. kg⁻¹. h⁻¹ and remifentanyl 0. 5 µg. kg⁻¹. min⁻¹ were started immediately. Rocuronium 50 mg was used for muscle relaxation and intubation was achieved uneventfully and additional boluses of rocuronium, 100 mg in total, were provided to ensure relaxation throughout the surgery. Propofol and remifentanyl were infused throughout the procedure and the infusion rate of propofol was adjusted to achieve a BIS value of 40-50 during the whole surgical procedure. The procedure took three hours. She was given sugammadex 200 mg in order to avoid the need for neostigmine and also to ensure that there was absolutely no residual neuromuscular block on extubation. She was extubated uneventfully, with no postoperative respiratory dysfunction. The patient did not require an intensive care unit admission but close monitoring was recommended. On postop day three she was discharged.

Discussions:

Anaesthetic management of MD patients can be challenging due to the high risk of perioperative cardiorespiratory complications and abnormal responses to sedatives, neuromuscular blocking agents and anticholinesterases. Neostigmine has the potential to trigger myotonic episodes and usually avoided for reversal of neuromuscular blockade in MD(3).

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We suggest the use of the new selective reversal agent sugammadex, for reversing neuromuscular blockade caused by rocuronium, in patients suffering from neuromuscular diseases and especially from Myotonic Dystrophy, because it rapidly and completely reverses any residual neuromuscular blockade.

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SESSION-4

12: 00-13: 00
Chairs: Dr Tülin Gümüş, Pınar Zeyneloğlu,

LACTIC ASIDOSIS TREATMENT DUE TO METFORMIN INTOXICATION: A CASE REPORT

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Introduction:

Metformin is a medicine used for Type 2 Diabetes Mellitus treatment. It increases cellular insulin sensitivity. Lactic Acidosis is a rare side effect of metformin treatment, but serious and life threatening. In this study, we aimed to present a patient with lactic acidosis due to overdose of metformin.

Case Report:

52-year-old woman who has taken metformin for diabetes treatment for 5 years came to Emergency service because of suicide. She took 30 pills. A pill consists of 1000 mg Metformin. when she was admitted to ICU 2 hours after Emergency department, her condition was moderate, conscious, but her cooperation was limited. Her K level was 6, 64 mmol/L, Lactate was 6, 54 mmol/L. , Blood pH was 7, 3, BE was 9, 8. In this patient, she was thought to have metabolic acidosis with anyon gap due to metformin intoxication. Immediately, hemodialysis was planned and 12 F dialysis catheter was placed and dialysis was performed within 2 hours. After dialysis, pH was 7, 4 and BE was -3, 8 and lactate was measured as 2, 94, and K was 3. 31 short after the dialysis. 8 hours after dialysis lactate level

decreased to 1, 6. 3 days after the admission the patient was discharged with normal blood lactate level, which was 0.8 mmol/L.

Discussion:

Lactic acidosis is a defined complication of metformin intoxication, which may cause death. In these cases, it is very important to diagnose and make dialysis decision in early hours. Early dialysis may save patient's life with metformin intoxication. In this case, early dialysis resulted in improvement of lactic acidosis and she was free of any complications and discharged 3 days after the admission.

Key Words: Metformin intoxication, lactic acidosis, Dialysis

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Chairs: Dr Tülin Gümüő, Pınar Zeyneloğlu,

SEPARATION AND ENTRAPMENT OF THE GUIDEWIRE DURING CENTRAL VENOUS CATHETER PLACEMENT

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Central venous catheterization (CVC) is a commonly performed invasive procedure in the operating room and intensive care unit. It is technically challenging, and associated with several risks. Patient related factors, operator's experience, the type and quality of the catheter are important factors for complications. In recent years ultrasound guidance has been widely accepted in clinical practice during CVC. In this case report; the separation and entrapment of the guidewire during CVC under ultrasound guidance was discussed.

Case Report

A 28-yr-old male with bladder perforation and urethral rupture due to trauma was administered to OR. He was conscious and hemodynamically stable. After routine monitorization and anesthesia induction rapid sequence intubation was performed. With ultrasound guidance (linear probe, out-of plane technique) right internal jugular vein was punctured by the introducer needle. After aspiration of blood, guidewire was introduced, but it could not be advanced more than 5 cm. We decided to take out the wire and the needle, but could not take out the wire. We tried to pull the wire back but noticed that it was separated. As we did not want to damage the vessel, we checked the localization of the wire with

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ultrasound, and recognized that it was placed in the subcutaneous tissue. After revealing it was not related with vessel wall or lumen we removed it safely. Later, a new catheter was placed with ultrasound guidance to the same jugular vein without difficulty. The operation was eventless and the patient was transferred to the ward after he recovered from anesthesia.

Conclusion and Discussion

With ultrasound guidance, detailed evaluation of the vascular anatomy before catheter insertion, and movement of the catheter and guidewire after insertion is possible. In this patient, confirmation of the wire in subcutaneous tissue with ultrasound facilitated us for pulling back the wire safely.

When resistance is experienced at any stage of CVC insertion, the procedure should either be abandoned or reattempted with ultrasound guidance. We recommend ultrasound guidance incase of resistance during insertion or removal of catheter and/or guidewire as a safe and reliable method.

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RADIAL NERVE INJURY AFTER LENGHTY PROCEDURE UNDER ANESTHESIA

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Background:

Peripheral nerve injury remains a serious perioperative complication and a significant source of professional liability, despite the low incidence. We report a case of transient, postoperative right radial nerve injury after Whipple procedure.

Case:

A 40-year-old, 60 kg male patient was scheduled for Whipple procedure. He was a smoker and had been smoking approximately 20 cigarettes a day for the past 20 years. He had history of chronic alcohol abuse and has ended just 6 months ago. Anesthesia was induced with lidocain 100 mg, propofol 200 mg, fentanyl 100 mcg and rocuronium 50 mg, and intubated without any difficulty. Anesthesia was maintained with 1. 2 MAC sevoflurane in 50% O2/air mixture, remifentanyl infusion and rocuronium boluses. After induction arterial cannula was inserted from the right radial artery without any complications in the first attempt. A central venous catheter was placed into the right internal jugular vein. During

surgery both of his arms were abducted out to the side in a neutral position. The patient hemodynamic was stable and there were no conflicted findings in all the arterial blood gas analysis, his body temperature was at least 36 °C. After a 6h long uneventful surgery, the patient was extubated and transferred to the Intensive Care Unit. At the fourth hour of postoperative care, the patient claimed to have numbness in the right thumb area and right wrist drop. There were no cyanosis and coldness in the right hand but incase ICU team removed radial artery were in the right arm. Neurological examination revealed hypoesthesia around the right thumb, the right biceps and triceps reflexes were normal, extensor muscle power below the right elbow was 0/5, thumb abduction was 0/5, finger extension was 0/5, finger adduction was 4/5, and wrist extension, hand abduction were 0/5, elbow extension was 5/5. Radial nerve injury was diagnosed and treated with oral NSAID and B complex vitamins. Electromyography showed axonal degeneration of the radial nerve in spiral groove.

Discussion:

In the present case, patient was in the supine position and arms abducted below 90°. However there was a suspicious factor: assistant surgeon, our belief is he might apply compression to patient's arm with his body.

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Chairs: Dr Tülin Gümüş, Pınar Zeyneloğlu,

STUTTERING AFTER GENERAL ANESTHESIA IN A PATIENT WHO UNDERWENT OPERATION FOR OSTEIOD OSTEOMA: A CASE REPORT

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Introduction: The term "awareness with recall" (AWR) refers to both intraoperative consciousness and recall of intraoperative events that may have serious effects. After general anesthesia, AWR is a not frequent, but well described event that may result in posttraumatic stress disorder (1, 2). In this case report we aimed to share a possible awareness event that presented with stuttering in a patient after general anesthesia who was scheduled for osteoid osteoma surgery.

Case Report: A 43 year-old, ASA I, female patient was scheduled for an operation of osteoma in lingual side of the ramus mandible. Following standard mon-

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itoring with pulse oximeter, non-invasive blood pressure, electrocardiogram and end-tidal carbondioxide; anesthesia induction was achieved with 2.5 mg/kg propofol, 1 µg/kg fentanyl and 0.6 mg/kg rocuronium. Maintenance was provided by 2% sevoflurane inhalation in a mixture of 50% oxygen/air with intravenous remifentanyl infusion. Just after intubation, blood pressure was measured to be 180/100 mmHg but it returned to normal levels by increasing the dosage of remifentanyl. We did not perform any cerebral monitoring. The patient was hemodynamically stable during the whole operation and she was transferred to the recovery room after an uneventful extubation. In the recovery room, we noticed that the patient was stuttering. Brain MRI, performed to exclude a neurological problem, was reported as normal. Psychiatric evaluation did not reveal any abnormalities. One week later, as stuttering kept going, speech therapy was initiated by ENT department. After suffering from stuttering for seven months, patient's speech returned to normal by the aid of speech therapy.

Discussion: AWR is a real and psychologically devastating complication requiring the attention of the entire perioperative team. A detailed evaluation should be performed to identify this problem and initiate psychological support (1, 2). In this case report, there were no causes to explain the patient's symptom. We thought that a possible post-traumatic stress disorder would emerge from a period of intraoperative awareness although the patient didn't recall any memories about intraoperative period. The main limitation of this case is the absence of any cerebral monitoring that may help to diagnose and treat the awareness period.

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12: 00-13: 00
Chairs: Dr Tülin Gümüş, Pınar Zeyneloğlu,

COMPARISON OF EFFICACY OF TOPICAL NAPROXEN, KETOPROFEN AND LIDOCAINE-PRILOCAINE CREAM (EMLA®) FOR PREVENTING PAIN DUE TO RADIAL ARTERY CANNULATION

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Introduction: Cannulation of radial artery and continuous, beat to beat measurement of blood pressure and monitoring of the cardiac rhythm are essential before anesthetic induction in awake patients, whom hemodynamic instability is predicted during the induction. Limited literature is available about the usage of topical antiinflammatory drugs for preventing pain due to arterial cannulation.

Objectives: The aim of this double-blind, prospective, randomised, controlled trial is to investigate the effect of naproxen, ketoprofen gel and EMLA cream, which are widely used for local pain control, on preventing cannulation pain.

Material and Method: After obtaining the ethics committee approval, we randomized 100 patients equally into four groups. Either ketoprofen gel, naproxen gel or EMLA cream applied topically over the skin where radial artery is examined, according to randomization. Nothing was administered to the control group. Patients were cannulated with a 20 G IV cannula on 30th minute of topical application. All cannulations were performed by the same clinician. Pain was assessed with visual analogue numeric scale (VNS) (0-10). Number of attempts, VNS scores, patient and clinician satisfaction scores (PS and CS) (1: poor 2: fair 3: good 4: excellent) and adverse effects were documented in a pre-defined protocol.

Results: VNS, PS and DS scores in the ketoprofen and EMLA groups were shown significantly lower by ANOVA compared with Naproxen and control groups. No significant difference has been shown between Ketoprofen and EMLA groups. (Table 1 and 2) No adverse effects were observed in any of the groups.

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Groups	VNS Scores Median (min-max)	P value
Naproxen - Ketoprofen	8 (2-10) - 1 (0-3)	<0.001 [¶]
Naproxen - EMLA	8 (2-10) - 1 (0-2)	<0.001 [¶]
Naproxen - Kontrol	8 (2-10) - 8 (4-10)	=0.743
Ketoprofen - EMLA	1 (0-3) - 1 (0-2)	=0.411
Ketoprofen - Kontrol	1 (0-3) - 8 (4-10)	<0.001 [¶]
EMLA - Kontrol	1 (0-2) - 8 (4-10)	<0.001 [¶]

Table 1. Comparison of VNS Scores between groups. .

min: minimum, **max:** maximum, **VNS:** Verbal Numeric Scale (0-10).

[¶]: p<0. 008, statistically significant (with Bonferonni correction)

Groups	PS Score Median (min-max)	P ₁ value	CS Score Median (min-max)	P ₂ value
Naproxen - Ketoprofen	2 (1-3) - 3 (2-4)	<0.001 [¶]	1 (1-3) - 4 (2-4)	<0.001 [¶]
Naproxen - EMLA	2 (1-3) - 4 (2-4)	<0.001 [¶]	1 (1-3) - 4 (3-4)	<0.001 [¶]
Naproxen - Kontrol	2 (1-3) - 1 (1-3)	=0.078	1 (1-3) - 1 (1-3)	=0.568
Ketoprofen - EMLA	3 (2-4) - 4 (2-4)	=0.291	4 (2-4) - 4 (3-4)	=0.287
Ketoprofen - Kontrol	3 (2-4) - 1 (1-3)	<0.001 [¶]	4 (2-4) - 1 (1-3)	<0.001 [¶]
EMLA - Kontrol	4 (2-4) - 1 (1-3)	<0.001 [¶]	4 (3-4) - 1 (1-3)	<0.001 [¶]

Table 2. Comparison of patient and clinician scores between groups.

PS Score: Patient satisfaction Score (1: poor 2: fair 3: good 4: excellent), **CS Score:** Clinician satisfaction score (1: poor 2: fair 3: good 4: excellent),

[¶]: p<0. 008, statistically significant (with Bonferonni correction)

Discussion / Conclusion: Ketoprofen gel, which has less cost compared to EMLA cream and has positive effects both on patient and clinician satisfaction, may be chosen for prevention of pain due to arterial cannulation of awake patients.

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12: 00-13: 00
Chairs: Dr. J. Bushinovska

SYNDROME KRUKENBERG: CASE REPORT

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Background: Syndrome Krukenberg (SK) is a rare condition (0.16/100000/year) characterized by malignancy of the ovaries which has metastasized from a primary location in the gastrointestinal system, mostly a gastric adenocarcinoma of the pylorus.

Case Report: A 24 year old female patient was hospitalized with lower abdominal pain. On echosonography examination both ovaries were enlarged with heterogeneous content, ascites was present. On an abdominal CT scan in the lower abdomen a large tumor with cystic compartments was found, the entire stomach wall was thicker than normal. After gastroscopy in the stomach biopsy sample histopathological finding of Adenocarcinoma Ventriculi was present. Epidural catheter (EDC) was placed at Th 11-Th 12 level with test dose of 0.5% bupivacaine 2ml (test negative). General endotracheal anesthesia was induced with Dormicum 1 mg, Fentanyl 0.05, Propofol 110mg and Esmeron 40mg. Anesthesia was maintained with Ultiva 1mg/50ml and Sevoflurane and 0.25% Bupivacaine in EDC. Intraoperatively the patient was hemodynamic and ventilatory stable with TA 110/70mmHg and HR 90/min. An operation was performed, Lap. exp. Adnexectomy bil. Evacuation of ascites, Lavage Drainage N. I. Recovery period was stable and then patient was subjected to chemotherapy and radiotherapy.

Discussion: The metastasizing of SK occurs most often via the lymphatic drainage, when the primary process is a stomach adenocarcinoma. The Metastases are most commonly found in the ovaries which are asymmetrically enlarged, the surface of the capsule is smooth without adhesions or peritoneal deposits, the ovaries are cystically enlarged and hard. The prognosis is poor; the survival rate is on average around 2 years.

Learning points: In most cases the primary process is very small and can be overlooked in the diagnosis of SK. After detailed examination of the gastrointestinal system the detection of the primary tumor might not happen, the primary tumor can be diagnosed even few years after the adnexectomy. These can occur when the tumor is small and without symptoms. Lower abdominal pain, distension and nonspecific digestive symptoms, irregular menstrual bleeding, virilism as well as hirsutism can indicate a diagnosis of SK.

BODY MASS INDEX IN PREOPERATIVE ANESTHESIOLOGICAL EVALUATION OF PATIENTS FOR NON-CARDIAC SURGERY

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INTRODUCTION: As the prevalence of obesity increases worldwide, anesthesiological examination of each patient should start with determination of his/hers body mass index-BMI. Furthermore, BMI is an additional parameter for determining ASA (American Society of Anesthesiologists) status since 2015 and it is a predictor for difficult mask ventilation (WHO safe surgery report 2009). Obesity is defined as body mass index of more than 30 kg/m². Obesity has a major implication in anesthesia due to associated alternation in pulmonary, cardiovascular and gastrointestinal functions.

MATERIAL AND METHODS: In preoperative anesthesiological evaluation in the period of July to November 2015, we examined 729 patients. We calculated BMI for all patients and classified them by WHO classification as underweight UW(< 18, 5 kg/m²), normal weight NW(18, 5-25 kg/m²), pre-obese POB(25-30 kg/m²) and obese OB patients(>30 kg/m²). The aim of this research is to examine the relationship between BMI and other demographic characteristics (gender, age, comorbidities, smoking and ASA status) and to determine proportional representation of obese patients.

RESULTS: 7. 28% are UW, 31% of patients have NW, 34. 43% are POB, and 27. 29 % are OB. Most of the children are UW 65, 22%, adolescents have NW 43. 48%, adults and elderly are mostly PO 36. 04% and 35. 39%. Patients with ASA1 status have mostly NW 45. 36%, ASA2 patients are mostly OB 43. 34% and ASA3 are OB 55. 55%. Male patients are 18. 98% OB, and female are 38. 05% obese. Smokers are 24. 39% obese, and nonsmokers are 27. 88% OB. Patients who have comorbidities are mostly OB 37. 57%.

DISCUSSION: The proportional representation of obese patients against pre-obese and normal weight patients is nearly identical. Obesity is accompanied by co-morbidities such as coronary artery disease, hypertension, OSAS and pre-diabetes. Furthermore, obese patients have hypercapnia, hypoxemia, ECG abnormalities, increased blood volume and left ventricle hypertrophy. The airway management is difficult due to different anatomic and physiological characteristics and risk of hypoxic event reduces when using CPAP in preoxygenation.

CONCLUSION: BMI is a significant parameter for pre-operative assessment of every patient. Anesthesiological management of obese patients should follow

the Guidelines from the European Society of Anesthesiology for pre-operative evaluation of patients for non-cardiac surgery in order to reduce perioperative risk.

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SESSION-6

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Chairs: Dr. J. Bushinovska

ATTEMPT OF SUICIDE WITH ACE INHIBITORS, BENZODIAZEPINES AND ANTIDEPRESSIVES-CASE REPORT

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Introduction: Intentional medication overdose continues to be the most common cause of acute poisoning all over the world. Medication overdosing is an important cause of organ dysfunction and metabolic derangements and the patients often require treatment in the Intensive Care Unit.

Case description: In a hospital in another city, a 39 year old male patient was admitted under a suspense for intentional medication overdose. The same day he was brought in our Intensive Care Unit intubated and ventilated. On admission he had blood pressure: 80/40 mmHg, hart rate: 110 bpm, 100ml diuresis, WBC-18, $9 \times 10^9/L$, Gluc-12, 9 mmol/L, Urea-10, 7 mmol/L, Crea-234 $\mu\text{mol/L}$, ALT-137 U/L, AST-637 U/L, LDH-1700 U/L, Na-128 mmol/L, K-6, 4 mmol/L, Ca-2, 11 mmol/L, Lact-5, 59 mmol/L, CK-4027 /L and myoglobin-386 mg/L. He had history of hypertension and mild Transient Ischemic Attack with no other implications. His medication therapy was with ACE inhibitors, benzodiazepines and antidepressives (no brand names known; no family for heteroanamnesis). Despite intensive supportive management and haemodialysis the patient regained no consciousness and the levels of Urea, Creatinine, Potassium, CK and myoglobin remained very high. The patient remained in our ICU and we expect a positive outcome. Considering the toxicity, complications and positive outcome regarding the medications used for the intentional overdose in this particular case, the attending doctors concluded that the cause for this kind of renal tubular necrosis was probably due to the effect of the ACE inhibitors and antidepressives.

Conclusion: Although there are some management strategies for some types of medication overdose, still they are not uniformed and the quality of the evidence is very low. The limited data and few case reports represent variable interpretations and confusion, therefore the management of combined drug intoxication remains a great challenge in the ICU.

POST INTUBATION TRACHEAL STENOSIS – CASE REPORT

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Introduction: Relatively rare condition with narrowing of the airway passage causing severe life-threatening conditions. Intubation is widely used method for supportive mechanical ventilation in surgery procedures also in urgent cardio-respiratory conditions with oro-tracheal, naso-tracheal and tracheostomy tubes.

Case report: A 32 year old male patient admitted in Intensive Care Unit (ICU) with combustion, 27% of the body surface. Skin lesions were immediately treated in operation room, and remains in ICU intubated on intermittent positive pressure ventilation (IPPV) with continuous sedation for 8 days. The patient was extubated on the 8th day and remained in ICU for treatment. He was treated several times for debridement under general anesthesia. The patient's condition was stabilized and transferred in the local Burn Center for additional treatment. Few days later the patient reported stridor, cough, dyspnea and immediately transferred to ENT University Clinic for airway evaluation. He underwent for diagnostic bronchoscopy and subglottic stenosis of trachea was diagnosed. Tracheotomy was performed under conscious sedation and local anesthesia.

Discussion: Post intubation tracheal stenosis is caused by prolonged endotracheal intubation in patients in ICU, caused by hyper-inflated cuff which pressure that leads to local ischemic necrosis of tracheal cartilage and granulation tissue. Circular erosion on the cuff level may occur and if this erosion is deep enough, the layers of trachea can be damaged and circular stenosis forms. Below the cuff level, granuloma can occur caused by irritation of distal end of the tube and aspiration. Endotracheal tube could trigger obstruction on laryngeal level even after intubation of 48 hours. Symptoms like dyspnea, cough and stridor are present next day after the extubation.

Conclusion: Post intubation tracheal stenosis can be prevent with high volume, low pressure cuffed tubes, cuff pressure monitoring, bronchoscopy airway evaluation and early extubation.

UNILATERAL SPINAL ANAESTHESIA WITH HYPERBARIC BUPIVACAINE

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Introduction: Since 1909 various techniques of localised spinal analgesia aimed at restricting the spread of somatic and sympathetic block have been described. Unilateral spinal anaesthesia was first achieved in 1947 by subarachnoid injection of local anesthetic with the patient placed in the lateral position. Limiting the spread of the spinal block offers many clinical advantages. First and foremost the haemodynamic impact of spinal anaesthesia is greatly reduced, as the increased venous capacity in affected side is compensated by a reflex vasoconstriction in the non-blocked areas. In case of successful unilateral spinal anaesthesia the difference in levels of sympathetic block between the two sides can be easily detected by measuring a higher temperature in the affected side, caused by a greater vasodilatation due to the sympathetic block.

Case report: Seventy years old women come in surgical department for extraction of internal fixation of tibiae after fracture cruris lat. dext. Anamnestic features: hypertension, anxio-depressive syndrome, and status after cerebrovascular attacks. We indicated unilateral block, which was performed at L3-L4 level with 25 G needle and 2.5 ml of hyperbaric 0.5 % Bupivacain with 20 µg Fentanyl. The patient was in right decubital position 15 min. After this period we put patient in normal position, and we found completely sensitive and motor block on a right leg, and incomplete sensitive and motor blocks on left leg. During the operation (1 hour) patient was extremely cardiocirculatory stable (TA 130-140 mmHg, HR 72-80). At the end of operation we found completely right block and preserved movements and sensitive feeling of left leg. Unilateral block lasted 2h and 30 min.

Conclusion: For unilateral spinal anaesthesia in lower extremity operations, 2.5 ml 0.5% hyperbaric bupivacaine solution for operations above the knee for 15 min in the lateral decubitus position were found to be appropriate.

POST TRAUMATIC DIAPHRAGMATIC RUPTURE – ONE OF THE REASONS FOR ABDOMINAL DISCOMFORT AND RESPIRATORY INSUFFICIENCY

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Introduction: Traumatic diaphragmatic injury is a unique entity and unusual type of trauma. It is a frequently missed diagnosis which can be delayed from couple of days to years after the injury. Causes of trauma included motor vehicle accidents, falls, penetrating abdominal and chest injuries. According to the statistics, the incidence of the diaphragmatic rupture is in a range from 0.8% to 7% for patients with blunt abdominal trauma.

Review of a case: Our case is about a 40 year old patient, with anamnestic data for blunt abdominal trauma in car accident 2 years ago, comes for a medical examination due to breathing difficulty, left sided chest pain, fatigue, abdominal discomfort and nausea. The initially performed x-rays on chest organs, found high standing in left hemi diaphragm, and the patient was hospitalized at the Thoracic Surgery Clinics. A CT scan of the chest organs was performed – the finding for Diaphragmatic rupture is enclosed. Despite the fact that the patient was diagnosed with respiratory insufficiency, it was still decided for a surgical intervention. The anesthetics, diprivan (propofol), succinylcholine, fentanyl and rocuronium bromide were used for the induction and maintenance of anesthesia. Double-lumen endotracheal tube placement was performed to achieve lung separation. A thoracotomy was performed in the sixth intercostal space on the left, with an incision of 10 cm. Diaphragmatic rupture was repaired primarily with interrupted non-absorbable direct sutures and a thoracic drainage tube set. The patient was taken to the Intensive Care Division postoperatively, for a 24 hour monitoring. After he was stabilized, hemodynamically and respiratory stable, he was transferred to the Thoracic Surgery Division.

Conclusion: . The diaphragmatic rupture diagnosis can be missed in the acute phase due to the presence of a hypovolemic shock, respiratory insufficiency, visceral injury or coma. A high index of suspicion combined with repeated radiologic evaluation is necessary for early diagnosis.

May 20, 2016, Friday
SESSION-6

12: 00-13: 00
Chairs: Dr. J. Bushinovska

MUSCLE RELAXANS AND PATIENTS WITH ATROPHY DISORDERS OF NERVES

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Introduction: In patients with Paraplegia Flaccida, due to the up-regulation, the increased number of acetylcholine receptors in the post synaptic membrane and their increased susceptibility to release potassium during the administration of succinylcholine is huge and it can lead to death.

Aim: A case report to highlight the association between denervation atrophy of nerves and use of depolarizing muscle relaxants.

Methods: This case report present a 56-years old female with established diagnosis of Paraplegia Flaccida wich is result of past major trauma, need emergency surgical teretmant because of acute abdomen from unknow etiology. The state requires RSI induction of anesthesia, but that must be avoided because of possible releasing of potassium while administration of succinylcholine.

Results: Our patient had no complications during surgery and in postoperative care.

Conclusion: Using non depolarizing muscle relaxans in patients with atrophy of nerves from different etiology when "crash" induction is needed are secure choice.

AMPUTATION OF THE BELOW-KNEE IN PATIENT WITH ESSENTIAL TROMBOCYTEMIA

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INTRODUCTION – BACKGROUND: Myeloproliferative Sy. - Essential Thrombocythemia is a condition with increased number of Trombocytes, hyperplasia of megakariocytes. There are no particular signs of the illness. In 60% of the patients there are ischemic changes of the arms and legs. It occurs in elderly patients.

MATERIAL AND METHODS: This is a case of 69 years old female patient who was admitted to ouer hospital- Ortopaedisc and Traumatology Hospital" Sv. Erazmo"-Ohrid because of prolonged lower back and right leg pain. CT and MRA with signs of lumbal spondylosis. Laboratory analisis show thrombocytosis $Tr-704 \times 10^9/L$, . The next day the patient experienced changes of the right lower leg. The same day she was sent to the MCKTA-where thrombosis and dilated thoracic aorta, thrombosis of abdominal aorta, thrombosis a. Femoralis profunda lat. dex. thrombosis a. Maesenterica sup. v. Lienalis. V. portae, ischemic changes in the left lobe of the liver, spleen, the left kidney, part of the pancreas and stomach were found. After diagnosis the patient is operated at University Hospiral Skopje as an emergency case, the same day - A tromboembolectomy mode. Sec. Fogartdz a. femoralis superficialis l. dex. Plastic Patch cum PTFE a. femoralis communis lat. dex. that gives satisfactory anterior-retrograde flow and after postoperative care the patient is returned to our hospital for rehabilitation. In the University Hospital due to extremely high levels of $Tr-1300 \times 10^9/L$, hematological examinations and biopsy of bone marrow are made. Rehabilitation takes place in Ohrid. Control laboratory and chemo stasis is made. Levels of trombocytes variete from $181-484 \times 10^9/L$ other findings in the reference values. The patient is complaining of excruciating pain, there are gangrenous changes of the right below-knee.

Results: After 20 days of thromboembolectomy In spinal anesthesia the patient underwent amputation of the right below-knee. Operative and postoperative progress normal. Results of a biopsy of the bone marrow where received and Mieloproliferative Su -essential thrombocythemia is proven. Transfusiologist is consulted and physical therapy begun.

DISCUSSION AND CONCLUSION: Resistant, long lasting pain should be closely looked at. Would amputation have been avoided ? Essential trombocytemy is a disease which needs serious approach for minimum consequences on the patients.