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u Bosni i Hercegovini



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PREDAVANJA PO POZIVU

FRAILTY – A NEW VITAL SIGN IN INTENSIVE CARE MEDICINE?

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Background: Frailty is a multidimensional state of reduced physiological reserve and increased vulnerability to acute stress. In the intensive care unit (ICU), chronological age alone is insufficient to describe a patient's biological resilience, expected response to critical illness, or potential for recovery. Frailty assessment may therefore provide information that complements conventional severity-of-illness scores and physiological parameters.

Aim: To review the clinical relevance of frailty assessment in critically ill patients and discuss whether frailty should be considered an additional "vital sign" in intensive care medicine.

Discussion: Frailty is common among patients admitted to the ICU and is consistently associated with adverse outcomes. A systematic review and meta-analysis reported a pooled frailty prevalence of approximately 30% and significantly higher hospital and long-term mortality among frail patients.1 The Clinical Frailty Scale (CFS) has emerged as the most frequently used bedside instrument in critical care. A large individual-patient-data meta-analysis including 23,989 patients demonstrated an independent association between frailty and ICU mortality among patients aged ≥65 years, even after adjustment for illness severity.2 A systematic review of 57 studies including 253,376 patients found substantial heterogeneity in frailty assessment methods, timing and cut-offs, while identifying the CFS as the most frequently used instrument and supporting routine assessment in critically ill patients.3 Frailty should not be interpreted as synonymous with chronological age, disability, comorbidity or treatment futility. Its assessment should reflect pre-illness functional status and be integrated with disease severity, comorbidities, clinical trajectory, patient preferences and the reversibility of the acute condition. Standardization of frailty assessment and prospective evaluation of frailty-guided interventions remain important areas for future research.

Conclusion: Frailty is not simply a geriatric characteristic but a clinically meaningful marker of physiological reserve. Incorporating a validated frailty assessment, particularly the CFS, into routine ICU evaluation may improve prognostic assessment, communication and individualized decision-making. Rather than replacing traditional vital signs or severity scores, frailty may represent a complementary measure of the patient's ability to withstand and recover from critical illness — potentially becoming a "new vital sign" of intensive care medicine.

Keywords: frailty; Clinical Frailty Scale; intensive care; critical illness; physiological reserve; mortality; older adults

References

1. Muscedere J, Waters B, Varambally A, et al. The impact of frailty on intensive care unit outcomes: a systematic review and meta-analysis. J Crit Care. 2017;38:329-334.
2. Bruno RR, Wernly B, Bagshaw SM, et al. The Clinical Frailty Scale for mortality prediction of old acutely admitted intensive care patients: a meta-analysis of individual patient-level data. Ann Intensive Care. 2023;13(1):37.
3. Bertschi D, Waskowski J, Schilling M, et al. Methods of Assessing Frailty in the Critically Ill: A Systematic Review of the Current Literature. Gerontology. 2022;68(12):1321-1349.

SPECIFICITIES OF MINIMALLY INVASIVE ANAESTHESIA IN PATIENTS WITH SEVERE PULMONARY ARTERIAL HYPERTENSION – WHEN LESS IS ENOUGH?

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Introduction
Minimally invasive (MI) surgical technique represents the optimised choice for the treatment of a number of severe cardiac diseases. Anaesthesiologist should use adequate parallel approaches to ensure the effectiveness of subsequent technique used, as well as to obtain plan and develop measures needed for optimal outcome.

Cardiac diseases as pulmonary artery hypertension along with planned surgery should always be considered as a high-risk task to be completed. Along with all comorbidities and led by imminent right heart failure and ultimately operating theatre outcome, this represents special hemodynamic and therapeutic challenge for anaesthesiologist. In a field of emerging MI surgery there has been parallel development of MI anaesthesia technique, expecially for the high risk population with severe pulmonary artery hypertension.

Pulmonary arterial hypertension (PAH) is a hemodynamic and pathophysiological condition defined as a mean pulmonary arterial pressure of ≥ 20 mmHg at rest. Pulmonary hypertension is present in various clinical scenarios. It is a chronic and progressive disease that leads to right heart failure and, ultimately, death if left untreated. Its most severe manifestation is acute right heart syndrome, characterized by right heart failure and cardiovascular collapse associated with high mortality.

Since the disease was originally discovered in 1891, patients with pulmonary arterial hypertension (PAH) have seen a significant improvement in their life expectancy; however, their mortality rate is still more than three times greater than that of a control group of healthy individuals. Overall, there are between five and fifty cases for every million persons. Oxygen therapy, diuretics, anticoagulants, calcium channel blockers, digoxin, pulmonary artery vasodilators, and primary treatment of the underlying illness are all part of the current therapeutic approach. Type 2 PAH, or PAH of cardiogenic origin, is a difficult and dangerous condition, particularly during sophisticated and prolonged cardiac surgical procedures. Acute right heart failure syndrome with concomitant cardiovascular collapse is the most severe symptom and poses a treatment challenge.

When combined with the fast track protocol following elective cardiac surgery, a sparing ventilation strategy prevents further harm to the alveo-capillary network and expedites extubation and discharge to the standard care unit without jeopardizing patient safety. Our experience showed that sparing ventilation technique used instead of a traditional mechanical ventilation approach could led to better outcomes, while patients undergoing heart surgery with pulmonary hypertension recover more successfully. This manifests as a much shorter stay on mechanical ventilation, less bleeding following surgery, fewer prescriptions for blood derivatives, fewer prescriptions for inotropic medications, and a shorter overall stay in the intensive care unit. Fast track, as well as ERAS, Early Recovery After Surgery protocols, manifested as minimally invasive anesthesia, could help better recovery for some of the patients.

Minimally invasive anaesthesia and pulmonary artery hypertension in clinical setup
Severe pulmonary arterial hypertension (PAH) is a high-risk surgical and anesthetic condition, even for apparently minor or minimally invasive procedures. The principal concern is not the size of the operation but the possibility of acute right-ventricular (RV) failure triggered by anesthesia, positive-pressure ventilation, hypoxemia, hypercarbia, hypotension, pain, or interruption of PAH therapy. Current AHA/ACC (American Heart Association/ American College of Cardiology) guidance emphasizes preservation of RV function and avoidance of increases in pulmonary vascular resistance.

Pulmonary arterial hypertension is a chronic and progressive disorder characterized by angioproliferative vasculopathy in the pulmonary arterioles, leading to the proliferation and dysfunction of endothelial and smooth muscle cells, inflammation, and thrombosis. Pulmonary arterial hypertension is accompanied by high blood pressure in the pulmonary circulation, resulting in impaired gas exchange across the alveolocapillary membrane. Regardless of the underlying etiology, PAH presents with similar pathological changes, including increased contractility of pulmonary arterioles, endothelial dysfunction,

remodeling and proliferation of endothelial and smooth muscle cells, and in situ thrombosis. The physiological outcome of these disorders is the partial occlusion of small pulmonary arteries, which intensifies as pulmonary vascular resistance increases. Clinical signs vary depending on the severity of the picture and range from peripheral edema, distended jugular vein, ascites and generalized decompensation, and central cyanosis and somewhat developed peripheral cyanosis, as well as club-shaped margins, are often present. Patients with clinically significant pulmonary hypertension must be carefully evaluated to identify reversible contributing factors, such as fluid balance, potential hypoxemia and right-heart ischemia, and uncorrected metabolic imbalances.

Minimally invasive anesthesia is based on fundamental treatment principles and involves maintaining systemic perfusion pressure, optimizing cardiac performance through the appropriate choice of inotropic support, employing lung-protective respiratory strategies, forcing fast-track protocol, and also attempting to reduce right ventricular afterload using pulmonary vasodilators. The objective of MI anesthesia is to avoid the major physiological perturbations associated with induction and positive-pressure ventilation: opioid use should be avoided or spared, sedation should be minimal and titrated slowly, while analgesia should be provided excellent.

Vasopressors are primarily indicated for maintaining arterial blood pressure and, consequently, improving organ perfusion. Norepinephrine can restore systemic hemodynamics without increasing right ventricular (RV) afterload, as it has no effect on pulmonary vascular resistance. Establishing coronary perfusion pressure using vasopressors is a cornerstone of therapy, given that an already compromised RV—when subjected to volume and/or pressure overload—becomes increasingly susceptible to ischemic injury.

In this context, vasopressors also act centrally, maintaining vulnerable cerebral, renal, and hepatosplanchnic perfusion pressures. Optimizing mean arterial pressure (MAP) to 65 mmHg should be a priority. In patients with RV failure and severe tricuspid regurgitation accompanied by massively elevated central venous pressure, organ-specific perfusion pressure targets include 50–70 mmHg for the brain, 65 mmHg for renal perfusion, and >50 mmHg for hepatosplanchnic flow. MAP optimization is clearly individualized and depends on the analysis of multiple factors. Myocardial contractility is improved through the infusion of inotropic agents such as dobutamine, levosimendan, and phosphodiesterase III inhibitors; these drugs enhance contractility and increase cardiac output and are indicated for patients with severe right ventricular (RV) failure causing cardiogenic shock.

An approach involving lung-protective mechanical ventilation, rapid weaning, and accelerated discharge from the intensive care unit (the "fast-track" protocol) is considered optimal for treating acute respiratory distress syndrome (ARDS) and ventilator-induced lung injury (VILI). It was hypothesized that this treatment modality—given the parallel underlying pathology—could also be successfully applied to the particularly vulnerable population of cardiac surgery patients who exhibit altered physiological dynamics at the alveolocapillary membrane, thereby reducing the risk of barotrauma and volutrauma.

Conclusion

A minimally invasive anesthesia and fast-track recovery strategy - specifically, early individualized patient optimization, brief surgical intervention, early extubation, a shorter Intensive Care Unit stay, and a protective ventilation strategy - could offer improved recovery dynamics and quality for patients with PAH, as well as prevent ventilator-associated pneumonia and reduce the overall incidence of postoperative complications.

Set of measures like lung-protective ventilation strategy combined with an accelerated intensive care protocol, adequate volume management and optimization of general metabolism, prevention of hypoxemia and right-heart ischemia, maintenance of systemic perfusion pressure, optimization of cardiac contractility via selective adequate inotropic support, use of a lung-protective mechanical ventilation strategy, attempts to reduce right ventricular afterload using pulmonary vasodilators, early extubation and early transfer to a standard care unit, could result in better operative results and postoperative outcomes in patients with severe pulmonary artery hypertension.

PROMJENE MIKROBIOLOŠKOG PROFILA I ANTIBIOTSKE OSJETLJIVOSTI U JIL UKC REPUBLIKE SRPSKE: POREĐENJE 2019. I 2025. GODINE

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Antibiotska rezistencija predstavlja jedan od najvažnijih izazova savremene intenzivne medicine. Cilj ovog retrospektivnog istraživanja bio je da se uporede učestalost mikrobioloških izolata i obrasci antibiotske osjetljivosti u Jedinici intenzivnog liječenja Klinike za anesteziju i intenzivno liječenje UKC Republike Srpske tokom 2019. i 2025. godine. Retrospektivno su analizirani respiratorni uzorci, hemokulture, urinokulture i brisevi rana. U 2019. godini 382 od 489 uzoraka bila su pozitivna (78,12%), u poređenju sa 625 od 678 uzoraka u 2025. godini (92,18%; p<0,001). U 2025. godini zabilježen je veći udio gram-negativnih izolata. U respiratornim uzorcima i brisevima rana značajno je smanjen udio Acinetobacter spp., dok je udio Klebsiella spp. povećan. U hemokulturama je zabilježeno smanjenje Staphylococcus epidermidis i povećanje udjela Serratia marcescens. Kod Klebsiella spp. utvrđen je izražen porast XDR izolata, dok je Acinetobacter spp. pokazivao visok stepen rezistencije u oba perioda. Kod Pseudomonas aeruginosa povećan je udio MDR, uz smanjenje XDR izolata. Rezultati ukazuju na dinamične promjene mikrobiološkog profila JIL-a i potrebu za kontinuiranim lokalnim nadzorom, redovnim prilagođavanjem empirijske antibiotske terapije, antibiotic stewardship programima i striktnim mjerama prevencije bolničkih infekcija.

Ključne riječi: intenzivno liječenje; antibiotska rezistencija; Klebsiella; Acinetobacter; Pseudomonas aeruginosa; MDR; XDR; antibiogram.

CHANGES IN THE MICROBIOLOGICAL PROFILE AND ANTIBIOTIC SUSCEPTIBILITY IN THE ICU OF THE UNIVERSITY CLINICAL CENTRE OF REPUBLIKA SRPSKA: A COMPARISON BETWEEN 2019 AND 2025

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Antibiotic resistance is one of the major challenges in contemporary intensive care medicine. This retrospective study compared microbiological isolates and antibiotic susceptibility patterns in the Intensive Care Unit of the Clinic for Anaesthesia and Intensive Care, University Clinical Centre of the Republic of Srpska, in 2019 and 2025. Respiratory samples, blood cultures, urine cultures and wound swabs were analysed. In 2019, 382 of 489 samples were positive (78.12%), compared with 625 of 678 samples in 2025 (92.18%; $p<0.001$). In 2025, Gram-negative isolates were more prevalent. Acinetobacter spp. significantly decreased, while Klebsiella spp. increased in respiratory samples and wound swabs. Blood cultures showed a decrease in Staphylococcus epidermidis and an increased proportion of Serratia marcescens. Klebsiella spp. showed a marked increase in XDR isolates, while Acinetobacter spp. remained highly resistant in both periods. Pseudomonas aeruginosa showed an increase in MDR and a decrease in XDR isolates. These findings highlight the dynamic nature of ICU microbiology and support continuous local surveillance, regular revision of empirical antibiotic therapy, antibiotic stewardship and strict infection-prevention measures.

Keywords: intensive care unit; antibiotic resistance; Klebsiella; Acinetobacter; Pseudomonas aeruginosa; MDR; XDR; antibiogram.

KLINIČKE, INFLAMATORNE I MIKROBIOLOŠKE KARAKTERISTIKE PACIJENATA SA SEPSOM I SEPTIČNIM ŠOKOM: ISKUSTVA UKC REPUBLIKE SRPSKE

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Uvod: Sepsa predstavlja životno ugrožavajuću organsku disfunkciju uzrokovanu poremećenim odgovorom domaćina na infekciju. Od objavljivanja Sepsis-3 definicije 2016. godine, dijagnoza sepse zasniva se na prisustvu infekcije i porastu SOFA skora za najmanje dva boda. Iako su dijagnostički kriterijumi ostali nepromijenjeni, pristupi ranom prepoznavanju sepse evoluirali su od SIRS kriterijuma i qSOFA skora prema savremenim sistemima ranog upozoravanja, uključujući NEWS i MEWS.

Cilj: Analizirati kliničke, inflamatorne i mikrobiološke karakteristike te ishode liječenja odraslih pacijenata sa sepsom i septičnim šokom hospitalizovanih u jedinicama intenzivnog liječenja Univerzitetskog kliničkog centra Republike Srpske.

Metode i rezultati: U prospektivnu opservacionu kohortnu studiju uključeno je 87 odraslih pacijenata sa sepsom i septičnim šokom liječenih u jedinicama intenzivnog liječenja UKC Republike Srpske. Prosječna starost ispitanika iznosila je 62,31 ± 14,70 godina, a muškarci su činili 60,9% (n = 53) studijske populacije. Pri postavljanju dijagnoze sepse qSOFA skor 2 imala su 62 (71,3%) pacijenta, dok je qSOFA skor 3 zabilježen kod 25 (28,7%) pacijenata. Prema mikrobiološkom nalazu, Gram-negativna sepsa potvrđena je kod 35 (40,2%) pacijenata, Gram-pozitivna kod 30 (34,5%), dok kod 19 (21,8%) pacijenata nije izolovan uzročnik infekcije. Polimikrobne infekcije registrovane su kod 3 (3,5%) ispitanika. Ukupna smrtnost iznosila je 43,7% (n=38), dok je stopa preživljavanja bila 56,3% (n = 49).

Zaključak: Uprkos savremenim dijagnostičkim kriterijumima i terapijskim mogućnostima, sepsa i septični šok i dalje su povezani sa visokom smrtnošću. Pravovremeno prepoznavanje pacijenata sa povećanim rizikom i rana mikrobiološka dijagnostika ostaju ključni preduslovi za uspješno liječenje. Dalji razvoj dijagnostičkih i prognostičkih alata mogao bi doprinijeti ranijem prepoznavanju sepse i poboljšanju ishoda liječenja.

ARDS IN TRAUMA PATIENTS

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Introduction: Trauma remains leading cause of mortality worldwide. Complications associated with trauma such as systemic inflammation, pneumonia, and sepsis frequently will give rise to subsequent respiratory failure. It has been estimated that 5%–20% of all mechanically ventilated patients will develop acute respiratory distress syndrome (ARDS) with majority demonstrating moderate to severe forms of disease.

Goal: Severe ARDS in trauma patients continues to have reported mortality rate as high as 60% despite appropriate and aggressive supportive care. Despite widespread acknowledgment that excessive plateau pressures contribute to associated lung injury, variable implementation of ventilator strategies promoting lung protective ventilation may exist. Evidence to support use of different advanced therapies frequently used in ARDS, such as extracorporeal membrane oxygenation (ECMO), and high frequency oscillatory ventilation (HFOV) is deficient.

Method: Use of ECMO as temporary rescue for trauma patients with hypoxic respiratory failure has been reported in multiple case reports. Despite associated risks of prior massive blood loss, coagulopathy, coexisting solid organ or traumatic brain injury, trauma patients placed on ECMO (with or without systemic anticoagulation) have improved survival with minimal complications or long-term morbidity.

Results: In studies trauma patients were placed on ECMO typically within 2 days of diagnosis of severe ARDS; ECMO then facilitated substantial reductions in ventilator volumes and pressures with less associated volutrauma and barotrauma, respectively.

Conclusions: Management of patients with severe ARDS remains challenge. Outside of lung protective ventilation there are few therapies that improve patient mortality. Numerous studies are published on this topic but conclusions drawn regarding appropriateness of these therapies are conflicting. In particular, for trauma patients with severe ARDS, even less data exists to guide clinical practice.

Keywords: trauma, ARDS

FLUID AND BLOOD PRODUCT REPLACEMENT IN CHILDREN DURING SURGERY

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The purpose of perioperative fluid management in children is to maintain an adequate volume, electrolyte levels, and endocrine system homeostasis during the perioperative period. Early and appropriate hydration improves outcomes and reduces mortality in children. Perioperative fluid management in pediatric patients requires special attention due to the limited reserve capacity of this population. To achieve a normal physiological state, it is necessary to maintain or restore extracellular fluid (ECF) volume, blood volume, tissue perfusion, metabolic function, electrolyte balance, and appropriate acid-base balance. During the intraoperative period, disturbances of this factors can be expected. Due to the small body size, the large ratio of surface area to volume, and immature compensatory mechanisms, these disturbances are more common in children. The anesthesiologist must have a good understanding of the child's physiological and biochemical system, the pathophysiology of disorders, as well as the techniques, medications, and fluids most suitable for establishing and maintaining perioperative homeostasis. The duration of fasting should be as short as possible without compromising safety; recent guidelines have recommended shortening the fasting period for clear fluids to 1 hour. Fluid administration should be with isotonic balanced salt solution. Administration of blood in children should be based on the preoperative Hb and type of surgery taking into consideration the problems associated with allogenic blood transfusion.

WHEN $SCVO_2$ AND LACTATE DISAGREE: WHICH PERFUSION MARKER SHOULD WE TRUST DURING CARDIAC SURGERY?

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Adequate tissue perfusion is a central goal of perioperative management in cardiac surgery. However, conventional hemodynamic parameters may appear satisfactory while global oxygen delivery remains insufficient. Central venous oxygen saturation ($ScvO_2$) and blood lactate are frequently used as complementary markers of the balance between oxygen delivery and consumption, yet these parameters do not always change in parallel. Their discordance may therefore represent an important clinical signal rather than a diagnostic dilemma.

$ScvO_2$ reflects the relationship between systemic oxygen delivery and oxygen consumption and is influenced by cardiac output, hemoglobin concentration, arterial oxygen saturation, and metabolic demand. Lactate provides additional information regarding cellular metabolism but is not a specific marker of tissue hypoxia, since hyperlactatemia may also result from adrenergic stimulation, impaired clearance, or other non-hypoxic mechanisms. During cardiopulmonary bypass and the early postoperative period, rapid changes in flow, hemodilution, oxygen extraction, temperature, and metabolic demand may further complicate interpretation of both variables.

Four clinically relevant patterns can therefore be encountered: low $ScvO_2$ with normal lactate, elevated lactate with preserved $ScvO_2$, concordantly abnormal values, and apparently normal values despite other signs of inadequate perfusion. Each pattern requires assessment of the underlying physiology rather than correction of an isolated laboratory value.

When $ScvO_2$ and lactate disagree, interpretation should integrate their trends with cardiac output or pump flow, hemoglobin, arterial oxygen saturation, oxygen delivery (DO_2), mean arterial pressure, acid–base status, urine output, and the overall clinical condition. Treatment should consequently target the mechanism responsible for impaired oxygen transport or utilization rather than an arbitrary $ScvO_2$ or lactate threshold.

Discordance between $ScvO_2$ and lactate should therefore trigger clinical reassessment, not automatic treatment. Recognizing these patterns may help identify occult hypoperfusion earlier and allow timely intervention before progression to postoperative organ dysfunction.

Keywords: central venous oxygen saturation; lactate; cardiac surgery; cardiopulmonary bypass; oxygen delivery; tissue perfusion

SEPSIS MANAGEMENT IN 2026: WHAT HAS CHANGED?

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Sepsis and septic shock remain major causes of morbidity and mortality worldwide, requiring timely recognition, individualized resuscitation, appropriate antimicrobial therapy, and comprehensive organ support. The 2026 Surviving Sepsis Campaign (SSC) guidelines introduce important updates that refine previous recommendations and place greater emphasis on diagnostic certainty, individualized treatment, antimicrobial stewardship, and recovery after critical illness.

Early recognition remains essential. Structured screening using NEWS/NEWS2, MEWS, or SIRS is preferred over qSOFA as a single screening tool, while multidisciplinary “code sepsis” or “sepsis huddle” protocols may facilitate rapid diagnosis and treatment. Sepsis remains a clinical diagnosis, and no single biomarker should be used to confirm or exclude it.

Antimicrobial timing is increasingly guided by the probability of infection and the presence of shock. Immediate antimicrobial therapy, ideally within one hour, remains recommended for septic shock and probable or definite sepsis, whereas possible sepsis without shock allows a short period of rapid diagnostic assessment. Antimicrobial stewardship is further emphasized through individualized multidrug-resistant pathogen coverage, de-escalation, shorter treatment duration, prolonged beta-lactam infusion, and selected use of therapeutic drug monitoring.

Hemodynamic management is becoming more individualized. An initial 30 mL/kg crystalloid strategy remains, accompanied by frequent reassessment, preferential use of balanced crystalloids, dynamic assessment of fluid responsiveness, and earlier initiation of vasopressors, including through peripheral access. Norepinephrine remains the first-line vasopressor, with an initial MAP target of 65 mmHg. Importantly, active de-resuscitation after stabilization is now explicitly incorporated into sepsis management.

The 2026 guidelines therefore represent a shift from rigid protocols toward timely, individualized, physiology-driven care, integrating antimicrobial stewardship, organ support, de-resuscitation, and long-term recovery into a continuum of sepsis management.

Keywords: sepsis; septic shock; Surviving Sepsis Campaign; antimicrobial therapy; hemodynamic resuscitation.

FATIGUE AMONGST ANAESTHESIOLOGISTS IN EUROPE: CAUSES, IMPACT, AND MITIGATION STRATEGIES

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Fatigue is an important occupational and patient-safety concern in anaesthesiology and intensive care medicine. The combination of night work, prolonged shifts, high clinical intensity, inadequate recovery, workforce shortages and circadian disruption creates conditions in which fatigue may become both frequent and cumulative. Its effects extend beyond subjective tiredness, impairing vigilance, reaction time, decision-making, communication and teamwork, while potentially reducing clinicians' ability to recognise their own impairment.

European data demonstrate the scale of the problem. In a joint European Board of Anaesthesiology (EBA) and National Anaesthesiologists Societies Committee (NASC) survey of 1,508 anaesthesiologists from 32 European countries, 91.6% reported work-related fatigue. Only 35% consistently achieved the 11-hour rest period required by the European Working Time Directive, while 96% reported working above contracted duties, averaging 17.2 additional hours per week. Fatigue adversely affected physical and mental health, emotional wellbeing, family life and safe commuting. A parallel European survey of 1,200 anaesthesiology and intensive care trainees from 31 countries demonstrated similarly concerning findings: 66% reported having made or nearly made a clinical error because of fatigue, while 37% reported a commuting accident or near miss.

Addressing fatigue therefore requires more than individual resilience. Effective mitigation should incorporate adequate staffing, physiologically informed rota design, protected recovery after night work, appropriate rest breaks and facilities, fatigue education, safe post-shift commuting and a culture in which reporting fatigue is regarded as a safety action rather than professional weakness. Structured Fatigue Risk Management Systems offer a framework to predict, prevent, detect, mitigate and learn from fatigue-related risk.

Protecting clinician wellbeing is integral to patient safety. Sustainable anaesthesiology requires a transition from recognising fatigue to systematically managing it as an organisational and clinical risk.

OPIOID HYPERALGESIA AND NON-OPIOID MULTIMODAL PERIOPERATIVE ANALGESIA

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Introduction: Contemporary perioperative pain management faces a paradox where the administration of potent opioid analgesics can trigger opioid-induced hyperalgesia (OIH). OIH is a clinical phenomenon characterized by a paradoxical increase in pain sensitivity, leading to higher postoperative opioid demands, increased side effects, and an increase risk of chronic postoperative pain.

Objective: This lecture aims to elucidate the pathophysiological mechanisms of opioid hyperalgesia and to evaluate the efficacy of non-opioid multimodal perioperative analgesic strategies in preventing this phenomenon and optimizing patient outcomes.

Overview: Based on current clinical guidelines and recent literature, the presentation will explore the transition from opioid-centric to "opioid-sparing" or opioid-free anesthesia and analgesia. It will analyze the synergistic use of non-opioid agents targeting different nociceptive pathways, including paracetamol, NSAIDs, NMDA antagonists (ketamine, magnesium), alpha-2 agonists (dexmedetomidine), gabapentin, intravenous lidocaine, and regional anesthesia techniques.

Conclusion: Preventing opioid hyperalgesia requires a proactive, multimodal approach. Implementing non-opioid multimodal perioperative analgesia not only mitigates OIH but also significantly enhances recovery, reduces opioid-related side effects, and shortens hospital stay, representing a cornerstone of modern enhanced recovery protocol.

Keywords: Opioid hyperalgesia, multimodal analgesia, nonopioid perioperative analgesia, opioid-sparing, enhanced recovery.

IS THERE ANY DIFFERENCE AMONG THE THREE TECHNIQUES FOR LABOR PAIN RELIEF FROM THE PATIENT'S PERSPECTIVE?

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Background: Childbirth is one of the most painful experiences in a woman's life. In many developing countries, labor pain is still considered "normal" and is often the primary reason for initiating neuraxial analgesia (NA). Women's expectations may influence satisfaction with childbirth.

Methods: After ethics committee approval, written consent was obtained from all participants. This prospective observational study was conducted over 6 months at a single center. We included 131 parturients in three groups: G1 (SSS, single-shot spinal), n=35; G2 (EA, epidural analgesia), n=32; G3 (CSE, combined spinal-epidural), n=64. Participants completed a structured questionnaire 24 hours after delivery. We assessed whether different neuraxial analgesic techniques influenced maternal satisfaction with childbirth.

Results: There were no differences among groups in age, BMI, or educational level. For 78% of participants, this was their first pregnancy. The obstetrician was the first source of information about NA for 56%, while only 31% had decided to use NA before labor. Pain before NA was severe in 90% of participants and was mild 30 minutes after NA in 80% ($p<0.05$). Analgesia onset was 4.9 min in G1 and 13.8 min in G3 ($p<0.001$). Postpartum complaints were reported by 39%, most commonly prolonged numbness (59%) and back pain (19%). After analgesia, pain was mild (NRS 0–2) in G1 and G2 and moderate (NRS approximately 5) in G3. Overall, 97% would choose NA again, and 99% would recommend it. Patient satisfaction did not differ significantly among groups.

Discussion: SSS provides effective pain relief and high patient satisfaction, even among women who do not deliver within the duration of its analgesic effect (1). Compared with EA, CSE is associated with a faster onset of analgesia and a lower need for additional analgesia (2).

Conclusion: There was no significant difference in patient satisfaction across the three neuraxial analgesic techniques.

References:
1. Rahmati J, et al. Anesth Pain Med. 2021;11(2):e113350.
2. Chen X, et al. Front Med. 2026;13:1805555.

AMNIOTIC FLUID EMBOLISM: DIAGNOSIS AND MANAGEMENT

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Background: Amniotic fluid embolism (AFE) is a rare, unpredictable, and potentially life-threatening obstetric emergency characterized by sudden cardiovascular collapse, respiratory compromise, and coagulopathy. Current evidence suggests that AFE involves an abnormal inflammatory and immunological response rather than simple mechanical obstruction of the pulmonary circulation.

Objective: To present the pathophysiology, clinical presentation, diagnostic criteria, and current management principles of amniotic fluid embolism, emphasizing early recognition and multidisciplinary intervention.

Discussion: AFE occurs most frequently during labor, delivery, or shortly after placental delivery. Although several risk factors have been described, the condition may also affect healthy women without identifiable risk factors. The initial pathophysiological event frequently involves acute pulmonary vasoconstriction, increased pulmonary vascular resistance, and right ventricular failure. Subsequent left ventricular dysfunction, severe hypoxemia, cardiogenic shock, cardiac arrest, and disseminated intravascular coagulation (DIC) may rapidly develop. Clinical manifestations include hypotension, respiratory distress, cyanosis, altered consciousness, seizures, and severe hemorrhage. Diagnosis is primarily clinical and requires consideration of similar conditions. Laboratory findings commonly demonstrate reduced fibrinogen levels, thrombocytopenia, prolonged coagulation times, and elevated D-dimer concentrations. Management focuses on immediate cardiopulmonary resuscitation, oxygenation, hemodynamic stabilization, and prompt correction of coagulopathy. Treatment may include massive transfusion protocols, fibrinogen replacement, tranexamic acid when indicated, and targeted cardiovascular support. Right ventricular dysfunction requires careful fluid management and may necessitate inotropic agents, vasopressors, pulmonary vasodilators, or extracorporeal membrane oxygenation in selected cases. Delivery decisions should be individualized according to maternal condition and fetal status.

Conclusion: AFE remains a challenging obstetric emergency because of its unpredictable onset and rapid progression. Early recognition of the combination of hypoxia, hypotension, and coagulopathy, followed by coordinated multidisciplinary management, is essential to optimize maternal and fetal outcomes.

PALLIATIVE CARE

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Background: Palliative care is an integral component of high-quality intensive care medicine. Critically ill patients often experience significant physical, psychological, social, and spiritual distress, while their families face uncertainty and emotional burden. Early integration of palliative care principles into intensive care unit (ICU) practice can improve patient comfort, facilitate communication, and support informed decision-making.

Objective: To review the principles of palliative care in the ICU, identify common clinical and ethical challenges, and discuss practical strategies for implementation in everyday critical care practice.

Methods: This presentation provides a narrative overview of palliative care in critically ill patients, focusing on symptom management, communication, ethical decision-making, multidisciplinary collaboration, and family-centered care.

Results: Patients with advanced malignancies, end-stage organ failure, severe neurological disorders, and frailty frequently benefit from a palliative approach. Effective control of pain, dyspnea, delirium, anxiety, and agitation is essential for maintaining comfort and dignity. Communication regarding prognosis, goals of care, and treatment preferences remains one of the greatest challenges in critical care. Ethical issues, including decisions about withholding or withdrawing life-sustaining treatment, do-not-resuscitate orders, and palliative sedation, require individualized assessment and interdisciplinary discussion. Family involvement, emotional support, and clear communication are crucial components of comprehensive care. Despite growing recognition of its importance, barriers such as inadequate training, cultural factors, limited resources, and delayed referral continue to impede implementation.

Conclusion: Early integration of palliative care into ICU practice improves symptom control, enhances patient and family satisfaction, and supports ethical, patient-centered decision-making. A multidisciplinary approach is essential to address the complex needs of critically ill patients and to ensure high-quality end-of-life care.

Keywords: Palliative care, intensive care unit, critical care, symptom management, ethics, communication, end-of-life care.

CAN POSTOPERATIVE DELIRIUM REALLY BE PREVENTED?

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Background: Postoperative delirium (POD) is one of the most common neuropsychiatric complications following major surgery, particularly among older and medically complex patients. It is associated with prolonged hospitalization, increased morbidity and mortality, functional decline, and higher healthcare costs. Although numerous risk factors have been identified, the effectiveness of preventive strategies in routine clinical practice remains an important challenge. The aim of this review is to examine whether POD can truly be prevented and to identify the most effective perioperative interventions.

Methods: A narrative review of contemporary literature was performed, focusing on multimodal and perioperative strategies for POD prevention. Evidence regarding preoperative risk assessment, optimization of modifiable risk factors, intraoperative anesthetic management, postoperative monitoring, and multicomponent non-pharmacological interventions was evaluated. Particular attention was given to depth of anesthesia, avoidance of excessive sedation, adequate analgesia, prevention of hypotension and hypoxia, sleep preservation, early mobilization, correction of sensory impairment, and maintenance of orientation and hydration.

Results: Current evidence suggests that POD is not completely preventable, particularly in patients with a high baseline vulnerability. However, a substantial proportion of delirium episodes may be reduced through systematic identification and modification of precipitating factors. Multicomponent non-pharmacological interventions appear to provide the most consistent preventive benefit. Optimization of pain control, avoidance of unnecessary psychoactive medications, maintenance of physiological homeostasis, early mobilization, appropriate nutritional and fluid management, and preservation of normal sleep–wake cycles are important components of prevention. Anesthesiologists play a central role in identifying high-risk patients and integrating preventive measures throughout the perioperative period. Emerging approaches, including individualized anesthetic management and artificial intelligence-based prediction models, may further improve early identification of patients at greatest risk.

Conclusion: Postoperative delirium cannot yet be considered entirely preventable, but it should not be regarded as an inevitable consequence of surgery or aging. Prevention is most effective when approached as a continuous perioperative process rather than as a single intervention. Early risk stratification combined with a structured, multidisciplinary and multimodal prevention strategy may significantly reduce the incidence and severity of POD and represents an important target for modern perioperative medicine.

POSTPARTUM HAEMORRHAGE: FROM FIXED PROTOCOLS TO REAL TIME, PRECISION HAEMOSTASIS

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Postpartum haemorrhage (PPH) is evolving from a predominantly volume-based emergency into a time critical, physiology driven haemostatic challenge. Despite advances in prevention and treatment, severe PPH continues to contribute substantially to maternal morbidity and mortality worldwide. The next generation of PPH management requires more than predefined transfusion ratios: it requires early recognition, rapid diagnosis, individualized haemostatic therapy and simultaneous control of the bleeding source.

This presentation will introduce a contemporary framework, integrating clinical assessment, dynamic blood-loss evaluation, laboratory testing and point of care viscoelastic haemostatic assays to guide treatment in real time.

Particular attention will be given to early fibrinogen depletion, the role of fibrinogen replacement as a targeted intervention, and the potential of ROTEM/TEG-guided algorithms to avoid both delayed treatment and unnecessary administration of blood components. The evolving evidence for tranexamic acid, fibrinogen concentrate, plasma, prothrombin complex concentrate and red blood cells will be discussed within a broader patient blood management strategy.

Importantly, haemostatic resuscitation cannot replace definitive haemorrhage control. Uterotonics, uterine tamponade, interventional radiology and surgical techniques must be integrated into a coordinated, parallel response pathway.

The presentation will also explore emerging opportunities for digital decision support, automated blood loss estimation, while emphasizing that technology must complement and not to replace, clinical judgement and multidisciplinary teamwork.

ENHANCED RECOVERY AFTER SURGERY (ERAS) IN CARDIAC SURGERY

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Background: Enhanced Recovery After Surgery (ERAS) is a multimodal, multidisciplinary approach designed to reduce the physiological stress associated with major surgery and help patients recover and return home faster. Although initially developed and widely implemented in other surgical specialties, ERAS principles are increasingly relevant to cardiac surgery, where patients are exposed to substantial perioperative physiological stress and a high risk of postoperative complications.

Objective: The aim of this presentation is to describe the principles of ERAS in cardiac surgery and to highlight its role in reducing perioperative stress, preventing complications, and improving postoperative recovery.

Methods: The presentation reviews the main components and goals of ERAS, with emphasis on their application to the perioperative, operative and postoperative management of cardiac surgical patients. Cardiac surgery is associated with major surgical trauma, cardiopulmonary bypass, systemic inflammatory response, bleeding and transfusion, mechanical ventilation, postoperative pain, delirium, reduced mobility, and prolonged intensive care unit (ICU) and hospital stay.

Results: The implementation of ERAS principles aims to preserve physiological function, reduce surgical stress and complications, and facilitate early recovery. Important elements include appropriate preoperative assessment and optimization, patient education, individualized anesthetic and analgesic strategies, blood conservation, maintenance of physiological homeostasis, lung-protective ventilation, effective pain management, prevention of delirium, early extubation, early mobilization, and early initiation of appropriate nutrition. Successful implementation requires close collaboration between cardiac surgeons, anesthesiologists, intensivists, nurses, physiotherapists, and other healthcare professionals. This multidisciplinary approach supports continuity of care and enables individualized management throughout the perioperative pathway.

Conclusion: ERAS represents a comprehensive strategy for improving recovery after cardiac surgery. By reducing physiological stress, preserving organ function, minimizing complications, and promoting early mobilization and recovery, ERAS has the potential to contribute to shorter ICU and hospital stays and improved patient experience. Its successful implementation depends on multidisciplinary cooperation, standardized evidence-based protocols, and continuous evaluation of clinical outcomes.

DOES NITROUS OXIDE STILL DESERVE A PLACE IN MODERN ANESTHESIA?

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Background: Nitrous oxide (N_2O) is one of the oldest anesthetic agents still in clinical use. Its rapid onset and offset, analgesic properties, and anesthetic-sparing effect have maintained its role for more than 180 years. However, advances in anesthetic drugs and techniques, together with concerns regarding adverse effects, occupational exposure, and environmental sustainability, have increasingly challenged its routine use.

Objective: This review aims to critically reassess the role of nitrous oxide in contemporary anesthesia and determine whether its clinical benefits still justify its use in modern anesthetic practice.

Methods: A narrative review and critical appraisal of contemporary evidence were performed, focusing on the pharmacological properties, clinical benefits, adverse effects, contraindications, occupational exposure, environmental impact, and available alternatives to nitrous oxide. Particular attention was given to its role as an adjunct to general anesthesia and its relevance in current anesthetic practice.

Results: Nitrous oxide provides rapid and predictable effects, clinically useful analgesia, and reduces requirements for volatile and intravenous anesthetic agents. Conversely, its use is associated with postoperative nausea and vomiting, expansion of closed gas spaces, interference with vitamin B12-dependent metabolism, and environmental concerns. Modern anesthetic techniques and multimodal analgesia have reduced the need for routine N_2O administration. Nevertheless, its favorable pharmacokinetic profile, limited cardiorespiratory depression, and analgesic properties may offer advantages in selected patients and clinical situations.

Conclusion: Nitrous oxide should no longer be regarded as an indispensable component of routine general anesthesia, but neither should it be considered obsolete. Contemporary evidence supports a transition from routine administration toward selective, indication-driven use. The relevant question may therefore not be whether modern anesthesia should abandon nitrous oxide, but rather when, where, and for whom it still provides meaningful clinical benefit.

Keywords: nitrous oxide, anesthesia, general anesthesia, anesthetic adjunct, patient safety, environmental sustainability

COMMON ERROR TRAPS IN PEDIATRIC ANESTHESIA

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Pediatric anesthesia presents a highly unique and complex set of clinical challenges where subtle physiological differences can rapidly escalate into critical, life-threatening events if specific error traps are not actively recognized and avoided by the medical team during surgery. In airway management, a primary trap involves inadequate pre-procedural planning and a critical failure to optimize the first intubation attempt, often by underutilizing advanced video laryngoscopy, which consequently leads to harmful repeated attempts and a vastly increased risk of severe respiratory complications. Neonates and young infants remain exceptionally vulnerable to metabolic and thermal instability; common clinical error traps in this domain include failing to aggressively maintain core normothermia, as small bodies lose body heat rapidly to the surrounding environment, alongside neglecting frequent blood glucose monitoring, which risks profound, undetected hypoglycemia due to their limited hepatic glycogen reserves. Furthermore, anesthesia practitioners frequently fall into cognitive traps regarding pediatric pharmacology by failing to adjust for age-dependent and developmental differences in drug metabolism, resulting in improper weight-based dosing of sensitive medications like opioids or local anesthetics, or completely omitting the use of objective, quantitative monitoring to detect residual neuromuscular blockade. Specific procedural contexts introduce highly localized risks; during a routine pediatric adenotonsillectomy, for instance, critical diagnostic oversights include failing to thoroughly assess the severity of obstructive sleep apnea, ignoring recent upper respiratory infections that severely hyper-react the airway tissue. Finally, in regional anesthesia techniques, traps involve misinterpreting complex ultrasound artifacts, failing to confirm the intended surgical block site location, or completely overlooking structural anatomical variations. Mitigating these multi-faceted risks effectively requires a systemic transition toward standardized cognitive checklists, rigorous weight-based calculations, and heightened interdisciplinary team communication across all crucial phases of perioperative patient care.

References

1. Morrissey T, Taverner F, Sawyer A, Strupp K. Common error traps in anesthesia for neonatal surgical emergencies. Paediatr Anaesth. 2025 Jan;35(1):6-16.
2. de Sousa GS, Faulk D, Quintao VC, Abbasian N, de Boer HD, Carlos RV. Error Traps in Pediatric Neuromuscular Block. Paediatr Anaesth. 2026 Aug;36(8):887-898.
3. Sohn L, Peyton J, von Ungern-Sternberg BS, Jagannathan N. Error traps in pediatric difficult airway management. Paediatr Anaesth. 2021 Dec;31(12):1271-1275.
4. Masaracchia MM, Sunder RA, Polaner DM. Error traps in pediatric regional anesthesia. Paediatr Anaesth. 2021 Nov;31(11):1161-1169.

HEMODYNAMIC MONITORING MODALITIES IN THE ICU - COMPLIANCE WITH CURRENT GUIDELINES

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Hemodynamic monitoring techniques can identify cardiovascular insufficiency (CVI) and guide personalized hemodynamic therapies when linked to clinical examination to assess perfusion adequacy. Effective hemodynamic monitoring to achieve these goals should be associated with improved outcomes. Still, no hemodynamic monitoring device will improve outcomes unless coupled to an appropriate and effective treatment. Cardiac output (CO) is a primary determinant of oxygen delivery and a cornerstone of hemodynamic management in critical illness. In septic shock, characterized by circulatory instability and evolving perfusion deficits, real-time CO monitoring enables clinicians to assess the effectiveness of resuscitation efforts and tailor ongoing therapy, including fluids and vasoactive agents. The goal is not to reach a specific CO per se, but to dynamically inform clinical decisions while minimizing fluid overload and risks of organ dysfunction. Accordingly, current guidelines strongly support dynamic CO assessment, particularly in patients who remain unstable after initial fluid resuscitation. Despite its centrality to bedside decision-making, no single CO measurement technique is universally accepted in septic shock. Key aspects of hemodynamic monitoring in ICU include following: individualizing the assessment of cardiovascular reserve, defining circulatory sufficiency, predicting volume responsiveness, minimizing the volume of resuscitation using vasopressors early, assessing arterial tone and predicting arterial pressure responses to hypotension and vasopressor weaning, optimizing cardiovascular support in circulatory shock, optimizing cardiovascular support of CVI during ARDS, prediction of instability. The proven efficacy of treatments guided by specific hemodynamic monitoring have improved patient outcomes; impacts are small but relevant. A one-size-fits-all approach may prevent patients from receiving life-saving fluid and vasoactive medication administration when needed and may encourage the use of these interventions when futile.

CHOOSING WISELY: EVIDENCE-BASED BLOCKS - REGIONAL ANALGESIA FOR THORACIC SURGERY

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Thoracic surgery are common procedures with a shift from open thoracotomy to minimally invasive video-assisted thoracoscopy (VATS) and robotic-assisted thoracoscopic surgery (RATS). Thoracotomy ranks among the most painful surgeries. VATS is considerered to be associated with less severe pain (1,2). However, acute pain after VATS impairs early mobilisation and is a predictor of early persistent postoperative pain (EPP) and chronic postsurgical pain (CPSP). Increased awareness about the risks of opioid use, boosted the relevance of regional analgesia in multimodal concepts. Regional analgesia evolved in recent years. For VATS we moved away from thoracic epidurals with specific risks and immanent problems in patients on anticoagulation (3,4). Regional analgesia is included in the PROSPECT recommendations for thoracotomy (1) and thoracoscopy (2). The expanding multitude of blocks, makes it increasingly complex for the clinician to select the optimal approach in different procedures. Heterogeneity in types of surgery, non-standardized- block execution and the lack of high-quality trials, limit conclusions regarding the superiority of any block. While the PROSPECT recommendations on thoracotomy are recent, those on thoracoscopy were published in 2022. PVB is the gold standard for thoracotomy and thoracoscopy. New evidence challenges the role of erector spinae plane block (ESPB) as a „Plan A Block“ (5). Different forms of ITPBs seem to be more reliable alternatives (6). SAPB (7) and ICNBs (8) are valuable alternatives for some procedures. The nomenclature of the presentation adheres to the ASRA–ESRA Delphi consensus statement on chest wall blocks (9).

References

1. Lemoine, A. et al. and the PROSPECT Working Group of the European Society of Regional Anaesthesia and Pain Therapy (2026), Pain management after open thoracotomy 2025: procedure-specific postoperative pain management (PROSPECT) recommendations. Anaesthesia, 81: 541-555.
2. Feray, S. et al. and the PROSPECT Working Group *of the European Society of Regional Anaesthesia and Pain Therapy (2022), PROSPECT guidelines for video-assisted thoracoscopic surgery: a systematic review and procedure-specific postoperative pain management recommendations. Anaesthesia, 77: 311-325.
3. Spaans LN et al.. Acute pain management after thoracoscopic lung resection: a systematic review and explorative meta-analysis. Interdiscip Cardiovasc Thorac Surg. 2023 Jan 4;36(1):ivad003.
4. Kietaibl S et al. Regional- anaesthesia in patients on antithrombotic drugs: Joint ESAIC/ESRA guidelines. Eur J Anaesthesiol. 2022 Feb 1;39(2):100-132.
5. Karmakar MK, Lönnqvist PA. The clinical use of the thoracic erector spinae plane block. Con - ESPB is not useful for thoracic analgesia. Journal of Clinical Anesthesia. 2024 May;93:111353.
6. Sivakumar RK, Karmakar MK. Variable anterior spread of local anesthetic after erector spinae plane block (ESPB): time to turn the spotlight on the 'retro-SCTL space'. Reg Anesth Pain Med. 2023 Sep;48(9):483-484.
7. Huppertz-Thyssen MH et al. Periphere Regionalanästhesie und -analgesie: „the Magnificent Seven“ für die Weiterbildung [Peripheral regional anesthesia and analgesia: "the magnificent seven" for training]. Anaesthesiologie. 2026 Mar 31. German.
8. Coppens S et al. Erector Spinae Plane Block versus Intercostal Nerve Blocks in Uniportal Videoscopic-assisted Thoracic Surgery: A Multicenter, Double-blind, Prospective Randomized Placebo-controlled Trial. Anesthesiology. 2025 Oct 1;143(4):1015-1025.
9. El-Boghdadly K et al. Standardizing nomenclature in regional anesthesia: An ASRA-ESRA Delphi consensus study of abdominal wall, paraspinal, and chest wall blocks. Reg. Anesth. Pain Med. 2021; 46: 571–80.

PERIOPERATIVE MANAGEMENT OF ANEURYSMAL SUBARACHNOID HEMORRHAGE: MODERN PARADIGMS, EVIDENCE-BASED UPDATES AND CLINICAL DILEMMAS

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Aneurysmal subarachnoid hemorrhage (aSAH) remains a neurosurgical emergency associated with high morbidity and mortality. Available recent data emphasize a need for continuum of specialized multidisciplinary care during hyperacute stabilization phase, intraoperative and neurointensive management.

In the pre-securing phase, primary objectives are focused on preventing rebleeding while maintaining adequate cerebral perfusion pressure. Current guidelines support target-driven blood pressure control, with recommendation to avoid blood pressure variability as well as hypotension. In this phase, antifibrinolytic therapy is not indicated for routine use.

Intraoperatively, anesthetic management prioritizes cerebral protection, brain relaxation and hemodynamic stability during critical maneuvers such as temporary vessel occlusion or coil deployment. Choice of anesthetic strategy should take into consideration impact on neurophysiology monitoring during surgical clipping.

Neurointensive management reflects major conceptual evolution: delayed cerebral ischemia (DCI) is recognized as a complex entity including microvascular changes, neuroinflammation and spreading depolarization, rather than macrovascular vasospasm. Consequently, management has shifted away from traditional „triple H“ therapy toward targeted euvolemia combined with induced hypertension for symptomatic DCI.

Despite these advancements, there are still controversis in clinical practice. Questions include prophylactic use of antiepileptics, dilemma between lumbar cerebrospinal fluid drainage versus external ventricular drainage, transfusion triggers as well as indications and timing of endovascular rescue procedure sin refractory DCI. Resolving these dilemmas is essential to establish standardized evidence-based protocols that would benefit long term functional recovery of aSAH patients.

References:
1. Treggiari MM, Rabinstein AA, Busl KM, Caylor MM, Citerio G, Deem S, Diringer M, Fox E, Livesay S, Sheth KN, Suarez JI, Tjoumakaris S. Guidelines for the Neurocritical Care Management of Aneurysmal Subarachnoid Hemorrhage. Neurocrit Care. 2023 Aug;39(1):1-28.
2. Hoh BL, Ko NU, Amin-Hanjani S, Chou SH-Y, Cruz-Flores S, Dangayach NS, Derdeyn CP, Du R, Hänggi D, Hetts SW, Ifejika NL, Johnson R, Keigher KM, Leslie-Mazwi TM, Lucke-Wold B, Rabinstein AA, Robicsek SA, Stapleton CJ, Suarez JI, Tjoumakaris SI, Welch BG. 2023 Guideline for the Management of Patients With Aneurysmal Subarachnoid Hemorrhage: A Guideline From the American Heart Association/American Stroke Association. Stroke. 2023 Jul;54(7):e314-e370.

INTRAVENSKA SEDACIJA DJECE OD 0-7 GODINA ZA MR DIJAGNOSTIKU

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Uvod: Dječja populacija je jedna jako osjetljiva grupa pacijenata koja nažalost u novije vrijeme zbog razvoja medicine i dijagnostike biva sve češće podvrgnuta modernim dijagnostičkim metodama koje zahtjevaju analgosedaciju ili anesteziju.

Cilj rada: je pokazati način rada sa sedacijom/anestezijom djece za potrebe MRI snimanja za djecu dobi 0-7 godina u Poliklinici Vitalis Mostar. U BiH se ove procedure za djecu dobi od 0-7 godina izvode većinom, pa možda i isključivo u inhalacijskoj anesteziji. Međutim kako inhalacijska anestezija ipak ima dosta kontraindikacija s obzirom na dijagnoze djece koja dolaze na magnetnu rezonancu, pokušali smo uvesti nov način rada s midazolam sirupom per os, a potom porpofolom ordiniranim intravenski putem bolusa i perfuzora.

Materijal i metode: U ovoj retrospektivnoj opservacijskoj studiji izvršili smo uvid u medicinsku dokumentaciju 107 djece dobi od 0-7 godina koja su sedirana za MR proceduru u Poliklinici Vitalis u periodu od 24.04.2023. – 01.09.2026.
Nakon plasiranog venskog puta pristupamo samoj dubokoj sedaciji djeteta propofolom intavenski, inicijalno u bolusnoj dozi, a nastavljamo porpofolom u kontinuiranoj inzufiji putem perfuzora. Bolusna doza inicijalno uspava dijete, nakon čega postavljamo pulsni oksimetar i facijalnu kisičnu masku. Potom dodatno produbljujemo anesteziju po potrebi, te krećemo sa kontinuiranim davanjem propofola na perfuzor .

Rezultati:Učinjeno je 107 anestezija, od toga 34 djevojčice i 73 dječaka.
Prosječna dob djece: 4.28 g. Prosječna kilaža djece: 19.1 kg
Nisu zabilježene ni najmanje nus pojave tijekom ove vrste anestezije.
Nakon obavljenog snimanja i buđenja u kabinetu za MRI, djeca u našoj ustanovi su provodila još 1-2 sata u pratnji roditelja i pod nadzorom naših medicinskih tehhničara, nakon čega su išli kući.

Zaključak: S obzirom da u meni dostupnoj literaturi nisam pronašao točno ovakav vid anestezije djece sa Midazolam sirupom i Propofolom doziranim na perfuzor, dokazali smo da je ovo prilično inovativan pristup kojeg svatko može primijeniti u svojoj ustanovi.

TEŠKE POVREDE JETRE UZROKOVANE KARDIOPULMONALNOM REANIMACIJOM - PRIKAZ SLUČAJA

Prim dr Mehmed Haznadar, spec.anesteziologije i reanimatologije, subspec.intenzivne medicine
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Kardiopulmonalna reanimacija je medicinski postupak koji se izvodi radi održavanja vitalnih funkcija u hitnim medicinskim stanjima. Tokom kardiopulmonalne reanimacije, zbog kompresija grudnog koša mogu se javiti mnoge komplikacije. Najcesce komplikacije su prelomi grudne kosti i rebara, ali i mogu nastati i rijetke po zivot opasne povrede visceralnih organa. Visceralne ozljede su rijetke, ali mogu utjecati na ishod lijecenja uprkos uspjesnoj reanimaciji. Prema dostupnim podacima iz literature ucestalost povreda jetre iznosi od 0,6 do 3%. Predstavlja potencijalno smrtonosnu komplikaciju ukoliko se pravovremeno ne prepozna i adekvatno ne tretira. Ovaj prikaz naglašava važnost prepoznavanja rijetkih, ali životno ugrožavajućih komplikacija KPR-a, kao sto je laceracija jetre. Brza dijagnoza i intervencija ključne su za poboljšanje ishoda liječenja pacijenata.

Uvod: Kardiopulmonalna reanimacija (KPR), iako temeljna i nezamjenjiva procedura u hitnim medicinskim stanjima, nije bez potencijalnih komplikacija. Kompresija grudnog koša tokom postupka kardiopulmonalne reanimacije predstavlja rizik, čak i ukoliko se izvodi prema preporukama (1,2,3). Prijavljene komplikacije kreću se u rasponu od manjih mišićno-koštanih ozljeda, poput preloma rebara i sternuma, do težih i rjeđih ozljeda visceralnih organa (1,4,5).
Visceralne ozljede tokom kardiopulmonalne reanimacije mogu utjecati na morbiditet i mortalitet pacijenata sa srčanim zastojem unatoč ranoj uspješnoj reanimaciji. Učestalost ozljeda visceralnih organa, posebno laceracija jetre, je relativno rijetka i cesto se moze previditi. Budući da traumatski mehanizmi nisu uključeni u ovim slučajevima, ljekari obično ne očekuju tešku intraabdominalnu traumu ili povredu. Tačan procenat oštećenja jetre uzrokovanih KPR-om nije poznat, sa sporadičnim prijavljenim izvještajima kreće se u rasponu od 0,6 do 3 %. Ispravna i rana dijagnoza, kao i adekvatan tretman su presudni (1,3,6,7).
Ovaj prikaz slučaja ima za cilj istaknuti iznimno rijedak slučaj udruzene povrede laceracije jetre i pneumotoraksa lijevo otkrivene nakon kardiopulmonalne reanimacije kod odrasle osobe. Naglašava se važnost pravovremenog razmatranja takvih komplikacija, čak i kada su izuzetno rijetke, kako bi se poboljšali ishodi liječenja pacijenata kroz visoku razinu sumnje, brzu dijagnozu i liječenje.

Prikaz slučaja: Pacijent starosti 63 godine zatečen bez svijesti i srčane akcije u kućnim uslovima. Od ranijih oboljenja prije deset godina prebolovao akutni infarkt miokarda (STEMI). Implantiran stent u LAD i Cx. Prije 10 godina prestao pušiti. Do tada koristio dvije kutije cigareta dnevno 20 godina. Alergije na lijekove nije manifestirao. Poznanik obučen za pružanje prve pomoći odmah započinje sa postupkom kardiopulmonalne reanimacije. Pozvana Služba hitne medicinske pomoći i vozilom biva transportovan u Centar urgentne medicine KB „Dr.Safet Mujić“. Nakon uspješne kardiopulmonalne reanimacije primljen u Jedinicu za anesteziologiju, intezivno liječenje i reanimaciju zbog potrebe za kontinuiranim praćenjem, terapeutskim i dijagnostičkim procedurama.
Ultrazvukom srca se nadje ishemijska kardiomiopatija, reducirana sistolna funkcija sa EF LV:45%, uz mitralnu insuficijenciju blagog stepena.
MSCT mozga ne nadje svježe ishemije, hemoragije, ekstraaksijalne kolekcije niti intraaksijalnog ekspanzivnog procesa.
CT toraksa nema sigurnih CT znakova vidljivih defekata u kontrastnom punjenju koji bi odgovorali eventualnoj plućnoj tromboemboliji. Veći pneumotoraks lijevo dijelom i u medijastinom prostu. Diskretan pleuralni izljev bilateralno. Manji potkožni emfizem uz ventralne strane lijevog hemitoraksa sa frakturom grudne kosti i ventralnog okrajka II i III rebra lijevo.
Zbog arteficijalnog pneumotoraksa plasira se torakalni dren u lijevo prsište.
Ulaznim lab.nalazima evidentiran uredan hemogram, uz elevirane vrijednosti jetrenih proba (AST 249; ALT 288; LDH 514; CK 297; CK MB 63) blago elevirane vrijednosti hS Troponina I 0,128; mioglobin 350,9, D-dimer >4000.
Drugi postoperativni dan zbog hipotenzije i pada u krvnoj slici realizira se ultrazvuk abdomena. Evidentira se veca kolicina slobodne tecnosti intraabdominalno. Indicira se hitni operativni zahvat. Ucini se medijalna laparotomija. Intraoperativno se notira hematom i laceracija lijevog lobusa jetre. Zbog opseznosti lezije jetre odluci se za perihepaticnu tamponadu, te se plasiraju dva abdominalna drena. Postupak relaparotomije se ponovi u dva navrata, sukcesivno nakon 48 sati. U prvom aktu

relaparotomije se promjene komprese, dok se u drugom iste odstrane. Hemostaza tokom oba zahvata relaparotomije uredna. Prati se sekrecija na abdominalne drenove, i isti odstrane u terminu. Nakon protokolarnog torakohirurškog postupka i reekspanziji plućnog krila odstrani se i torakalni dren.
Pacijent se cetvrtog postoperativnog dana od zadnjeg operativnog zahvata ekstubira. Prate se vitalni parametri i laboratorijski nalazi. Svijestan, komunikativan, hemodinamski stabilan. Mobiliziran uz fizijatrijski tretman. Kontrolnim ultrazvucnim pregledima jetra uredne velicine, na granici desnog i lijevog reznja evidentira se hematom u organizaciji. Manji pleuralni izljev lijevo. Na rendgenen snimcima grudnog kosa reekspandirano lijevo plucno krilo, prelomi rebara u sanaciji. Realizira se koronografija i evidentira znacajna stenoza RCA u ranije implantiranom stentu. U istom aktu ucini se dilatacija i implantacija dva stenta. Kontrola kardiologa sa nalazom ergometrije za tri mjeseca. Pacijent se oporavljen hemodinamski stabilan otpusta na kucno lijecenje.

Diskusija: Kompresija grudnog koša je najvažnija komponenta kardiopulmonalne reanimacije. Povezana je sa cijelim spektrom povreda koje najcese ukljucuju ozljede grudnog kosa, ali rijetko moze dovesti i do ozljeda visceralnih organa. Predstavlja traumatski postupak i svaka komplikacija ozbiljnija od traume mekih tkiva je nepozeljna. Na stepen i ozbiljnost komplikacija moze uticati primjenjena kompresija na grudni kos koja moze oscilirati od sile samog potiska i mjesta aplikacije (1,5,8).
Najčešća komplikacija tokom postupka kardiopulmonalne reanimacije je povreda grudnog kosa. Prelomi rebara i grudne kosti su cesto opazeni slucajevi nakon KPR-e. Prelomi rebara obicno ne uzrokuju dodatne povrede, ali visestruki ili segmentni prelomi, mogu dovesti do povrede drugih organa (5,8,9,10). Druge torakalne komplikacije uključuju hemotoraks, pneumotoraks i hemoperikard (9,10). U nasem prikazu, pronadjeni su visestruki prelomi rebara obostrano i grudne kosti, koji su doveli do povrede plucne maramice sa posljedicnim pneumotoraksom lijevo.
Povrede intraabdominalnih organa su rijetke komplikacije reanimacije. Medjutim, mnogi organi mogu biti povrjedjeni. Opisane su povrede jetre, slezene, dilatacija i perforacija zeludca, traume tankih crijeva, intraperitonelano krvarenje i retroperitonelani hematomi (5,8,9,10,11,12). Prema podacima iz literature, povrede jetre se javljaju sa incidencom od 0,6 do 3% (1,3,4,5,10). Laceracije jetre se najčešće desavaju na lijevom režnju. To bi se moglo objasniti bliskim anatomskim odnosom između lijevog režnja jetre i sabljastog nastavka grudne kosti. Dakle, ako su ruke pružatelja kardiopulmonalne reanimacije postavljene prenisko ili se primjenjuje prekomjerni pritisak, grudna kost može potencijalno oštetiti lijevi rezanj jetre (3,4,5,10,13,14). I u nasem slucaju zabiljezena je laceracija i hematom lijevog reznja jetre. Dva druga važna faktora koja mogu povećati rizik od laceracije jetre su ishemija i distenzija jetre zbog venske opstrukcije (4,5,10). Smatramo da su navedeni faktori i u nasem slucaju uzrok ozljede jetre. Pored toga, jos jedan faktor koji dovodi do protrahiranog krvarenja kod pacijenata sa infarktom miokarda jeste tretman sa antitrombocitnim, antitrombotskim i trombolitičkim sredstvima (5,10,14).
Ishodi povreda jetre uzrokovani KPR-om ovise od primarnog uzroka i trajanja reanimacije, kao i tezine, te rane dijagnoze ozljede. Hoskovec i sur. u studiji su izvjestili o smrtnosti lezija jetre udruzene sa KPR-om od 44%, pet od devet pacijenata je prezivjelo (7). Slicni rezultati zabiljezeni su u studijama prikaza slucaja. Tri od devet pacijenata je preminulo (3,15,16,17,18,19). Meron i sur. su izvjestili o visokom mortalitetu povreda jetre tokom KPR-e, od petnaest pacijenata samo su dva prezivjela 13% (4). U nasem slucaju pacijent je imao udruzene povrede obostrane serijske prelome rebara i grudne kosti sa posljedicnim pneumotoraksom. Navedene povrede su predstavljale dodatni izazov u dijagnosticiranju lezije jetre, buduci da se pad u hemogramu mogao obrazloziti navedenim prelomima. Prema nasim saznanjima do sada nije objavljen slucaj sa udruzenom povredom jetre i pneumotoraksom kao posljedica KPR-e.
Pravilna upotreba tehnika KPR-a, lokalizacija ruku tokom primjene kompresije grudnog koša i jačina kompresija, može smanjiti prijelome rebara i time smanjiti povrede susjednih organa (5). Meron i saradnici su naglasili važnost tima za reanimaciju i njihove kvalifikacije. Ipak su istakli da se, uprkos njihovoj obuci, većina spomenutih komplikacija javlja nakon što kvalifikovani tim primijeni KPR, cak i ako tim za reanimaciju vrši blage kompresije grudnog koša, to i dalje može uzrokovati povrede organa (4). Bez obzira na razlog, KPR je nezamjenjivi postupak koji se primjenjuje kako bi se pacijenti vratili u život i povećale njihove šanse za preživljavanje. Medjutim, i pravilno izvedena KPR-a može uzrokovati ozljede organa ili fatalne komplikacije, te smanjiti šanse za preživljavanje (1,2,3,5). Ljekari bi trebali da dobro poznaju proces reanimacije, da budu dobro kvalifikovani, da pravilno primjenjuju tehniku KPR-e, da paze da ne izazovu, ali i da prepoznaju ozljede organa i moguce komplikacije tokom izvođenja reanimacije.
Budući da su intraabdominalne povrede rijetke komplikacije KPR-a njihova dijagnoza može biti teška i izazovna. Ona zahtijeva pažljivu kliničku procjenu, kao i redovno praćenje standardnih hemodinamskih i laboratorijskih parametara. Rutinska primjena tehnika abdominalnog snimanja kod svakog pacijenta

nakon uspješne KPR-a čini se suvišnom (10). Mozda bi odluka o izvođenju abdominalnog ultrazvuka ili CT skeniranja trebala biti zasnovana na kliničkim pretpostavkama i premisama.

Zakljucak: Laceracija jetre je rijetka, ali ozbiljna komplikacija kardiopulmonalne reanimacije. Krvarenje uzrokovano oštećenjem jetre kompresijama grudnog koša može biti opasno po život, čak i nakon tehnički uspješne reanimacije. Kliničari bi trebali uzeti u razmatranje laceraciju jetre kod pacijenata čiji oporavak nakon KPR-e nije zadovoljavajuci. Visok indeks sumnje, rana dijagnoza i brza intervencija presudni su za prezivljavanje pacijenta.

LITERATURA

1. Sawhney M et al. Liver laceration following cardiopulmonary resuscitation in a young adult: An unexpected life-threatening complication. The American Journal of Emergency Medicine. 2025;
2. Y. Kashiwagi et al. Computed tomography findings of complications resulting from cardiopulmonary resuscitation. Resuscitation. 2015. 88:86-91.
3. Min-Jeong Cho Liver laceration as a post-cardiopulmonary resuscitation complication in a person with breast implants: a case report. Journal of Trauma and Injury 2024;37(4):300-303.
4. Meron et al. Cardiopulmonary resuscitation-associated major liver injury. Resuscitation. 2007; 75:445-453.
5. Beydilli et al. Liver laceration related to cardiopulmonary resuscitation. Turkish Journal of Emergency Medicine. 2016; 16 (2):77-79.
6. Viniol R.P. et al. Comparison of different resuscitation methods with regard to injury patterns in cardiac arrest survivors based on computer tomography. European Journal of Radiology. 2020; 131.
7. Hoskovec, D. et al. Rare Complication of Cardiopulmonary Resuscitation—Liver Injury. Medicina. 2024; 60:1470.
8. Boz B., Erdur B., Acar K., Ergin A., Turkcuer I., Ergin N. Frequency of skeletal chest injuries associated with cardiopulmonary resuscitation: forensic autopsy. Ulus Travma Acil Cerrahi Derg. 2008;14:216–220.
9. Buschmann CT, Tsokos M. Frequent and rare complications of resuscitation attempts. Intensive Care Med. 2009;35:397–404.
10. Kaplon-Cieslicka A., Kosior D.A., Grabowski M., Rdzanek A., Huczek Z., Opolski G. Coronary artery dissection, traumatic liver and spleen injury after cardiopulmonary resuscitation - a case report and review of the literature. Arch Med Sci. 2013;9:1158–1161.
11. Rosen J., Tuchek J.M., Hartmann J.R. Liver laceration in the hemodynamically unstable post-cardiac massage patient: early recognition and management–case report. J Trauma. 1999;47:408–409.
12. Pezzi A., Pasetti G., Lombardi F., Fiorentini C., Iapichino G. Liver rupture after cardiopulmonary resuscitation (CPR) and thrombolysis. Intensive Care Med. 1999;25:1032.
13. Camden J.R., Carucci L.R. Liver injury diagnosed on computed tomography after use of an automated cardiopulmonary resuscitation device. Emerg Radiol. 2011;18:429–431.
14.Ziegenfuss M.D., Mullany D.V. Traumatic liver injury complicating cardio-pulmonary resuscitation. The value of a major intensive care facility: a report of two cases. Crit Care Resusc. 2004;6:102–104.
15.Engelken, F.J.; Bosse, G.; Diederichs, G. A complication of cardiopulmonary resuscitation. Emerg. Med. J. 2011; 28:173.
16. Kouzu, H.; Hase, M.; Kokubu, N.; Nishida, J.; Kawamukai, M.; Usami, Y.; Hirokawa, N.; Meguro, M.; Tsuchihashi, K.; Miura, T.; et al. Delayed visceral bleeding from liver injury after cardiopulmonary resuscitation. J. Emerg. Med. 2012; 43: e245–e248.
17. de Rooij, P.P.; Wiendels, D.R.; Snellen, J.P. Fatal complication secondary to mechanical chest compression device. Resuscitation 2009; 80: 1214–1215.
18. Zahn, G.; Hauck, M.; Pearson, D.A.; Green, J.M.; Heffner, A.C. Major hemorrhage from hepatic laceration after cardiopulmonary resuscitation. Am. J. Emerg. Med. 2015;33: 991.e3–991.e4.
19. Næss, P.A.; Engeseth, K.; Grøtta, O.; Andersen, G.Ø.; Gaarder, C. Minimal invasive treatment of life-threatening bleeding caused by cardiopulmonary resuscitation-associated liver injury: A case report. J. Med. Case Rep. 2016; 10: 132.15.

THE ROLE OF SERIAL ULTRASONOGRAPHIC ASSESSMENT OF INTRA-ABDOMINAL FREE FLUID IN THE ICU?

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Background:
Point-of-care ultrasound (POCUS) has become an increasingly important component of modern anesthesiology and intensive care practice. Its integration into the routine assessment of critically ill patients enables anesthesiologists to obtain immediate bedside information and to repeat examinations according to changes in the patient's clinical condition. Among its practical applications, detection and serial assessment of free fluid in different body compartments represent a simple but valuable extension of the physical examination. Unlike advanced radiological imaging, which provides detailed information at a specific time point, POCUS offers the possibility of dynamic, real-time reassessment without patient transport.

Serial POCUS assessment of intra-abdominal free fluid may provide valuable information on its appearance, persistence, increase, or decrease over time. A negative initial examination does not exclude subsequent fluid accumulation. Changes in hemodynamic status, abdominal findings, hemoglobin concentration, or overall clinical condition should prompt reassessment. Repeated examination of the hepatorenal, splenorenal and pelvic spaces can therefore complement, rather than replace, CT imaging.

Extending the examination to the thorax provides additional clinically relevant information. The eFAST approach enables rapid identification and serial monitoring of pleural fluid, including hemothorax and pleural effusion.

The pelvic view should not focus exclusively on intraperitoneal free fluid. Assessment of the urinary bladder provides useful information regarding bladder filling and urinary catheter function. In patients with unexpected oliguria or absent urine output, POCUS may identify bladder distension, urinary retention, catheter obstruction or malposition.

POCUS should become an integral skill for anesthesiologists working in intensive care. Its major advantage is repeatability: serial bedside examinations allow clinicians to follow dynamic changes in the abdomen, pleural spaces and urinary bladder and to integrate imaging findings with the evolving clinical condition.

Keywords: Point-of-Care Ultrasound; Intensive Care; Anesthesiology; Peritoneal Fluid; Pleural Effusion

References
1. American Institute of Ultrasound in Medicine. AIUM Practice Parameter for the Performance of the Extended Focused Assessment With Sonography for Trauma (EFAST). J Ultrasound Med. 2023.
2. Richards JR, McGahan JP. Focused Assessment with Sonography in Trauma (FAST) in 2017: What Radiologists Can Learn. Radiology. 2017.
3. Taus PJ, Manivannan S, Dancel R. Bedside Assessment of the Kidneys and Bladder Using Point of Care Ultrasound. POCUS J. 2022;7:94–104.

TRANEXAMIC ACID IN MODERN PERIOPERATIVE HAEMOSTASIS

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Background: Perioperative bleeding remains an important cause of morbidity and transfusion in major surgery. Trauma, orthopaedic and spine surgery, obstetric haemorrhage, major liver and cancer surgery, and cardiac procedures are associated with substantial blood loss. Tranexamic acid (TXA), an antifibrinolytic agent, has become an important component of modern patient blood management by stabilizing fibrin clots and reducing bleeding.

Evidence: Although TXA has been used for more than five decades, its indications have progressively expanded. Large trials such as CRASH-2 and CRASH-3 demonstrated benefit in selected trauma populations, particularly when treatment is administered early. In orthopaedic surgery, evidence consistently demonstrates reductions in perioperative blood loss and transfusion requirements without a significant increase in symptomatic thromboembolic events. In obstetric haemorrhage, the WOMAN trial demonstrated reduced mortality due to bleeding when TXA was administered promptly. Cardiac surgery is another important indication because cardiopulmonary bypass promotes fibrinolysis. The ATACAS trial, involving more than 4,600 patients undergoing elective cardiac surgery, demonstrated reduced bleeding and transfusion requirements without a significant increase in thrombotic complications.

Safety and clinical considerations: The optimal dose and timing remain important considerations. High-dose TXA has been associated with an increased risk of postoperative seizures, particularly in cardiac surgery. Consequently, current practice increasingly favours moderate, individualized dosing. Renal function must be considered because TXA is predominantly renally eliminated, and dose adjustment is required in renal impairment. Although clinical trials have not demonstrated a consistent increase in thrombotic events, caution is appropriate in patients with significant thrombotic risk.

Conclusion: TXA is an effective, accessible and cost-effective component of perioperative haemostatic management. Its optimal use requires appropriate timing, individualized dosing and consideration of renal, neurological and thrombotic risk. TXA should be regarded not as a substitute for meticulous surgical haemostasis, but as an important pharmacological tool within a comprehensive patient blood management strategy.

EARLY VERSUS DEFERRED RENAL REPLACEMENT THERAPY IN SEPSIS AND SEPTIC SHOCK

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Background: Acute kidney injury (AKI) is a common complication of sepsis and septic shock and is associated with increased morbidity and mortality. Continuous renal replacement therapy (CRRT) is frequently preferred in such hemodynamically unstable patients. However, the optimal timing of renal replacement therapy (RRT) remains controversial. Early CRRT has been proposed to provide timely control of fluid balance, electrolyte and acid–base disturbances, and uremic toxin accumulation, while potentially removing inflammatory mediators and limiting secondary organ dysfunction.

Current evidence: Early RRT initially showed promising results in the ELAIN trial, which reported lower 90-day mortality, although the study was single-center and predominantly included surgical patients. In contrast, AKIKI trial demonstrated no survival advantage with an early strategy. The IDEAL-ICU trial, specifically involving patients with septic shock and severe AKI, found no difference in 90-day mortality between early and delayed RRT. Similarly, the large multinational STARRT-AKI trial demonstrated no survival benefit from accelerated RRT initiation. Importantly, deferred strategies allowed a substantial proportion of patients to recover kidney function without ever receiving RRT.

Adsorptive technologies, including oXiris membranes and CytoSorb hemoadsorption, have renewed interest in early extracorporeal treatment of septic shock. Preliminary evidence suggests reductions in inflammatory mediators, lactate concentrations, and vasopressor requirements; however, a consistent survival benefit has not been demonstrated.

Conclusion: Current evidence does not support routine early CRRT in septic AKI without conventional indications for RRT. A deferred, indication-based approach with close clinical reassessment appears appropriate. Whether early CRRT combined with adsorptive blood purification can benefit selected hyperinflammatory or hemodynamically unstable phenotypes remains uncertain and requires adequately powered randomized controlled trials

Keywords: sepsis, septic shock, acute kidney injury, renal replacement therapy

T3 SUPPLEMENTATION IN SEPTIC SHOCK PATIENTS WITH EUTHYROID SICK SYNDROME

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Background: To assess 28-day survival in two pilot groups of septic shock patients with euthyroid sick syndrome (ESS) supplemented with triiodothyronine (T3).

Methods: A total of 95 septic shock patients with ESS were divided according to values of the thyroid hormones into low T3 and low T3T4 groups. Among 48 patients with low T3, 24 (50%) were randomized to T3 for 4 days and 24 (50%) to placebo. Among 47 patients with low T3T4, 24 (51%) were randomized to T3 for 4 days and 23 (49%) to placebo. The analysis included 28-day survival as the primary outcome and laboratory with hemodynamics as the secondary outcomes. Laboratory data were analyzed on the day of admission (T0), on the first (T1), third (T2) and seventh day (T3) with hemodynamics analyzed for the first four days.

Results: In the low T3 population, 18 (75%) patients receiving T3 died at day 28 compared with 8 (33.3%) patients receiving placebo ($p = 0.004$). In the low T3T4 population, 6 (25%) patients receiving T3 died in ICU compared with 12 (52.1%) patients receiving placebo ($p = 0.039$). Oral T3 treatment increased mean arterial pressure values at day 1, day 3 and day 7 in the low T3T4 population, ($p = 0.015$, $=0.005$ and $=0.042$ respectively), and had no significant effect on these values in the low T3 population.

Conclusion: T3 supplementation was associated with a low 28-day mortality rate in patients with low T3T4 but with increased mortality in patients with low T3 ESS. These results suggest caution before initiating thyroid supplementation in septic patients.

FASCIAL PLANE BLOCKS: WHERE DO WE STAND IN 2026?

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Introduction: Fascial plane blocks (FPBs) are ultrasound-guided regional techniques in which a local anesthetic (LA) is deposited in a fascial plane, between two muscles or between a muscle and bone, to reach small nerves and nerve endings [1]. The ASRA–ESRA Delphi consensus standardized their nomenclature, recommending the term “fascial” rather than “interfascial” plane block, in order to support their integration into multimodal analgesia (MMA) and opioid-sparing strategies after abdominal and thoracic surgery [1]. Blocks performed near the spine allow spread of LA into the paravertebral and possibly epidural spaces, providing both parietal and visceral analgesia [2]. Under ultrasound guidance FPBs are technically simpler and safer than thoracic epidural (TED) or paravertebral block (PVB), yet they can provide up to 24 hours of analgesia. The goal has been consistent since day one: better analgesia, faster recovery, fewer opioids. What has changed since 2024 is that the field has moved from enthusiasm to guidelines and practical decision tools.

Guidelines and evidence: The most important recent development is the 2026 ASA Practice Guideline, which strongly recommends FPBs in adults to reduce pain and/or opioid requirements in the first 24 h after open cardiothoracic, abdominal, retroperitoneal and pelvic surgery and mastectomy, and recommends them after minimally invasive abdominal procedures. Recommendations are conditional for minimally invasive cardiothoracic surgery and open hernia repair. In children, the recommendation is strong for open cardiac or thoracic surgery and conditional for open hernia repair [3]. The Task Force also emphasized limitations of the evidence base: low methodologic quality, inconsistent outcome measures and small single-center samples [3]. Effect sizes are clinically meaningful but modest, which argues for FPBs as one component of MMA rather than a stand-alone solution.
Education is following the evidence. Italian regional anesthesia experts recently proposed an expanded “must-know” list of FPBs for residency curricula: erector spinae plane block (ESPB), deep serratus anterior plane (SAP), superficial parasternal intercostal plane, interpectoral and pectoserratus plane blocks, rectus sheath (RS), ilioinguinal–iliohypogastric (II-IH), and subcostal and midaxillary transversus abdominis plane (TAP) blocks [4]. The ESPB, which can be performed at all spinal levels and from neonates to frail elderly patients, has earned the label of the “Plan A” block [2]. Early ESPB in rib fractures is associated with fewer respiratory complications and shorter ICU stay [5], and as a superficial block it carries a low bleeding risk [6].

How to choose the block: With the number of available blocks growing, selection is the real challenge. Sultan and colleagues proposed a practical algorithm for abdominal surgery [7]. For open surgery without contraindications, TED remains the reference standard and nothing else quite compares; ultrasound can help identify the epidural space when placement is difficult. Only when TED is contraindicated or undesirable do FPBs become the primary option. For minimally invasive surgery, the first question is whether ultrasound-guided regional anesthesia is available; if so, FPBs are the choice, and if not, surgeon-performed local infiltration is a reasonable alternative [7]. Once an FPB is chosen, location matters: subcostal TAP or external oblique intercostal block for the upper abdomen, bilateral RS block for midline incisions, and midaxillary TAP or lateral quadratus lumborum block (QLB) for the lower abdomen [7]. Tulgar and colleagues approached the same problem by mapping the abdominal wall into zones matched to real surgical incisions, so that the block is chosen for the incision rather than the operation [8].
For breast surgery, Tolson and colleagues matched each procedure to a block, from basic to advanced. The updated PROSPECT recommendations for major oncologic breast surgery (2026) now advocate a single-shot regional technique and consider ESPB, interpectoral and pectoserratus plane blocks, superficial and deep SAP blocks, thoracic PVB and local infiltration analgesia equivalent to one another, with no technique found superior [9]. This is a notable shift from the earlier position favoring PVB as first choice. FPBs also have a role in spine surgery as part of MMA, and the superficial parasternal intercostal plane block is a simple, reproducible option after sternotomy.

FPBs as the primary anesthetic technique: In selected high-risk patients, FPBs combined with light or deep sedation can serve as the primary surgical anesthetic, and are especially valuable in unstable patients who cannot tolerate the hemodynamic burden of general anesthesia [8]. This is not a decision to be taken lightly. Block planning must take into account the planned incision, the surgical manipulations

involved, and a contingency plan if coverage proves incomplete, including readiness to convert to general anesthesia.

Limitations and safety: FPBs cannot produce dense nerve blockade, depend on relatively large LA volumes, and give inconsistent dermatomal coverage. Because the blocks are volume dependent and no optimal dose has been defined, the risk of local anesthetic systemic toxicity (LAST) must always be kept in mind: calculate the maximum dose, use standard ASA monitoring, and have lipid emulsion available. Superficial FPBs are probably safe in patients with coagulation disorders or on antithrombotic therapy, but deeper and non-compressible sites still require case-by-case judgment according to ASRA guidance [6]. Needle trajectory also matters for beginners: the QLB, with its trajectory far from the peritoneal cavity, may be a safer entry point than the TAP block, which passes close to the peritoneum and viscera [10].

Conclusion: Where do we stand in 2026? FPBs are now formally endorsed as essential components of perioperative MMA. The technique is simple: an LA injection between two muscles, guided by sonographic landmarks that are easy to find, with a low risk of serious complications and analgesia lasting about 24 hours. TED remains the gold standard for open abdominal surgery, while FPBs are the first choice when it is contraindicated and in minimally invasive surgery. The block should always be tailored to the patient, the surgery and local expertise. The main task ahead is better evidence: standardized volumes and concentrations, head-to-head trials of individual blocks, and outcomes beyond the first 24 hours.

References

1. El-Boghdadly K, Wolmarans M, Stengel AD, Albrecht E, Chin KJ, Elsharkawy H, et al. Standardizing nomenclature in regional anesthesia: an ASRA-ESRA Delphi consensus study of abdominal wall, paraspinal, and chest wall blocks. Reg Anesth Pain Med. 2021;46:571-80.
2. Pawa A, King C, Thang C, White L. Erector spinae plane block: the ultimate 'plan A' block? Br J Anaesth. 2023;130(5):497-502.
3. Joshi GP, Mariano ER, Elkassabany NM, Harbell M, Johnson RL, Li J, et al. 2026 American Society of Anesthesiologists practice guideline on perioperative pain management using local and regional analgesia for cardiothoracic surgeries, mastectomy, and abdominal surgeries. Anesthesiology. 2026;144:19-43.
4. De Cassai A, Behr A, Bugada D, Canzio D, Capelleri G, Costa F, et al. Anesthesiologists ultrasound-guided regional anesthesia core curriculum: a Delphi consensus from Italian regional anesthesia experts. J Anesth Analg Crit Care. 2024;4(1):54.
5. Mladenovic J, Erskine RN, Riley B, Mitchell A, Abi-Fares C, Basson W, et al. The association between erector spinae plane block timing and reduced rib fracture related respiratory complications: a cohort study. J Clin Anesth. 2022;82:110940.
6. Kopp, S. L., Vandermeulen, E., McBane, R. D., Perlas, A., Leffert, L., & Horlocker, T. Regional anesthesia in the patient receiving antithrombotic or thrombolytic therapy: American Society of Regional Anesthesia and Pain Medicine Evidence-Based Guidelines (fifth edition). Reg Anesth Pain Med. 2025:rapm-2024-105766. Epub ahead of print.
7. Sultan E, Kosasih MA, Pawa A, Versyck B, Mariano ER. Which fascial plane block is right for my patient? A practical decision-making algorithm for abdominal surgery. J Anesth Analg Crit Care. 2026;6(1):92.
8. Tulgar S, Ahiskalioglu A, Kilicaslan A, Ciftci B, Dost B, Aydin ME, et al. Fascial plane blocks as the main anesthetic method: a narrative review. Saudi J Anaesth. 2025;19(2):198-208.
9. Desai N, Dirzu DS, Zolger D, Adansi DN, Van de Velde M, Joshi GP; PROSPECT Working Group of ESRA. Pain management after major oncological breast surgery: an updated systematic review and procedure-specific postoperative pain management (PROSPECT) recommendations. Anaesthesia. 2026. doi:10.1111/anae.70313.
10. Akerman M, Pejčić N, Veličković I. A review of the quadratus lumborum block and ERAS. Front Med (Lausanne). 2018;5:44.

HIGH RISK PULMONARY EMBOLISM

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High-risk pulmonary embolism remains a time-critical problem at the intersection of intensive care, anesthesia, interventional medicine, and surgery. This presentation reviews current treatment challenges through a postoperative shock case, then examines observational comparative-effectiveness data comparing systemic thrombolysis and catheter-directed interventions. The talk emphasizes practical decision-making when evidence is incomplete: severity of shock, bleeding risk, timing, local expertise, and rescue options such as VA-ECMO. Special attention is given to reduced-dose systemic thrombolysis, the rapid expansion of catheter-based therapies, and the persistent uncertainty about whether these newer approaches improve patient-centered outcomes.

SGLT-2 INHIBITORS AND GLP-1 AGONISTS IN PERIOPERATIVE PERIOD

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Novel antihyperglycaemic drugs are used increasingly for patients with and without diabetes mellitus to reduce cardiovascular and renal morbidity and mortality. These include: incretin-based hormone therapies (glucagon-like peptide-1 receptor agonists (GLP-1RA) and sodium-glucose cotransporter-2 (SGLT2) inhibitors. Data about their perioperative use is controversial, based mostly on case reports.

SGLT-2 inhibitors are peroral drugs, that inhibit glucose reabsorption in the proximal kidney tubules, which results in glycosuria and lower plasma glucose. Consequently, there is lower release of insulin, which leads to lower insulin/glucagon ratio, higher free fatty acids release from fat tissue, which are transformed into ketones in the liver. SGLT-2 inhibitors are used in treatment of diabetes type 2, chronic heart failure and chronic kidney disease. Despite half-time of 12-13h their effect on glycosuria lasts up to 72h. Stress in the perioperative period and starvation further decrease plasma insulin level with the consequent increased production of ketone bodies and acidosis, which leads to euglycemic diabetic ketoacidosis (eDKA). Incidence of eDKA in emergency surgery is around 1%, whereas in elective surgery 0.17%, but mortality is 2.4%. Higher risk for eDKA are emergency surgery, diabetic patients, within 6 months after the start of the therapy, starvation, bowel preparation, dehydration, active infection, acute kidney failure, intensive workout and vomiting.
To avoid eDKA stopping the drug at least 48h before surgical/diagnostic procedure is advised. Exceptions are procedures with low stress level and when patients eat normally on the same day (shortest starvation time possible). In this case withholding the drug on the day of procedure suffices. Besides this emphasis should be put on shortening the fasting interval to minimum. Patient resumes taking SGLT-2 inhibitors as soon as he eats normally. Perioperative SGLT-2 inhibitors discontinuation in patients with heart failure results in a significant increase in morbidity and mortality due to cardiovascular complications.
In emergency cases initial glucose level, plasma pH, bicarbonate and ketone levels (beta-hydroxybutyrate - BHB) should be measured. If the levels of ketone bodies are elevated (≥ 1,5 mmol/L) and there is a presence of metabolic acidosis, immediate treatment of eDKA should be initiated: infusion of insulin and glucose. Intraoperatively glucose, pH, bicarbonate and ketones (bedside test) should be routinely followed every 1-2h and glucose maintained between 6-10 mmol/L. Postoperatively glucose and ketones should be measured at least every 6h until patients resumes normal eating. In case od eDKA rehydration with crystalloids, insulin and glucose infusion should be applied.
The latest consensus statement by the experts from UK recommends that the risk of peri-operative ketoacidosis and mitigation strategies should be discussed with the patient using a shared decision-making approach. Patients and clinicians should adhere to recommended fasting guidelines and avoid prolonged starvation times.

GLP-1RA are used in treatment of diabetes type 2, obesity and recently osteoarthritis, obstructive sleep apnoea, metabolic dysfunction-associated steatotic liver disease, and metabolic dysfunction-associated steatohepatitis. Endogenous GLP-1 (incretin) stimulates the production and release of insulin from beta-cells and inhibits glucagon release from alpha-cells in pancreas. At the same time GLP-1 reduces appetite and gastric emptying. Besides this it has protective effects on heart and kidney function. Perioperative use of GLP-1RA is related to higher risk of gastric regurgitation (because of slower gastric emptying) and pulmonary aspiration during anesthesia induction or procedural sedation despite proper fasting timing before procedure. Even after 3 weeks of GLP-1RA discontinuation gastric emptying is often not normal, therefore rapid sequence intubation is recommended. Discontinuation of GLP-1RA can lead to perioperative hyperglycemia with higher infection rate, acute kidney failure, acute coronary syndrome, even in patients that are taking the medicine for weight-loss.
Taking all the available data into account, experts in the consensus recommend that the risk of pulmonary aspiration and mitigation strategies should be discussed with the patient. Patients should continue to take GLP-1RA throughout the perioperative period and follow the usual fasting guidelines. Fasting times do not differ from patients not taking GLP-1RA. Regional anesthesia should be considered as the primary anesthetic technique, if appropriate. Point-of-care gastric ultrasound should be considered before induction. Anesthesia and airway management should aim to reduce the risk of pulmonary aspiration on induction of anesthesia, during maintenance and after emergence of anesthesia (prokinetics, rapid sequence intubation, head-up position, gastric tubes and awake tracheal

extubation). If patient complains about digestive problems (nausea, belching, bloating, abdominal pain), even after discontinuation of GLP-1RA therapy, the procedure has to be postponed.

THE FIRST EXIT PROCEDURE IN CROATIA – ANESTHESIOLOGIST POINT OF VIEW

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Background: The Ex Utero Intrapartum Treatment (EXIT) procedure is a specialized surgical delivery technique designed to secure a fetal airway while maintaining uteroplacental oxygenation. Unlike a standard cesarean section, EXIT requires simultaneous anesthetic and surgical management of two distinct patients—the mother and the fetus.

Case Description: This lecture reviews Croatia's first EXIT procedure, performed on a newborn at 38+2 weeks gestational age with a massive congenital neck teratoma measuring 10.7 x 9.8 cm, which posed a severe risk of acute airway obstruction at delivery.

Anesthetic Management: From the anesthesiologist's perspective, the primary goal was preserving uteroplacental perfusion through deep uterine relaxation using high concentrations of volatile anesthetics. Transplacental and direct fetal anesthesia ensured patient immobility during airway intervention. Continuous maternal monitoring and vasopressor support were critical to manage anesthetic-induced hypotension.

Post-Procedure Transition: Once the fetal airway was successfully secured via intubation on placental support, management shifted immediately to preventing postpartum hemorrhage and uterine atony. Inhalational anesthetics were rapidly discontinued, and oxytocin boluses and infusions were administered to restore uterine tone.

Conclusion: The procedure achieved a successful delivery with Apgar scores of 8 and 9, enabling subsequent tracheotomy and same day tumor resection. Multidisciplinary coordination and dedicated anesthetic control are essential for managing high-risk fetal airway emergencies.

CURRENT PERSPECTIVES ON MULTIMODAL NEUROMONITORING IN GENERAL INTENSIVE CARE UNITS

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Background: Neurological deterioration in critically ill patients may result from disturbances in cerebral perfusion, oxygen delivery, oxygenation, metabolism, or autoregulation. No single monitoring modality captures the entire cerebral oxygen cascade; therefore, multimodal neuromonitoring provides a physiological framework for integrating complementary information.

Objective: To review current principles and practical applications of multimodal neuromonitoring in general intensive care practice, with emphasis on physiological interpretation rather than isolated numerical thresholds.

Discussion: Multimodal neuromonitoring integrates intracranial pressure and cerebral perfusion pressure, cerebral blood flow and autoregulation assessed by transcranial Doppler, cerebral oxygenation assessed by near-infrared spectroscopy, brain tissue oxygen tension, and jugular venous oxygen saturation, together with cerebral metabolism and clinical trajectory. These modalities interrogate different stages of the cerebral oxygen cascade, from systemic oxygen delivery and cerebral blood flow to regional oxygenation and cellular oxygen utilization. Near-infrared spectroscopy provides continuous, non-invasive regional monitoring and may be particularly useful in general ICU and perioperative patients at risk of neurological complications, although interpretation is influenced by extracranial contamination, hemoglobin concentration, systemic physiology, and device-specific thresholds. Brain tissue oxygen tension and jugular venous oxygen saturation provide complementary regional and global information, respectively. Importantly, concordant and discordant signals may identify physiological abnormalities that cannot be recognized by a single parameter.

Conclusion: Multimodal neuromonitoring should be considered an integrated physiological strategy rather than a collection of independent measurements. Trends, concordance, discordance, clinical examination, and imaging should guide interpretation and targeted reassessment. Further research is required to determine whether individualized physiology-guided monitoring improves clinical outcomes.

References

1. Sada F, Domi R, Huti G, Abdyli A, Coniglione F, Biasucci DG, et al. Current strategies of cerebral oxygenation monitoring in general intensive care units: a narrative review. J Crit Care Med. 2026. doi:10.62838/jccm-2026-0030.
2. Robba C, et al. Multimodal neuromonitoring and cerebral oxygenation monitoring in critically ill patients. J Clin Monit Comput. 2023;37:943–949. doi:10.1007/s10877-023-01002-8.
3. Hoiland RL, et al. Clinical targeting of the cerebral oxygen cascade to improve brain oxygenation in patients with hypoxic–ischemic brain injury after cardiac arrest. Intensive Care Med. 2023;49:1062–1078. doi:10.1007/s00134-023-07165-x.

ARE WE STILL MAKING MISTAKES IN THE MANAGEMENT OF POSTOPERATIVE PAIN?

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Despite advances in perioperative medicine, postoperative pain remains a significant clinical challenge. Contemporary pain management extends beyond simply reducing pain intensity or opioid consumption, focusing instead on functional recovery and the prevention of adverse outcomes.

Effective postoperative analgesia should facilitate early mobilization, adequate sleep and oral intake, preservation of respiratory function, and rehabilitation, while minimizing treatment-related adverse effects and the risk of persistent opioid use. Current evidence and international recommendations support an individualized, procedure-specific, multimodal approach incorporating non-opioid analgesics, regional techniques when indicated, rational opioid use, non-pharmacological interventions, and structured follow-up.

Despite these advances, several preventable shortcomings persist in clinical practice. These include inadequate preoperative risk assessment, reliance on numerical pain scores alone, reactive rather than preventive analgesia, routine opioid prescribing, non-selective use of adjuvant medications, insufficient consideration of patient-specific risk factors, and limited attention to the transition from acute to persistent postoperative pain.

The challenge is no longer simply to provide “more analgesia”, but to provide the right analgesia for the right patient and procedure, at the right time, using meaningful outcome measures. The persistent gap between evidence and clinical implementation suggests that postoperative pain management still requires improvement. Postoperative pain should therefore be regarded as a dynamic perioperative process extending from preoperative risk assessment through hospitalization and beyond discharge.

Keywords: postoperative pain; multimodal analgesia; opioids; regional anesthesia; functional recovery; persistent postoperative pain; PROSPECT.

SEVERE INTRACEREBRAL HEMORRHAGE DUE TO AN ARTERIOVENOUS MALFORMATION DURING PREGNANCY: MANAGEMENT CHALLENGES AND A CASE REPORT

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Introduction: Pregnancy complicated by intracerebral hemorrhage is a rare but potentially life-threatening condition requiring a multidisciplinary approach and simultaneous consideration of maternal and fetal well-being. Cerebral arteriovenous malformations are possible causes of intracranial hemorrhage during pregnancy, and rupture may result in sudden neurological deterioration requiring intensive care. Major challenges include assessment of maternal and fetal risks, selection of the timing and modality of neurosurgical, endovascular, or radiosurgical treatment, and decisions regarding continuation and timing of delivery.
The lecture will present principles of initial management of a pregnant patient with acute intracerebral hemorrhage, stabilization of respiratory and hemodynamic function, neurological and neuroradiological monitoring, and the importance of multidisciplinary care. Therapeutic decisions should be individualized according to clinical condition, gestational age, and characteristics of the vascular malformation.

Case Report: We present a previously healthy primigravida at 24 weeks of gestation with an uneventful pregnancy who developed sudden impairment of consciousness, right-sided hemiparesis, and seizures. She was intubated and transferred to intensive care. Neuroradiological evaluation demonstrated brainstem hemorrhage with edema and supratentorial hydrocephalus. A ventriculoperitoneal shunt was placed, followed by continued intensive and multidisciplinary management. Pregnancy was continued and completed by cesarean delivery at 34/35 weeks. Subsequent angiography confirmed an arteriovenous malformation of the posterior cranial fossa, and the patient was referred to Turkey for CyberKnife radiosurgery. Following later revision of the right ventriculoperitoneal shunt, at the latest neurosurgical follow-up she was conscious, oriented and communicative, ambulatory with assistance, with normal speech and preserved sphincter control, while left-sided facial paresis persisted.

Discussion: The staged treatment approach allowed pregnancy continuation before definitive AVM treatment.

Conclusion: This case highlights how individualized multidisciplinary management enabled prolongation of pregnancy, substantial functional recovery, and subsequent definitive treatment despite severe initial maternal neurological illness.

Keywords: pregnancy, intracerebral hemorrhage, arteriovenous malformation, intensive care, multidisciplinary management

WHAT WE SHOULD KNOW ABOUT POST - INTENSIVE CARE SYNDROME?

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Millions of people worldwide have survived an admission to the intensive care unit (ICU), and the number of survivors is growing. While these patients have survived a life-threatening illness, most survivors suffer important long-term complications. These impairments often have a profound impact on patients' and families' lives.

Post-intensive care syndrome (PICS) is a term that describes the cognitive, mental, physical and other consequences that plague ICU survivors. The burden of PICS is significant, affecting up to 80% of ICU survivors with at least one or more PICS symptoms. These impairments often go unrecognized and diagnosis remains challenging as these symptoms often emerge after hospital discharge and may be misattributed to age-related decline or pre-existing medical conditions.

Cognitive impairment occurs in 30 - 80%, psychiatric illnesses in 8 - 57%, and new physical impairment occurs in 25–80% of ICU survivors patients. The prevalence of post-ICU sequelae varies widely among different ICU patients, some patients survive ICU illness without any significant impairment, but a notable proportion experience impairment in multiple areas.

The major risk factors are numerous, such as presence of delirium, hypo/hyperglycaemia, hypoxemia, hypotension, sedation, prolonged mechanical ventilation, sepsis, MOF, age, immobility, inadequate pain management, drugs, duration of ICU stay, etc.

To effectively manage PICS, we should implement prevention measures during ICU stay. It is recommended to implement an individualized multidisciplinary approach involving specialists, nurses, pharmacists, physiotherapists, psychologists/psychiatrists, and social workers. This approach should be maintained throughout the entire process of caring for ICU survivors, including in the community and home care settings.

If there is a possibility, post-ICU Clinics should be established and rehabilitation efforts should be focused at all domains of PICS, psychological, physical and cognitive.

References:
1. Anderson J, et al. Trauma Surg Acute Care Open 2026;11:e002172. doi:10.1136/tsaco-2025-002172
2. Mark L. Rolfsen et al. Post-Intensive Care Syndrome Awareness and Communication. Surveys of ICU Providers and Patients. CHEST 2026; 169(2):486-495
3. Yie Hui Lau et al. Post intensive care syndrome: a state of the art review. Singapore Medical Journal 2026; Vol67, Issue 1. DOI:10.4103/singaporemedj.SMJ-2025-099

BEYOND PAIN RELIEF: LABOR EPIDURAL ANALGESIA, MATERNAL SATISFACTION, AND POSTPARTUM DEPRESSION

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Introduction: Evidence on the relationship between labor epidural analgesia (LEA) and postpartum depressive symptoms remains inconclusive. Early cohort studies suggested favorable associations: Ding et al. reported fewer positive Edinburgh Postnatal Depression Scale (EPDS) screens with LEA [1], while Lim et al. linked greater percent improvement in pain (PIP) to lower postpartum EPDS scores [2]. However, Orbach-Zinger et al.'s systematic review found no clear evidence of an association and noted a high risk of bias across the available studies [3].

Methods: This lecture presents findings from our published prospective cohort study [4], focusing on analgesic effectiveness and women's experience of pain control. Of the 156 women who completed the six-week follow-up, 101 received LEA, and 55 did not. We assessed satisfaction with the childbirth experience in all women and satisfaction with pain control in the LEA group [5].

Results: Positive EPDS screens (score ≥ 10) occurred in 7.9% of women who received LEA and in 12.7% of those who did not (P = 0.491). PIP was not significantly associated with EPDS scores or a positive screen but was positively correlated with satisfaction with pain control (r_s = 0.389; P < 0.001). In the LEA group, mean PIP was 95.1%. Satisfaction with the childbirth experience did not differ significantly between the LEA and non-LEA groups (P = 0.800). Greater satisfaction with pain control was associated with lower EPDS scores at six weeks (r_s = −0.268; P = 0.007), but not with a positive EPDS screen.

Discussion: The association between greater satisfaction with pain control and lower EPDS scores suggests that women's experience of pain control deserves further investigation.

Conclusion: These findings do not support LEA as a strategy for preventing postpartum depression. They suggest that analgesic effectiveness and the woman's experience of pain control may reflect different dimensions of labor analgesia.

References:
1. Ding T, et al. Anesth Analg. 2014;119(2):383–392.
2. Lim G, et al. Anesth Analg. 2018;126(5):1598–1605.
3. Orbach-Zinger S, et al. Int J Obstet Anesth. 2021;45:142–149.
4. Krusic SB, et al. J Anesth. 2026;40(1):94–105. doi:10.1007/s00540-025-03563-1.
5. Orbach-Zinger S, et al. Anesth Analg. 2018;126(5):1590–1597.

REGIONAL ANESTHESIA IN ORTHOPEDIC SURGERY: CHOOSING THE RIGHT BLOCK FOR THE RIGHT PATIENT

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Regional anesthesia plays an important role in perioperative care for orthopedic surgery. Selecting an appropriate technique requires consideration of the surgical field, the purpose of the block, patient comorbidities, and postoperative rehabilitation goals.

This lecture presents a practical approach to choosing regional techniques for common orthopedic procedures involving the shoulder, upper limb, hip, knee, foot, and ankle. It distinguishes blocks intended to provide surgical anesthesia from those used primarily for postoperative analgesia and examines how anatomical coverage influences block selection.

Particular attention is given to balancing analgesic efficacy with preservation of motor function and respiratory reserve. Clinical examples illustrate how pulmonary disease, antithrombotic therapy, pre-existing neurological deficits, frailty, and chronic pain may modify the anesthetic plan. The discussion also addresses the limitations of techniques intended to preserve motor function and the choice between single-injection blocks and continuous catheters.

Safety considerations include local anesthetic systemic toxicity, documentation of baseline neurological findings, postoperative surveillance, and planning for incomplete block coverage. Prevention and management of rebound pain, patient education, and integration with multimodal analgesia are emphasized.

The aim is to provide a clinically applicable framework for individualized block selection. A successful regional anesthesia strategy should provide appropriate pain relief while supporting safe rehabilitation and the patient’s recovery goals.

NEUROTRAUMA IN CHILDREN

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Traumatic brain injury (TBI), the leading cause of mortality and disability in the pediatric population, differs from adult TBI because of anatomic and physiological features in children. In the case of pediatric TBI, a rapid and decisive multimodal approach to diagnostics and treatment must be ensured. In 2019, the third revised Guidelines for the Management of Pediatric Severe Traumatic Brain Injury were presented to assist clinicians in making decisions in this setting. Treatment can range from observation, pharmacological intervention, invasive diagnostics, and urgent surgical intervention. Traumatic brain injury (TBI) is the leading cause of death and disability in the pediatric population (1–3). Those children who survive the initial injury often suffer severe lifelong cognitive, emotional, physical, and behavioral complications, such as post-traumatic epileptic seizures, cognitive deficits, sleep disorders, psychiatric disorders, and chronic headaches.

TBI in the pediatric population is specific and differs from TBI in adults in terms of mechanism of injury, pathophysiologic changes, and treatment. The main reason being the specific anatomy of the developing brain, biomechanical properties that differ from those of adults, and the different etiology of traumatic events. The head is, relative to the body, significantly larger in the pediatric population, especially in infants and neonates, the larger exposure of the head, in this instance, results in greater risk. Trauma is therefore associated with greater parenchymal accelerations. Another important factor is the plasticity of the neurocranium. In the younger pediatric population, the cranial sutures are not ossified and still function as semi-rigid joints. This allows small movements of the cranial bones and little elongation of the cranial vault. Furthermore, the differences can be observed in age-related subgroups of the pediatric population itself. In infants and toddlers up to 2 years of age, falls and abusive head injuries are the leading cause of injury; in toddlers and younger school-aged children from 2 to 6 years old, accidental head injuries are the leading cause of TBI; in older school-aged children, bicycle-related injuries arise, and falls are less frequently the cause of TBI; in the adolescent pediatric population from 13 to 18 years of age, sports or motor vehicle accidents are most commonly associated with TBI.

ARRHYTHMIAS IN INTENSIVE UNIT CARE: WHEN AND HOW TO INTERVENE?

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Pathophysiology of atrial fibrillation (AF) in ICU patients is specific with many risk factors. New onset AF differs from preexisting atrial fibrillation, but both are predictors of survival. Risk factors for atrial flutter (AFL) and AF are similar, and more than half of all patients with AFL will develop AF. Observational studies suggest that thromboembolic risk is elevated in AFL. In the event of a supraventricular arrhythmia in the ICU, the first assessment should be echocardiography to evaluate cardiac function and hemodynamic status. After that, it is needed to identify and actively manage all risk factors, predisposing and precipitating, as well as comorbidities. Guidelines exist for management of AF in patients in the community. However, this is not the case in the critical care setting, where the risks and benefits associated with different treatment options remain unclear, with no large scale trials undertaken. But there is some consensus about universal AF package. The next very important question that is needed to answer: is AF contributing to the hemodynamic instability, because it will influence the treatment approach. In hemodynamically unstable patients, there is indication for electrical cardioversion. Rate control is indicated as initial therapy in the acute setting, in combination with rhythm control therapies, or as the sole treatment strategy to control heart rate and reduce symptoms. Limited evidence exists to inform the best type and intensity of rate control treatment. For acute rate control, beta-blockers are generally preferred across the full range of LVEF, while diltiazem or verapamil are preferred in patients with LVEF >40%. Among beta-blockers, selective beta1-receptor blockers offer a more favourable efficacy and safety profile compared with non-selective agents. In acute settings, adding digoxin may be necessary when adequate rate control cannot be achieved with a single agent. However, the combination of beta-blockers with diltiazem or verapamil should generally be avoided, except in carefully selected patients under close monitoring. In patients who are hemodynamically unstable or have severely reduced LVEF, intravenous amiodarone, landiolol, or digoxin may be considered.

Conclusions. Atrial fibrillation increases mortality in ICU patients. Hemodynamic evaluation should come first, before treating the rhythm with correction of reversible factors. Rate control is often preferred over rhythm control, while rhythm control comes if there is hemodynamic or respiratory impact of arrhythmia.

References

1. Rottmann FA, et al. Int J Cardiol. 2024 Mar 15; 399: 131673.
2. Van Gelder IC, et al. European Heart Journal 2024;45: 3314–3414.
3. Perrett M, et al. Clinical Research in Cardiology 2024; 113:831–841.
4. Ghallab M, et al. Cardiol Rev. 2026 May-Jun 01;34(3): 212-217.

ENTERAL AND PARENTERAL NUTRITION IN CARDIAC SURGERY PATIENT- WHAT DO WE KNOW?

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Nutrition support is increasingly recognized as a clinically relevant aspect of the intensive care treatment of cardiac surgery patients. However, evidence from adequate large-scale studies evaluating its clinical significance for patients' mid- to long-term outcome remains sparse. Considering nutrition support as a key component in the perioperative treatment of these critically ill patients led us to review and discuss our understanding of the metabolic response to the inflammatory burst induced by cardiac surgery. In addition, we discuss how to identify patients who may benefit from nutrition therapy, when to start nutritional interventions, present evidence about the use of enteral and parenteral nutrition and the potential role of pharmaconutrition in cardiac surgery patients. Although the clinical setting of cardiac surgery provides advantages due to its scheduled insult and predictable inflammatory response, researchers and clinicians face lack of evidence and several limitations in the clinical routine, which are critically considered and discussed in this paper.

Keywords: cardiac surgery, cardiopulmonary bypass, systemic inflammatory response, nutrition risk stratification, underfeeding, postoperative nutritional management, supplemental parenteral nutrition, enteral nutrition, pharmaconutrition

HEMODYNAMIC ASSESSMENT: OLD PARAMETERS IN A NEW WAY

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High-risk patients account for about 10% of the total number of elective surgical patients in noncardiac surgery. However, they carry about 80% of the total morbidity and mortality in elective surgery. Reduce complications and mortality in high-risk patients have a significant and obvious impact on the overall quality of surgical treatment. Clearly observed connection between quality of immediate perioperative treatment (surgery and anesthesiology) to improving the overall outcomes and duration of treatment of high-risk patients, and hemodynamic stability is one of the crucial factors of individual optimization during the perioperative period.

Perioperative hemodynamic disorders in high-risk surgery patients are a challenge for the anesthesiologist. The usual parameters of assessment hemodynamics not enough for an objective assessment of intra and post-operative problems in such delicate patients.

Blood pressure, heart rate and urine output can not reliably indicate to tissue hypoperfusion in the early stages of disorders (surgery). Neither static parameters assessment of hemodynamics, such as central venous pressure and pulmonary capillary wedged pressure (PCWP) does not provide sufficient information for adequate intraoperative fluid therapy and vasoactive drugs [1,2]. The first reflex anesthesiologist at a pressure drop during operation is giving fluid, which often leads to fluid overload. Perioperative hypo or hyper-hydration increases the morbidity of patients [3].

The intraoperative hypoperfusion allows the formation of oxygen debt, which is particularly deepened in the first eight hours postoperatively, and most intense during the first four hours after awakening from anesthesia. Due to these findings, the initial aim of the treatment of perioperative hemodynamic changes was an attempt to be in the immediate postoperative period, provide hyperkinetic circulation and thus Supernormal oxygen delivery (supra-normal oxygen delivery - DO2) [4], which would have removed intraoperatively incurred oxygen debt. This enabled the maintenance of a certain level of cardiac output (cardiac output - CO), giving fluids, medications or blood products.

Technological progress has allowed minimal or noninvasive CO monitoring [5-6]. Studies support the hypothesis that hemodynamic intervention and preventive maintenance of adequate tissue perfusion reduce postoperative mortality, morbidity and the emergence of organic insufficiency, as well as duration of hospitalization [7,8].

In addition, the dynamic response parameters of the fluid load during surgery, such as variations in cardiac output (stroke volume variation - SVV) and pulse pressure variation (pulse pressure variation - PPV), to identify patients who need to be given fluids to normalize cardiac output (CO) [9]. Today, minimally invasive techniques for measuring CO and surrogate hemodynamic variables, available as routine hemodynamic monitoring to optimize hemodynamic status in high risk patients.

Finally, a new minimally invasive monitors allow monitoring of physiological variables for the objective assessment of circulation during the perioperative period. This allows the correct choice of therapeutic intervention, or an adequate protocol of haemodynamic optimization, and therefore safer anesthesia, stable patient with faster postoperative recovery [10]. Such protocols optimizing circulatory status commonly called targeted therapies (Individual Goal-directed therapy - IGDT) [11]. There are more advanced protocols, which are generally dependent on the monitoring, which is used in an estimate of the disturbance that arises. Only by introducing such protocol monitors fulfill its function. Namely, not monitors that enable better patient survival. They allow timely and appropriate decisions about therapeutic intervention to be performed, and therapeutic interventions are those that affect the better treatment outcome [12].

The combination of different monitors (depth of anesthesia-BIS, regional cerebral tissue oxygen saturation-rSO2, with non-invasive hemodynamic monitoring: multimodal monitoring) we have valid information about when and why to intervene (liquid medicines, blood ...), that be on time, and even pre-emptively to potential or existing hemodynamic disorders.

References

1. Marik PE, Baram M, Vahid B. Does central venous pressure predict fluid responsiveness? A systematic review of the literature and the tale of seven mares. Chest 2008; 134: 172-8.
2. Osman D, Ridel C, Ray P, Monnet X, Anguel N, Richard C, et al. Cardiac filling pressures are not appropriate to predict hemodynamic response to volume challenge. Crit Care Med 2007; 35: 64-8.
3. Corcoran T, Rhodes JE, Clarke S, Myles PS, Ho KM. Perioperative fluid management strategies in major surgery: a stratified meta-analysis. Anesth Analg 2012; 114: 640-51.
4. Shoemaker WC, Appel PL, Kram HB, Waxman K, Lee TS. Prospective trial of supranormal values of survivors as therapeutic goals in high-risk surgical patients. Chest 1988; 94: 1176-86.
5. Zimmermann M, Feibicke T, Keyl C, Prasser C, Moritz S, Graf BM, et al. Accuracy of stroke volume variation compared with pleth variability index to predict fluid responsiveness in mechanically ventilated patients undergoing major surgery. Eur J Anaesthesiol 2010; 27: 555-61.
6. Kuper M, Gold SJ, Callow C, Quraishi T, King S, Mulreany A, et al. Intraoperative fluid management guided by oesophageal Doppler monitoring. BMJ 2011; 342: d3016.
7. Gurgel ST, do Nascimento P Jr. Maintaining tissue perfusion in high-risk surgical patients: a systematic review of randomized clinical trials. Anesth Analg 2011; 112: 1384-91.
8. Hamilton MA, Cecconi M, Rhodes A. A systematic review and meta-analysis on the use of preemptive hemodynamic intervention to improve postoperative outcomes in moderate and high-risk surgical patients. Anesth Analg 2011; 112: 1392-402.
9. Hofer CK, Senn A, Weibel L, Zollinger A. Assessment of stroke volume variation for prediction of fluid responsiveness using the modified FloTrac and PiCCOplus system. Crit Care 2008; 12: R82.
10. Poeze M, Greve JWM, Ramsay G: Meta-analysis of hemodynamic optimization: relationship to methodological quality. Crit Care 2005, 9:R771-R779.
11. Kapoor PM, Kakani M, Chowdhury U, Choudhury M, Lakshmy R, Kiran U: Early goal-directed therapy in moderate to high-risk
cardiac surgery patients. Ann Card Anaesth 2008, 11:27-34.
12. Cannesson M, Pestel G, Ricks C, Hoeft A, Perel A. Hemodynamic monitoring and management in patients undergoing high risk surgery: a survey among North American and European anesthesiologists. Crit Care 2011; 15: R197.

FAST TRACK AMBULATORY ANESTHESIA: CLINICAL PEARLS

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The expansion of ambulatory surgery requires anesthesiologists to balance patient safety, efficient perioperative care, and predictable same-day discharge. This presentation reviews practical strategies for optimizing ambulatory anesthesia across diverse surgical specialties. Key topics include patient and procedural selection, preoperative optimization of medically complex patients, and matching anesthetic technique to surgical requirements and recovery goals. Emphasis will be placed on regional anesthesia, short-acting neuraxial techniques, multimodal opioid-sparing analgesia, and prevention of postoperative nausea and vomiting. Common barriers to successful same-day discharge—including uncontrolled pain, nausea, excessive sedation, orthostatic symptoms, impaired mobility, and operational delays—will be discussed alongside strategies to minimize these risks. The presentation will also address discharge readiness, facility-specific rescue capabilities, and safe escalation of care.

ANALGESIC EFFICACY OF THE SUPERFICIAL CERVICAL PLEXUS BLOCK IN NECK SURGERY: AN OVERVIEW AND OUR EXPERIENCE

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Background: Superficial cervical plexus block (SCPB) is a regional anesthesia technique targeting the superficial sensory branches of C2–C4. It can be performed using anatomical landmarks or ultrasound guidance and may be used as a sole anesthetic technique, combined with other regional blocks, or as an adjunct to general anesthesia.

Methods: We reviewed the role of SCPB in carotid, thyroid, and other neck procedures and summarized our institutional experience. In carotid endarterectomy (CEA), our center performs approximately 400 procedures annually, with regional anesthesia used in about 35% of cases. Landmark-guided SCPB with lidocaine is routinely employed, without intravenous analgosedation in awake CEA. Our clinical series included 70 ASA III patients, divided into two groups of 35 patients, with perioperative pain assessed at predefined intraoperative and postoperative time points.

Results: Published evidence supports the efficacy of SCPB in CEA, showing effective anesthesia and analgesia, reduced postoperative pain, and reduced opioid requirements. In our experience, 77% of patients managed with SCPB had no or only mild pain, while 23% required additional analgesia; severe pain was not recorded. When SCPB was combined with general anesthesia, average intraoperative fentanyl consumption was reduced by more than 60% compared with general anesthesia alone. Evidence from thyroid surgery also demonstrates reduced postoperative pain, lower opioid consumption, and less postoperative nausea and vomiting with bilateral SCPB.

Conclusion: SCPB is a simple and versatile regional anesthesia technique for neck surgery. It may improve perioperative analgesia, reduce opioid requirements, and serve either as a primary regional technique or as an adjunct to general anesthesia in appropriately selected patients.

References

1. GALA Trial Collaborative Group. Lancet. 2008;372:2132-2142.
2. Pandit JJ, et al. Anesth Analg. 2000;91:781-786.
3. Ramachandran SK, et al. Br J Anaesth. 2011;107:157-163.
4. Kruc A, et al. Indian J Anaesth. 2024;68:801-808.
5. Woldegerima YB, et al. BMC Res Notes. 2020;13:42.

POSTER PREZENTACIJE

SEEDLE BLOK, PRIKAZ SLUČAJA

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Uvod: Seedle blok anestezija je vrsta ciljane spinalne anestezije koja se primjenjuje za operativne zahvate u donjem dijelu tijela, tačnije u području koje bi dodirivalo sedlo pri jahanju (perineum, spolni organi, stražnjica i unutrašnja strana natkoljenice). Ova vrsta anestezije najčešće se koristi za kratke zahvate u donjem dijelu zdjelice i na anogenitalnom području.

Prikaz slučaja: Pacijent dobi 18 godina, podvrgava se operativnom tretmanu recidivantne pilonidalne bolesti. Subjektivno se žali na bol i otok u sakrokokcigealnoj regiji. Pacijent do sada zdrav, bez komorbiditeta, gojazan (BMI 32,4). Kardiorespiratorno kompenzovan. Pacijent primljen u bolnicu dan prije planiranog operativnog zahvata. 12h preoperativno ordiniran niskomolekularni heparin. Na dan operativnog zahvata, pacijent se uvede u operacionu salu, postavi se u sjedeći položaj te mu se detaljno objasni planirana procedura. Nakon toalete i antiseptične pripreme lumbosakralne regije, operativno polje je sterilno garnirano te se načini punkcija u intervertebralnom prostoru L4/L5. Intratekalno se aplicira hiperbarni Bupivacain (0,5% Bupivacain a 1,5ml + 10% Glucosa a 0,5ml) te 25mcg (0,5ml) Fentanyla u odvojenoj šprici. Pacijent sjedi narednih 5 minuta dok ne osjeti težinu u nogama. Potom se pacijent samostalno okrene u pronacijski položaj, uz adekvatno pozicioniranje i zaštitu predilekcionih mjesta pritiska, rasterećenje koštanih prominencija i očuvanje slobodnog položaja očiju i disajnih puteva. Operativni zahvat protekao bez komplikacija. Tokom operativnog zahvata pacijent samostalno diše, hemodinamski i respiratorno stabilan.

Zaključak: Brojne su prednosti seedle bloka uključujući manji uticaj na hemodinamiku u odnosu na klasičnu spinalnu anesteziju jer se koriste manje doze lokalnog anestetika, izraženiji je senzorni blok uz manje izraženu motornu blokadu, manji rizik od retencije urina, brži oporavak i ranija mobilizacija.

Literatura:
1. Yung EM, et al. Regional Anesthesia and Pain Medicine, 2020; 45(9): 733-739
2. Peterson KJ, et al. Surgery, 2022; 171(3): 615-620

SEEDLE BLOCK, CASE REPORT

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Introduction: Seedle block anesthesia is a type of targeted spinal anesthesia used for surgical procedures in the lower part of the body, more precisely in the area that would touch the saddle when riding (perineum, genitals, buttocks and inner side of the thigh). This type of anesthesia is most often used for short procedures in the lower part of the pelvis and in the anogenital area.

Case report: An 18-year-old patient undergoes surgical treatment of recurrent pilonidal disease. He subjectively complains of pain and swelling in the sacrococcygeal region. The patient has been healthy so far, without comorbidities, obese (BMI 32.4). Cardiorespiratory compensated. The patient was admitted to the hospital the day before the planned surgical procedure. Low molecular weight heparin was prescribed 12 hours preoperatively. On the day of the surgical procedure, the patient was admitted to the operating room, he is placed in a sitting position and the planned procedure is explained to him in detail. After the toilet and antiseptic preparation of the lumbosacral region, the operative field is sterilely dressed and a puncture is made in the L4/L5 intervertebral space. Hyperbaric Bupivacaine (0.5% Bupivacaine a 1.5ml + 10% Glucose a 0.5ml) and 25mcg (0.5ml) Fentanyl in a separate syringe are applied intrathecally. The patient sits for the next 5 minutes until he feels heaviness in his legs. Then the patient independently turns into the pronation position, with adequate positioning and protection of the predilection points of pressure, relief of bony prominences and preservation of the free position of the eyes and airways. The operation took place without complications. During the operation, the patient breathes independently, hemodynamically and respiratoryly stable.

Conclusion: There are numerous advantages of the seedle block, including a smaller impact on hemodynamics compared to classic spinal anesthesia because smaller doses of local anesthetic are used, it is more pronounced sensory block with less pronounced motor block, lower risk of urinary retention, faster recovery and earlier mobilization.

Literature:
1. Yung EM, et al. Regional Anesthesia and Pain Medicine, 2020; 45(9): 733-739
2. Peterson KJ, et al. Surgery, 2022; 171(3): 615-620

ULOGA FIBEROPTIČKE BRONHOSKOPIJE PRI POZICIONIRANJU ENDOTRAHEALNOG TUBUSA TOKOM RESEKCIJE TUMORA MEDIJASTINUMA KOD DJETETA (PRIKAZ SLUČAJA)

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Uvod: tumori prednjeg medijastinuma kod djece predstavljaju značajan izazov za anesteziologa zbog mogućnosti kompresije disajnog puta i velikih krvnih sudova, kao i potrebe za održavanjem adekvatne ventilacije tokom operativnog zahvata. Kod djece primjena dvolumenskog endotrahealnog tubusa najčešće nije moguća zbog anatomskih ograničenja, zbog čega pravilno pozicioniranje jednolumenskog tubusa ima poseban značaj.

Cilj: cilj ovog rada je prikazati značaj fiberoptičke bronhoskopije u intraoperativnom pozicioniranju jednolumenskog endotrahealnog tubusa tokom torakotomije kod djeteta s tumorom medijastinuma.

Materijali i metode; prikazan je slučaj šestogodišnje djevojčice podvrgnute desnostranoj torakotomiji zbog tumora prednjeg medijastinuma. Operacija je izvedena u opštoj anesteziji uz primjenu jednolumenskog endotrahealnog tubusa, budući da zbog uzrasta pacijentice nije postojala mogućnost primjene dvolumenskog tubusa. Tokom hirurškog zahvata fiberoptička bronhoskopija je korištena za višekratnu provjeru i korekciju položaja tubusa u odnosu na karinu, čime je omogućeno održavanje adekvatne ventilacije i optimalnih uslova za rad hirurškog tima.

Rezultati: primjena fiberoptičke bronhoskopije omogućila je pravovremeno prepoznavanje i korekciju položaja endotrahealnog tubusa tokom operacije, bez razvoja respiratornih ili hemodinamskih komplikacija.

Zaključak: fiberoptička bronhoskopija ima veliki značaj u upravljanju disajnim putem tokom pedijatrijskih torakalnih operacija. Bronhoskopsko navođenje omogućava precizno pozicioniranje i sigurno intraoperativno repozicioniranje jednolumenskog tubusa, čime se povećava sigurnost pacijenta i olakšava izvođenje složenih torakalnih operacija. Ključne riječi: bronhoskopija,djeca,medijastinalni tumor.

Literatura:
1. Tan A, Nolan JA. Anesthesia for children with anterior mediastinal masses. Paediatr Anaesth. 2022;32(1):4-9.
2. Pearson JK, Tan GM. Pediatric anterior mediastinal mass: A review article. Semin Cardiothorac Vasc Anesth. 2015;19(3):248-254.
3. Stricker PA, Gurnaney HG, Litman RS. Anesthetic management of children with an anterior mediastinal mass. J Clin Anesth. 2010;22(3):159-163.
4. Monrigal JP, Granry JC, Rezzadori G, Tracheal compression by mediastinal mass in children: value of fiberoptic tracheobronchoscopy for anesthetic management. Paediatr Anaesth. 1995;5(4):225-229.
5. Catalán Escudero P, Uriarte Valiente M, Morató Robert P, García del Valle S, Anesthetic management during anterior mediastinal mass resection in a pediatric patient: A case report. Rev Esp Anestesiol Reanim (Engl Ed). 2020;67(1):39-43.

THE ROLE OF FIBEROPTIC BRONCHOSCOPY IN ENDOTRACHEAL TUBE POSITIONING DURING MEDIASTINAL TUMOR RESECTION IN A CHILD (CASE REPORT)

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Introduction: anterior mediastinal tumors in children pose a significant challenge for the anesthesiologist due to the potential for compression of the airway and great vessels, as well as the need to maintain adequate ventilation during the surgical procedure. In children the use of a double-lumen endotracheal tube is often not feasible due to anatomical limitations, consequently, the correct positioning of a single-lumen tube is of particular importance.

Objective: the aim of this paper is to demonstrate the importance of fiber-optic bronchoscopy in the intraoperative positioning of a single-lumen endotracheal tube during thoracotomy in a child with a mediastinal tumor.

Materials and methods: we present the case of a six-year-old girl who underwent a right-sided thoracotomy for an anterior mediastinal tumor. The surgery was performed under general anesthesia using a single-lumen endotracheal tube, as the patient's age precluded the use of a double-lumen tube. During the procedure, fiberoptic bronchoscopy was used to repeatedly verify and adjust the tube's position relative to the carina, thereby ensuring adequate ventilation and optimal operating conditions for the surgical team.

Results: the use of fiber-optic bronchoscopy enabled the timely identification and correction of the endotracheal tube position during surgery, without the development of respiratory or hemodynamic complications.

Conclusion: fiberoptic bronchoscopy plays a significant role in airway management during pediatric thoracic surgeries. Bronchoscopic guidance enables precise positioning and safe intraoperative repositioning of the single-lumen tube, thereby enhancing patient safety and facilitating the performance of complex thoracic surgeries. Keywords: bronchoscopy, children, mediastinal tumor.

References:
1.Tan A, Nolan JA. Anesthesia for children with anterior mediastinal masses. Paediatr Anaesth. 2022;32(1):4-9.
2. Pearson JK, Tan GM. Pediatric anterior mediastinal mass: A review article. Semin Cardiothorac Vasc Anesth. 2015;19(3):248-254.
3.Stricker PA, Gurnaney HG, Litman RS. Anesthetic management of children with an anterior mediastinal mass. J Clin Anesth. 2010;22(3):159-163.
4. Monrigal JP, Granry JC, Rezzadori G, Tracheal compression by mediastinal mass in children: value of fiberoptic tracheobronchoscopy for anesthetic management. Paediatr Anaesth. 1995;5(4):225-229.
5. Catalán Escudero P, Uriarte Valiente M, Morató Robert P, García del Valle S, Anesthetic management during anterior mediastinal mass resection in a pediatric patient: A case report. Rev Esp Anestesiol Reanim (Engl Ed). 2020;67(1):39-43.

CENTRALNI VENSKI KATETERI KOD DJECE : INDIKACIJE, IZAZOVI I SAVREMENI PRISTUP SIGURNOM PLASIRANJU (NAŠA ISKUSTVA)

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Uvod: Centralni venski kateteri (CVK) predstavljaju neizostavan dio liječenja djece koja zahtijevaju dugotrajnu intravensku terapiju, parenteralnu prehranu, hemodijalizu, primjenu vazoaktivnih lijekova ili intenzivno hemodinamsko praćenje. Uprkos njihovom značaju, primjena CVK povezana je s rizikom mehaničkih, infektivnih i trombotičkih komplikacija, koje mogu značajno uticati na ishod liječenja.

Cilj: prikazati najvažnije indikacije za plasiranje centralnih venskih katetera kod djece, ukazati na najčešće komplikacije, ali i prikazati savremene preporuke za sigurnu primjenu i prevenciju neželjenih događaja.

Materijal i metode: proveden je pregled dostupne naučne literature koja se odnosi na primjenu centralnih venskih katetera kod djece. Analizirani su stručni radovi i međunarodne smjernice koje obrađuju indikacije za plasiranje centralnih venskih katetera, izbora mjesta insercije, najčešće komplikacije i preporuke za njihovu prevenciju.

Rezultati: analizirana literatura pokazuje da su centralni venski kateteri neophodni u liječenju djece koja zahtijevaju dugotrajnu intravensku terapiju, parenteralnu prehranu, hemodijalizu ili intenzivno hemodinamsko praćenje. Najčešće komplikacije su infekcije povezane s kateterom, tromboza, mehaničke komplikacije i gubitak vaskularnog pristupa. Primjena ultrazvučno vođene kateterizacije, odgovarajući izbor mjesta insercije i striktno pridržavanje aseptičnih mjera značajno smanjuju učestalost komplikacija i povećavaju sigurnost postupka.

Zaključak: centralni venski kateteri predstavljaju ključan element savremene pedijatrijske medicine. Sigurna primjena zahtijeva dobro poznavanje indikacija, primjenu ultrazvuka, pravilnu tehniku plasiranja i dosljedno provođenje mjera prevencije komplikacija. Ključne riječi : centralni venski kateteri, djeca, sigurnost.

Literatura:
1. Mandel-Shorer N, Tzvi-Behr S, Harvey E, Revel-Vilk S. Central venous catheter-related venous thrombosis in children with end-stage renal disease undergoing hemodialysis. Thromb Res. 2019;173:65–70.
2. Warsco Smith R, Pettini M, Gulden R, Wendel D. Central venous catheter safety in pediatric patients with intestinal failure. Nutr Clin Pract. 2023;38(6):1188-1198.
3. Timsit JF, Baleine J, Bernard L, et al. Expert consensus-based clinical practice guidelines management of intravascular catheters in the intensive care unit. Ann Intensive Care. 2020;10:118.
4. Javeri Y, Jagathkar G, Dixit S, et al. Indian Society of Critical Care Medicine Position Statement for Central Venous Catheterization and Management 2020. Indian J Crit Care Med. 2020;24(Suppl 1):S6-S30.
5. Ge X, Cavallazzi R, Li C, Pan SM, Wang YW, Wang FL. Central venous access sites for the prevention of venous thrombosis, stenosis and infection. Cochrane Database Syst Rev. 2012;(3):CD004084.

CENTRAL VENOUS CATHETERIZATION IN CHILDREN: CLINICAL INDICATIONS, CHALLENGES AND STRATEGIES FOR SAFER PRACTICE (OUR EXPERIENCES)

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Intraduction: Central venous catheters (CVCs) are an essential part of treatment for children requiring long-term intravenous therapy, parenteral nutrition, hemodialysis, the administration of vasoactive drugs or intensive hemodynamic monitoring. Despite their importance, the use of CVCs is associated with a risk of mechanical, infectious and thrombotic complications, which can significantly affect treatment outcomes.

Objective: to present the most important indications for central venous catheter placement in children, highlight the most common complications and outline current recommendations for safe use and the prevention of adverse events.

Materials and methods: a review of available scientific literature regarding the use of central venous catheters in children was conducted. Professional papers and international guidelines addressing indications for central venous catheter placement, the choice of insertion site, the most common complications and recommendations for their prevention were analyzed.

Results: the analyzed literature indicates that central venous catheters are essential in the treatment of children requiring long-term intravenous therapy, parenteral nutrition, hemodialysis or intensive hemodynamic monitoring. The most common complications include catheter related infections, thrombosis, mechanical complications and loss of vascular access. The use of ultrasound guided catheterization, appropriate selection of the insertion site and strict adherence to aseptic measures significantly reduce the incidence of complications and enhance the safety of the procedure.

Conclusion: central venous catheters are a key element of modern pediatric medicine. Safe use requires a thorough understanding of indications, the use of ultrasound, proper insertion technique and consistent implementation of measures to prevent complications. Key words: central venous catheters, children, safety.

References:
1. Mandel-Shorer N, Tzvi-Behr S, Harvey E, Revel-Vilk S. Central venous catheter-related venous thrombosis in children with end-stage renal disease undergoing hemodialysis. Thromb Res. 2019;173:65–70.
2. Warsco Smith R, Pettini M, Gulden R, Wendel D. Central venous catheter safety in pediatric patients with intestinal failure. Nutr Clin Pract. 2023;38(6):1188-1198.
3. Timsit JF, Baleine J, Bernard L, et al. Expert consensus-based clinical practice guidelines management of intravascular catheters in the intensive care unit. Ann Intensive Care. 2020;10:118.
4. Javeri Y, Jagathkar G, Dixit S, et al. Indian Society of Critical Care Medicine Position Statement for Central Venous Catheterization and Management 2020. Indian J Crit Care Med. 2020;24(Suppl 1):S6-S30.
5. Ge X, Cavallazzi R, Li C, Pan SM, Wang YW, Wang FL. Central venous access sites for the prevention of venous thrombosis, stenosis and infection. Cochrane Database Syst Rev. 2012;(3):CD004084.

PRES SINDROM NAKON TEŠKE PREEKLAMPSIJE KOMPLIKOVAN TRAHEOEZOFAGEALNOM FISTULOM – PRIKAZ SLUČAJA

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Uvod: Posteriorni reverzibilni encefalopatski sindrom (PRES) je akutni neurološki sindrom karakteriziran poremećajem svijesti, epileptičkim napadima, poremećajima vida i tipičnim neuroradiološkim promjenama. Preeklampsija i eklampsija predstavljaju značajne precipitirajuće faktore.

Prikaz slučaja: Osamnaestogodišnja pacijentica primljena je 7.5.2021. u Odjeljenje intenzivne terapije nakon hitnog carskog reza zbog EPH gestoze/preeklampsije. Preoperativno je razvila akutni potpuni gubitak vida. Po prijemu je bila sedirana, relaksirana, intubirana i mehanički ventilirana, uz izraženu hipertenziju, tahikardiju i generalizirane edeme. CT mozga pokazao je obostrane parijeto-okcipitalne i cerebelarne zone vazogenog edema kompatibilne s PRES-om. Liječena je antihipertenzivnom terapijom, magnezij-sulfatom, sedacijom, mehaničkom ventilacijom i suportivnim mjerama. Tok je komplikovan respiratornim problemima, produženom ventilacijom s traheotomijom i epileptičkim napadima, zbog čega je uvedena antiepileptička terapija. Kontrolna neuroradiološka dijagnostika pokazala je regresiju promjena. Nakon respiratornog i neurološkog oporavka odvojena je od respiratora te 5.6.2021. premještena na Kliniku za ginekologiju i akušerstvo. Naknadno je razvila traheoezofagealnu fistulu. Dana 21.7.2021. ponovo je primljena u intenzivnu terapiju nakon resekcije fistule, suture jednjaka i resekcije traheje s terminoterminalnom anastomozom. Postoperativni tok bio je povoljan, uz spontano disanje i hemodinamsku stabilnost.

Diskusija: Slučaj pokazuje kompleksnost PRES-a povezanog s preeklampsijom i mogućnost potpunog neurološkog oporavka uz pravovremenu intenzivnu terapiju. Istovremeno naglašava rizik ozbiljnih kasnih komplikacija produženog osiguranja disajnog puta, uključujući traheoezofagealnu fistulu, te značaj multidisciplinarnog pristupa.

Zaključak: Rano prepoznavanje PRES-a, kontrola hipertenzije, liječenje konvulzija i adekvatna respiratorna podrška ključni su za povoljan ishod. Pravovremeno prepoznavanje i hirurško liječenje traheoezofagealne fistule omogućili su uspješan oporavak.

Ključne riječi: PRES; preeklampsija; mehanička ventilacija; traheostomija; traheoezofagealna fistula.

PRES SYNDROME AFTER SEVERE PREECLAMPSIA COMPLICATED BY TRACHEOESOPHAGEAL FISTULA – A CASE REPORT

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Introduction: Posterior reversible encephalopathy syndrome (PRES) is an acute neurological syndrome characterized by altered consciousness, seizures, visual disturbances, and typical neuroradiological changes. Preeclampsia and eclampsia are important precipitating factors.

Case report: An 18-year-old patient was admitted to the Intensive Care Unit on 7 May 2021 after an emergency cesarean section due to EPH gestosis/preeclampsia. Preoperatively, she developed acute complete loss of vision. On admission, she was sedated, paralyzed, intubated, and mechanically ventilated, with marked hypertension, tachycardia, and generalized edema. Brain CT showed bilateral parieto-occipital and cerebellar areas of vasogenic edema compatible with PRES. She was treated with antihypertensive therapy, magnesium sulfate, sedation, mechanical ventilation, and supportive measures. The course was complicated by respiratory problems, prolonged ventilation requiring tracheostomy, and epileptic seizures, for which antiepileptic therapy was introduced. Follow-up neuroradiological imaging showed regression of the changes. After respiratory and neurological recovery, she was weaned from mechanical ventilation and transferred to the Clinic of Gynecology and Obstetrics on 5 June 2021. She subsequently developed a tracheoesophageal fistula. On 21 July 2021, she was readmitted to intensive care after fistula resection, esophageal suturing, and tracheal resection with end-to-end anastomosis. The postoperative course was favorable, with spontaneous breathing and hemodynamic stability.

Discussion: This case demonstrates the complexity of PRES associated with preeclampsia and the possibility of complete neurological recovery with timely intensive care. It also highlights the risk of serious late complications of prolonged airway management, including tracheoesophageal fistula, and the importance of a multidisciplinary approach.

Conclusion: Early recognition of PRES, blood pressure control, seizure management, and adequate respiratory support are crucial for a favorable outcome. Timely recognition and surgical treatment of the tracheoesophageal fistula enabled successful recovery.

Keywords: PRES; preeclampsia; mechanical ventilation; tracheostomy; tracheoesophageal fistula.

TEŠKA ENCEFALOPATIJA SA BILATERALNIM PROMJENAMA BAZALNIH GANGLIJA U SKLOPU SISTEMSKOG LUPUSA – PRIKAZ SLUČAJA

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Uvod: Akutni poremećaj svijesti uz obostrane lezije bazalnih ganglija i duboke bijele mase predstavlja značajan dijagnostički izazov, posebno kada je praćen sistemskim poremećajima i višestrukim organskim manifestacijama. Pravovremeno prepoznavanje potencijalno reverzibilnih uzroka i multidisciplinarni pristup od značaja su za ishod liječenja.

Cilj: Prikazati klinički tok, dijagnostičku obradu, intenzivno liječenje i neurološki oporavak mlade pacijentice sa teškim poremećajem svijesti i kompleksnim radiološkim nalazom.

Prikaz slučaja: Prikazan je slučaj 24-godišnje pacijentice primljene u jedinicu intenzivnog liječenja zbog progresivnog poremećaja stanja svijesti i opće slabosti. Zbog pogoršanja neurološkog statusa pacijentica je intubirana i mehanički ventilirana uz kontinuiranu sedaciju. Učinjena je opsežna laboratorijska, mikrobiološka, imunološka, reumatološka, endokrinološka i metabolička obrada, uključujući analizu cerebrospinalnog likvora. Serijskim MRI pregledima mozga evidentirane su obostrane promjene u bazalnim ganglijima, kapsuli eksterni i insularno, kao i u dubokoj bijeloj masi, uz elemente vaskularnog/perivaskularnog zahvatanja. U diferencijalnoj dijagnozi razmatrani su infektivni, inflamatorni/autoimuni, vaskulitični i metaboličko-toksični uzroci.

Diskusija: Liječenje je zahtijevalo produženu mehaničku ventilaciju, sedaciju, antibiotsku i antivirusnu terapiju, korekciju metaboličkih poremećaja te intenzivan monitoring i suportivno liječenje. Proveden je multidisciplinarni konzilijarni pristup. Tokom hospitalizacije došlo je do postepenog poboljšanja neurološkog statusa, od dubokog poremećaja svijesti do spontanog disanja, praćenja pogledom, izvršavanja jednostavnih naloga i uspostavljanja verbalnog kontakta. Kontrolni MRI pokazao je regresiju prethodno opisanih patoloških promjena. Nakon stabilizacije pacijentica je uključena u fizikalnu i logopedsku rehabilitaciju.

Zaključak: Kompleksne bilateralne lezije bazalnih ganglija i duboke bijele mase zahtijevaju široku diferencijalno-dijagnostičku obradu. Multidisciplinarni pristup, pravovremena intenzivna terapija i kontinuirano neurološko praćenje mogu biti ključni za postizanje značajnog funkcionalnog oporavka.

Ključne riječi: encefalopatija, bazalni gangliji, duboka bijela masa, poremećaj svijesti, intenzivno liječenje, neurološki oporavak, sistemski lupus

SEVERE ENCEPHALOPATHY WITH BILATERAL BASAL GANGLIA WITH SLE – A CASE REPORT

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Introduction: Acute disturbance of consciousness associated with bilateral basal ganglia and deep white matter lesions represents a significant diagnostic challenge, particularly when accompanied by systemic abnormalities and multiorgan involvement. Early recognition of potentially reversible causes and a multidisciplinary approach are essential for patient outcome.

Aim: To present the clinical course, diagnostic evaluation, intensive care management, and neurological recovery of a young patient with severe disturbance of consciousness and complex brain MRI abnormalities.

Case report: We present the case of a 24-year-old female admitted to the intensive care unit because of progressive impairment of consciousness and generalized weakness. Due to neurological deterioration, the patient was intubated and mechanically ventilated with continuous sedation. Extensive laboratory, microbiological, immunological, rheumatological, endocrinological, and metabolic investigations were performed, including cerebrospinal fluid analysis. Serial brain MRI examinations demonstrated bilateral lesions involving the basal ganglia, external capsule and insular regions, as well as the deep white matter, with vascular/perivascular involvement. Infectious, inflammatory/autoimmune, vasculitic, and metabolic-toxic etiologies were considered in the differential diagnosis.

Discussion: The clinical course required prolonged mechanical ventilation, sedation, antimicrobial and antiviral therapy, correction of metabolic abnormalities, intensive monitoring, and supportive treatment. A multidisciplinary team was involved throughout the diagnostic and therapeutic process. During hospitalization, gradual neurological improvement was observed, progressing from severe impairment of consciousness to spontaneous breathing, visual tracking, execution of simple commands, and establishment of verbal communication. Follow-up brain MRI demonstrated regression of previously described pathological lesions. Following clinical stabilization, the patient underwent physical and speech rehabilitation.

Conclusion: Complex bilateral lesions of the basal ganglia and deep white matter require a broad differential diagnostic approach. Multidisciplinary management, timely intensive care, and continuous neurological assessment may be crucial for achieving substantial neurological and functional recovery.

Keywords: encephalopathy, basal ganglia, deep white matter, disturbance of consciousness, intensive care, neurological recovery

ACUTE KIDNEY INJURY AFTER POLYTRAUMA: THE ROLE OF EARLY RENAL REPLACEMENT THERAPY

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Introduction: Polytrauma is frequently associated with crush syndrome, a life-threatening condition resulting from extensive skeletal muscle injury and rhabdomyolysis. Massive release of myoglobin, potassium, phosphate, and other intracellular contents may lead to acute kidney injury (AKI), severe hyperkalemia, metabolic acidosis, disseminated intravascular coagulation, and multiple organ dysfunction syndrome. Early recognition of these complications and timely initiation of renal replacement therapy (RRT) are essential to reduce mortality and improve clinical outcomes.

Aim: To present the intensive care management of a patient with severe polytrauma complicated by crush syndrome and acute kidney injury, with particular emphasis on the benefits of early initiation of renal replacement therapy.

Case Description: A patient sustained severe polytrauma after falling from the eighth floor of a building during construction work. Following initial Advanced Trauma Life Support (ATLS) management in the Emergency Department of the Clinical Center University of Sarajevo, the patient was admitted to the Intensive Care Unit.
During the first 24 hours of hospitalization, laboratory findings demonstrated severe rhabdomyolysis with markedly elevated creatine kinase levels, acute kidney injury, refractory hyperkalemia, metabolic acidosis, and progressive deterioration of renal function. Despite aggressive fluid resuscitation and supportive treatment, metabolic abnormalities persisted, indicating the need for extracorporeal therapy. Continuous renal replacement therapy (CRRT) was initiated early to achieve rapid correction of electrolyte disturbances, metabolic acidosis, and fluid balance while providing renal support. The patient's metabolic parameters gradually normalized, serum potassium returned to the reference range, and renal function progressively improved. After 15 days of CRRT, renal replacement therapy was discontinued following recovery of kidney function. The patient remained hemodynamically stable and continued multidisciplinary rehabilitation.

Conclusion: Crush syndrome remains one of the most severe complications of polytrauma and is frequently associated with acute kidney injury and life-threatening metabolic disturbances. This case demonstrates that early initiation of continuous renal replacement therapy can effectively control hyperkalemia, correct metabolic acidosis, support renal recovery, and contribute to favorable clinical outcomes. Prompt diagnosis and close collaboration between intensivists, anesthesiologists, nephrologists, and trauma surgeons are essential for successful management of these critically ill patients.

Keywords: Polytrauma; Crush syndrome; Rhabdomyolysis; Acute kidney injury; Continuous renal replacement therapy; Intensive care.

Literature

1. Better OS, Stein JH. Early management of shock and acute renal failure in traumatic rhabdomyolysis. N Engl J Med. 1990;322(12):825–829.
2. Sever MS, Vanholder R. Rhabdomyolysis. In: Critical Care Nephrology. 3rd ed. Philadelphia: Elsevier; 2019.
3. Khwaja A. KDIGO Clinical Practice Guideline for Acute Kidney Injury. Kidney Int Suppl. 2012;2(1):1–138.
4. Ostermann M, Joannidis M, Pani A, et al. Patient selection and timing of continuous renal replacement therapy. Nat Rev Nephrol. 2016;12(4):201–212.
5. Kellum JA, Lameire N; KDIGO AKI Guideline Work Group. Diagnosis, evaluation, and management of acute kidney injury. Kidney Int Suppl. 2013;3(1):19–36.

“BAMBUSOV ŠTAP”: IZAZOVI I STRATEGIJE ANESTEZIOLOŠKE PRIPREME KOD PACIJENATA SA BECHTEREWOVOM BOLEŠĆU U ABDOMINALNOJ HIRURGIJI – PRIKAZ SLUČAJA

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Uvod: Bechterewova bolest poznatija kao ankilozantni spondilitis definira se kao hronična i progresivna upalna bolest lokomotornog sistema. Bolest primarno zahvata aksijalni skelet – sakroilijakalne zglobove te intervertebralne zglobove kičmenog stuba na mjestima gdje se ligamenti, tetive ili zglobne čahure spajaju sa kosti. Na hvatištima dolazi do lokalnog opterećenja koje kod genetski predisponiranih osoba izaziva povišenu imunološku reakciju. Oboljenje se razvija u dvije faze: Prva faza u kojoj upala oštećuje rubove kralježaka, a potom nastupa stvaranje novog koštanog tkiva (sindezmofiti) koje se vremenom spaja sa gornjim i donjim pršljenom, pretvarajući kičmeni stub u krutu i nepokretnu strukturu "kičmeni stub poput bambusova štapa".

C**ilj**: Cilj je prikazati naše izazove i strategiju vođenja anestezije pri abdominalnom operativnom zahvatu kod pacijenta sa uznapredovalim Bechterew oboljenjem.

Prikaz slučaja: Prikazaćemo slučaj pacijenta hospitaliziranog na Kliniku za opštu i abdominalnu hirurgiju kao hitni prijem radi tegoba u vidu bolova u abdomenu. Pacijent se od ranije liječi od Crohn-ove bolesti te ima izvedenu stomu nakon učinjene lijeve hemikolektomije. Unazad osam godina dolazi do postepene progresije primarnog Bechterew oboljenja, a poslednje dvije godine bolest izrazito progredira u smislu flektiranog vratnog dijela kičmenog stuba.

Zaključak: Preoperativna anesteziološka priprema pacijenata s Bechterew oboljenjem koji se podvrgavaju abdominalnoj operaciji predstavlja izniman klinički izazov. Zbog specifičnosti bolesti i same prirode abdominalnih zahvata, priprema zahtijeva multidisciplinarni pristup usmjeren na uspostavljanje disajnog puta, optimizaciju respiratorne i kardiovaskularne funkcije te specifično pozicioniranje pacijenta na operacionom stolu. Detaljnim pristupom preoperativnoj pripremi, kao i postoperativnom zbrinjavanju ovakvih pacijenata, mogućnost pojave komplikacija svedena je na minimum, a u slučaju pojave komplikacija olakšano je rješavanje istih.

Ključne riječi: Anestezija, Bechterew oboljenje, Mb Chron, fiberoptička bronhokopija.

Literatura

1. American Society of Anesthesiologists. Practice Guidelines for Management of the Difficult Airway. Anesthesiology. 2022;136(1):31-81.
2. Woodward LJ, Kam PCA. Ankylosing spondylitis: recent developments and anaesthetic implications. Anaesthesia. 2009;64(5):540-548.
3. OpenAnesthesia. Ankylosing Spondylitis: Airway and Positioning Considerations. International Anesthesia Research Society. 2024.
4. Wang T, et al. Anesthesia management of morbid obesity and ankylosing spondylitis: A case report. BMC Anesthesiology. 2022;22(1):241.
5. Laktašić Žerjavić N, Žagar I, Kovač Durmiš K, et al. Anestezija u bolesnika s ankilozom kralježnice, izazovi i posljedice. Fizikalna i rehabilitacijska medicina. 2026;40(1).

“BAMBOO SPINE”: CHALLENGES AND STRATEGIES FOR ANESTHETIC PREPARATION IN PATIENTS WITH BECHTEREW'S DISEASE UNDERGOING ABDOMINAL SURGERY – A CASE REPORT

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Introduction: Bechterew's disease, better known as ankylosing spondylitis, is defined as a chronic, progressive inflammatory disease of the musculoskeletal system. The disease primarily affects the axial skeleton—specifically the sacroiliac joints and the intervertebral joints of the spine—at the sites where ligaments, tendons, or joint capsules attach to the bone. Local stress at these attachment points triggers an heightened immune response in genetically predisposed individuals. The disease develops in two phases: an initial phase where inflammation damages the vertebral margins, followed by the formation of new bone tissue (syndesmophytes) that eventually bridges the adjacent vertebrae, transforming the spine into a rigid, immobile structure—often described as a "bamboo spine."

Objective: The aim is to present the challenges encountered and the anesthesia management strategy during an abdominal surgical procedure in a patient with advanced Bechterew's disease.

Case Report: We present the case of a patient admitted as an emergency to the Department of General and Abdominal Surgery due to abdominal pain. The patient has a history of Crohn's disease and a pre-existing stoma following a left hemicolectomy. The primary Bechterew's disease has shown gradual progression over the past eight years, with marked worsening over the last two years, particularly manifesting as flexion deformity of the cervical spine.

Conclusion: Preoperative anesthetic preparation of patients with Bechterew's disease undergoing abdominal surgery presents a significant clinical challenge. Due to the specific characteristics of the disease and the nature of abdominal procedures, preparation requires a multidisciplinary approach focused on airway management, optimization of respiratory and cardiovascular function, and specific patient positioning on the operating table. A meticulous approach to preoperative preparation and postoperative care minimizes the risk of complications and facilitates their management should they occur.

Keywords: Anesthesia, Bechterew's disease, Crohn's disease, fiberoptic bronchoscopy.

Literatura

1. American Society of Anesthesiologists. Practice Guidelines for Management of the Difficult Airway. Anesthesiology. 2022;136(1):31-81.
2. Woodward LJ, Kam PCA. Ankylosing spondylitis: recent developments and anaesthetic implications. Anaesthesia. 2009;64(5):540-548.
3. OpenAnesthesia. Ankylosing Spondylitis: Airway and Positioning Considerations. International Anesthesia Research Society. 2024.
4. Wang T, et al. Anesthesia management of morbid obesity and ankylosing spondylitis: A case report. BMC Anesthesiology. 2022;22(1):241.
5. Laktašić Žerjavić N, Žagar I, Kovač Durmiš K, et al. Anestezija u bolesnika s ankilozom kralježnice, izazovi i posljedice. Fizikalna i rehabilitacijska medicina. 2026;40(1).

SOCIODEMOGRAFSKI I KLINIČKI FAKTORI RIZIKA ZA POSTOPERATIVNI KOGNITIVNI POREMEĆAJ POSLIJE OPERACIJE KARCINOMA DEBELOG CRIJEVA

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Uvod: Postoperativni kognitivni poremećaj (POKP) predstavlja čestu komplikaciju nakon velikih hirurških zahvata. Povezan je sa sporijim oporavkom, dužim bolničkim liječenjem, narušenim kvalitetom života i povećanim troškovima liječenja.

Cilj: Cilj istraživanja bio je utvrditi incidenciju postoperativnog kognitivnog poremećaja primjenom Mini-Mental State Examination (MMSE) kod pacijenata operisanih zbog karcinoma debelog crijeva, te analizirati potencijalne sociodemografske i kliničke faktore rizika za razvoj POKP sedmog postoperativnog dana i tri mjeseca nakon operacije.

Metode: U ovoj prospektivnoj studiji učestvovalo je ukupno 113 pacijenata starijih od 18 godina koji su operisani u opštoj anesteziji zbog karcinoma debelog crijeva u periodu od 2021. do 2023. godine u JZU Bolnica „Srbija", Istočno Sarajevo. Preoperativna priprema, anestezija i postoperativni tretman bili su ujednačeni i standardizovani za sve pacijente. Kognitivni status procijenjen je primjenom MMSE testa dan prije operacije, sedmog postoperativnog dana i tri mjeseca nakon operacije.

Rezultati: Stariji pacijenti (≥65 godina) češće su imali POKP tri mjeseca nakon operacije u poređenju sa mlađim pacijentima (80,0% u odnosu na 52,9%; p = 0,003). Ostali analizirani sociodemografski i klinički faktori (BMI, pol, ASA, nivo obrazovanja, trajanje anestezije i trajanje operacije) nisu bili statistički značajno povezani sa pojavom POKP sedmog postoperativnog dana i tri mjeseca nakon operacije (p > 0,05).

Zaključak: Starija životna dob bila je značajno povezana sa većom učestalošću POKP tri mjeseca nakon operacije karcinoma debelog crijeva.

Ključne riječi: postoperativni kognitivni poremećaj, MMSE, karcinom debelog crijeva, faktori rizika, opšta anestezija

SOCIODEMOGRAPHIC AND CLINICAL RISK FACTORS FOR POSTOPERATIVE COGNITIVE DYSFUNCTION FOLLOWING SURGERY FOR COLORECTAL CANCER

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Introduction: Postoperative cognitive dysfunction (POCD) is a common complication following major surgical procedures. It is associated with delayed recovery, prolonged hospital stay, impaired quality of life, and increased healthcare costs.

Objective: The aim of this study was to determine the incidence of postoperative cognitive dysfunction using the Mini-Mental State Examination (MMSE) in patients undergoing surgery for colorectal cancer and to analyze potential sociodemographic and clinical risk factors for the development of POCD on the seventh postoperative day and three months after surgery.

Methods: A total of 113 patients aged over 18 years who underwent surgery under general anesthesia for colorectal cancer between 2021 and 2023 at the Public Health Institution Hospital "Serbia," East Sarajevo, were included in this prospective study. Preoperative preparation, anesthesia, and postoperative management were standardized and uniform for all patients. Cognitive status was assessed using the MMSE one day before surgery, on the seventh postoperative day, and three months after surgery.

Results: Older patients (≥65 years) were more likely to develop POCD three months after surgery compared with younger patients (80.0% vs. 52.9%; $p = 0.003$). The other analyzed sociodemographic and clinical factors (BMI, sex, ASA physical status, educational level, duration of anesthesia, and duration of surgery) were not statistically significantly associated with the occurrence of POCD on the seventh postoperative day or three months after surgery ($p > 0.05$).

Conclusion: Older age was significantly associated with a higher incidence of POCD three months after surgery for colorectal cancer.

Keywords: postoperative cognitive dysfunction, MMSE, colorectal cancer, risk factors, general anesthesia

ANESTHETIC MANAGEMENT OF PEDIATRIC SCOLIOSIS SURGERY: FROM PREOPERATIVE ASSESSMENT TO SAFE EXTUBATION

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Introduction: Pediatric scoliosis correction requires simultaneous protection of spinal cord perfusion, management of blood loss, reliable neuromonitoring, safe prone positioning, effective analgesia, and assessment of respiratory readiness. These interdependent demands place the anesthesiologist at the center of neurological and perioperative safety.

Objective: To present anesthetic management of a 14-year-old patient undergoing posterior spinal fusion and relate key clinical decisions to contemporary evidence.

Materials and Methods: The perioperative course was analyzed as a case-based narrative review and integrated with pediatric studies and SRS/POSNA recommendations on spinal cord protection, hemodynamics, blood conservation, analgesia, and extubation.

Results and Discussion: Following preoperative cardiopulmonary and hematological assessment, general anesthesia with controlled ventilation and invasive arterial pressure monitoring was performed in the prone position. Surgery lasted approximately 390 minutes. $EtCO_2$ was maintained around 36 mmHg, with stable hemodynamics and preserved urine output. Clinically significant blood loss required packed red-cell transfusion. Multimodal analgesia comprised fentanyl, ketamine, paracetamol, and ibuprofen, with dexamethasone as an adjunct. Evidence supports stable anesthesia compatible with multimodal IONM when the spinal cord is at risk, avoidance of sustained hypotension during correction, multimodal blood conservation, normothermia, and opioid-sparing analgesia. After return to the supine position, adequate spontaneous ventilation, hemodynamic stability, and satisfactory recovery permitted successful extubation in the operating room. Despite transfusion, extubation was determined by the patient's final physiological condition rather than an isolated risk factor.

Conclusion: Pediatric scoliosis anesthesia should be managed as a coordinated perioperative pathway. Safe extubation is the physiological endpoint of preserved spinal cord perfusion, controlled blood loss, effective analgesia, and satisfactory respiratory and neuromuscular recovery, not merely the final step of anesthesia.

Keywords: Pediatric scoliosis; anesthesia; posterior spinal fusion; spinal cord perfusion; blood conservation; multimodal analgesia; extubation.

ANESTEZIOLOŠKO ZBRINJAVANJE PEDIJATRIJSKE OPERACIJE SKOLIOZE: OD PREOPERATIVNE PROCJENE DO SIGURNE EKSTUBACIJE

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Uvod: Korekcija skolioze kod djece zahtijeva istovremeno očuvanje perfuzije kičmene moždine, kontrolu gubitka krvi, pouzdan neuromonitoring, sigurno pozicioniranje u prone položaju, efikasnu analgeziju i procjenu respiratorne spremnosti. Ovi međusobno povezani zahtjevi postavljaju anesteziologa u središte neurološke i perioperativne sigurnosti.

Cilj: Prikazati anestezиološko zbrinjavanje 14-godišnjeg pacijenta podvrgnutog posteriornoj spinalnoj fuziji i ključne kliničke odluke povezati sa savremenim dokazima.

Materijal i metode: Perioperativni tok analiziran je u obliku prikaza slučaja sa narativnim pregledom pedijatrijskih studija i preporuka SRS/POSNA o zaštiti kičmene moždine, hemodinamici, kontroli gubitka krvi, analgeziji i ekstubaciji.

Rezultati i diskusija: Nakon preoperativne kardiopulmonalne i hematološke procjene, primijenjena je opšta anestezija sa kontrolisanom ventilacijom i invazivnim monitoringom arterijskog pritiska u prone položaju. Operacija je trajala približno 390 minuta. $EtCO_2$ je održavan oko 36 mmHg, uz stabilnu hemodinamiku i očuvanu diurezu. Klinički značajan gubitak krvi zahtijevao je transfuziju koncentrata eritrocita. Multimodalna analgezija uključivala je fentanil, ketamin, paracetamol i ibuprofen, uz deksametazon kao adjuvans. Dokazi podržavaju stabilnu anesteziju kompatibilnu sa multimodalnim IONM-om kada je kičmena moždina izložena riziku, izbjegavanje produžene hipotenzije tokom korekcije, multimodalnu kontrolu krvarenja, normotermiju i opioid-štedljivu analgeziju. Nakon vraćanja u leđni položaj, adekvatna spontana ventilacija, hemodinamska stabilnost i zadovoljavajući oporavak omogućili su uspješnu ekstubaciju u operacionoj sali. Uprkos transfuziji, odluka o ekstubaciji zasnivala se na završnom fiziološkom stanju pacijenta, a ne na izoliranom faktoru rizika.

Zaključak: Anesteziju za pedijatrijsku skoliozu treba provoditi kao koordiniran perioperativni proces. Sigurna ekstubacija je fiziološki rezultat očuvane perfuzije kičmene moždine, kontrolisanog gubitka krvi, efikasne analgezije te zadovoljavajućeg respiratornog i neuromuskularnog oporavka, a ne samo završni korak anestezije.

Ključne riječi: Pedijatrijska skolioza; anestezija; posteriorna spinalna fuzija; perfuzija kičmene moždine; kontrola krvarenja; multimodalna analgezija; ekstubacija.

Literatura

1. Nedomová B, Liščák B, Urbanová S, et al. Perioperative Anesthetic Management in Pediatric Scoliosis Surgery: A Narrative Review with Focus on Neuromuscular Disorders. Children (Basel). 2025;12(11):1481. doi:10.3390/children12111481.
2. Halsey MF, Myung KS, Ghag A, et al. Neurophysiological monitoring of spinal cord function during spinal deformity surgery: 2020 SRS neuromonitoring information statement. Spine Deform. 2020;8(4):591–596. doi:10.1007/s43390-020-00140-2.
3. Fletcher ND, Ghag R, Hedequist DJ, et al. Perioperative Blood Pressure Management for Patients Undergoing Spinal Fusion for Pediatric Spinal Deformity: Current Concept Review. J Pediatr Orthop Soc North Am. 2023;5(1). doi:10.55275/JPOSNA-2023-602.
4. Wang L, Xia Q, Ni W, et al. Predicting delayed extubation and transfer to the intensive care unit in children undergoing posterior fusion surgery for scoliosis: A retrospective observational study. Anaesthesiologie. 2024;73(6):398–407. doi:10.1007/s00101-024-01391-8.
5. Einhorn LM, Monitto CL, Ganesh A, et al. Multi-Institutional Study of Multimodal Analgesia Practice, Pain Trajectories, and Recovery Trends After Spine Fusion for Idiopathic Scoliosis. Anesth Analg. 2025;141(5):1137–1148. doi:10.1213/ANE.0000000000007351.

PERIOPERATIVE ANAESTHETIC CHALLENGES IN EMERGENCY RESECTION OF AN OBSTRUCTIVE LEFT ATRIAL TUMOR IN A PATIENT WITH ACUTE PULMONARY EMBOLISM: A CASE REPORT

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Background: Emergency cardiac surgery in patients with acute pulmonary embolism (PE) presents major anaesthetic challenges due to right ventricular dysfunction, increased pulmonary vascular resistance, and the risk of hemodynamic collapse during induction of anaesthesia and cardiopulmonary bypass (CPB). The coexistence of a pedunculated left atrial myxoma prolapsing through the mitral valve further increases perioperative risk by causing dynamic obstruction of left ventricular inflow. We report the anesthetic management of a patient requiring urgent surgical resection under these complex conditions.

Case presentation: A 59-year-old woman with no significant medical history presented with progressive dyspnea after two months of treatment for presumed chronic bronchitis. Computed tomography pulmonary angiography confirmed acute PE involving the right lobar, segmental, and bilateral subsegmental pulmonary arteries and revealed a left atrial mass. Transesophageal echocardiography demonstrated a 38×55 mm pedunculated tumor attached to the interatrial septum, prolapsing through the mitral valve and causing significant obstruction of left ventricular inflow, with preserved left ventricular systolic function and pulmonary hypertension. Urgent surgical resection was indicated because of the imminent risk of complete mitral valve obstruction. General anaesthesia was induced under invasive haemodynamic monitoring, while controlled ventilation maintained normoxia, normocapnia, and acid–base balance. Separation from CPB required low-dose norepinephrine and dobutamine to support right ventricular function and systemic perfusion. Histopathological examination confirmed a left atrial myxoma. The postoperative course was complicated by ischemic stroke with generalized seizures; however, intensive multidisciplinary treatment and neurorehabilitation resulted in near-complete neurological recovery.

Conclusion: The coexistence of acute pulmonary embolism and a left atrial myxoma causing mitral obstruction represents an exceptional perioperative challenge. In such patients, maintaining right ventricular performance, avoiding abrupt changes in loading conditions, and using advanced haemodynamic monitoring are crucial for safe anaesthetic management.

Reference List:
1. Qi W, Yu XL, Yang DX, Hu XK, Chen JP, Yao Y, et al. Anesthetic management of patients undergoing cardiac myxoma resection: a single-center retrospective analysis. Fron Cardiovasc Med. 2023; 10:1126822.
2. Konstantinides SV, Meyer G, Becattini C, Bueno H, Geersing GJ, Harjola VP, et al. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). Eur Heart J. 2020; 41(4):543-603.
3. Rossler J, Cywinski JB, Argalious M, Ruetzler K, Khanna S. Anesthetic management in patients having catheter-based thrombectomy for acute pulmonary embolism: A narrative review. J Clin Anesth. 2024; 92:111281.
4. Tyebally S, Chen D, Bhattacharyya S, Mughrabi A, Hussain Z, Manisty C, et al. Cardiac Tumors: JACC CardioOncology State-of-the-Art Review. JACC CardioOncol. 2020; 2(2):293-311.
5. Reynen K. Cardiac myxomas. N Engl J Med. 1995; 333(24):1610-7.

PERIOPERATIVNI ANESTEZIOLOŠKI IZAZOVI U HITNOJ RESEKCIJI OPSTRUKTIVNOG TUMORA LIJEVOG ATRIJA KOD PACIJENTICE S AKUTNOM PLUĆNOM EMBOLIJOM: PRIKAZ SLUČAJA

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Uvod: Hitni kardiohirurški zahvati kod bolesnika s akutnom plućnom embolijom (PE) predstavljaju značajan anesteziološki izazov zbog prisutne disfunkcije desne komore, povećanog plućnog vaskularnog otpora, visokog rizika od hemodinamskog kolapsa tokom uvoda u anesteziju i primjene kardiopulmonalnog bajpasa (KPB). Istovremeno prisustvo tumora lijevog atrijuma, koji prolabira kroz mitralni zalistak, dodatno povećava perioperativni rizik uzrokujući dinamičku opstrukciju izlaznog trakta lijeve komore.

Prikaz slučaja: Žena, 59 godina, primljena je zbog progresivne dispneje nakon dvomjesečnog tretmana hroničnog bronhitisa. Urađena je CT angiografija plućnih arterija koja je potvrdila je akutnu PE, koja je zahvatala desnu lobarnu, segmentalne i obostrane subsegmentalne plućne arterije, uz istovremenu detekciju tumorozne mase u lijevom atriju. Transezofagealna ehokardiografija prikazala je tumor veličine 38×55 mm, pričvršćen za interatrijalni septum, koji prolabira i značajno opstruira mitralni zalistak. Sistolna funkcija lijeve komore je očuvana, uz prisutnu plućnu hipertenziju. Zbog neposrednog rizika od potpune opstrukcije mitralnog zaliska indicirana je hitna hirurška resekcija. Opća anestezija provedena je uz kontinuirani invazivni hemodinamski monitoring i kontrolisanu ventilaciju koja je omogućila održavanje adekvatne oksigenacije, normokapnije i stabilne acidobazne ravnoteže. Odvajanje od KPB zahtijevalo je primjenu niskih doza noradrenalina i dobutamina. Histopatološkim nalazom potvrđen je miksom lijevog atrija. Postoperativni tok je komplikovan ishemijskim moždanim udarom i generaliziranim epileptičkim napadima, ali je uz intenzivno multidisciplinarno liječenje i neurorehabilitaciju postignut gotovo potpuni neurološki oporavak.

Zaključak: Istovremena pojava akutne PE i tumora lijevog atrija koji opstruira mitralni zalistak, predstavlja složen perioperativni izazov. Kod ovakvih bolesnika očuvanje funkcije desne komore, izbjegavanje naglih promjena volumnog opterećenja i sistemskog vaskularnog otpora, kao i primjena naprednog hemodinamskog monitoringa, ključni su za sigurno i uspješno anesteziološko zbrinjavanje.

Reference:
1. Qi W, Yu XL, Yang DX, Hu XK, Chen JP, Yao Y, et al. Anesthetic management of patients undergoing cardiac myxoma resection: a single-center retrospective analysis. Fron Cardiovasc Med. 2023; 10:1126822.
2. Konstantinides SV, Meyer G, Becattini C, Bueno H, Geersing GJ, Harjola VP, et al. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). Eur Heart J. 2020; 41(4):543-603.
3. Rossler J, Cywinski JB, Argalious M, Ruetzler K, Khanna S. Anesthetic management in patients having catheter-based thrombectomy for acute pulmonary embolism: A narrative review. J Clin Anesth. 2024; 92:111281.
4. Tyebally S, Chen D, Bhattacharyya S, Mughrabi A, Hussain Z, Manisty C, et al. Cardiac Tumors: JACC CardioOncology State-of-the-Art Review. JACC CardioOncol. 2020; 2(2):293-311.
5. Reynen K. Cardiac myxomas. N Engl J Med. 1995; 333(24):1610-7.

DIJAGNOSTIČKI IZAZOV NAKON TRANSPLANTACIJE BUBREGA

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Uvod: Rana funkcija bubrežnog grafta zavisi od brojnih faktora povezanih s donorom i recipijentom, ishemijsko-reperfuzijskim oštećenjem, hemodinamskim statusom te imunološkim i vaskularnim komplikacijama [1,2]. Očuvana diureza predstavlja povoljan rani znak, ali ne isključuje disfunkciju grafta. Kod pacijenata s fokalnom segmentalnom glomerulosklerozom (FSGS) dodatni izazov predstavlja mogućnost recidiva osnovne bolesti nakon transplantacije [3,4].

Cilj: Prikazati dijagnostički i terapijski pristup ranoj disfunkciji bubrežnog grafta uz očuvanu diurezu nakon žive srodne transplantacije.

Prikaz slučaja: Pacijent muškog spola, star 36 godina, s terminalnom bubrežnom insuficijencijom uzrokovanom FSGS, nakon četiri mjeseca liječenja hroničnom hemodijalizom podvrgnut je živoj srodnoj transplantaciji bubrega. Donor je bila njegova majka. FSGS je biopsijski potvrđen devet godina ranije i inicijalno liječen kortikosteroidima, koji su pet godina kasnije obustavljeni zbog sumnje na Alportov sindrom. Zbog rizika od recidiva osnovne bolesti, u pretransplantacijskoj pripremi provedene su terapijske plazmafereze. Transplantacija je protekla uredno, uz neposrednu produkciju urina nakon reperfuzije grafta. Uprkos očuvanoj postoperativnoj diurezi, nije došlo do očekivanog pada serumskog kreatinina. Svakodnevnim Color Doppler pregledima praćena je perfuzija grafta. Zbog perzistentne disfunkcije grafta, šestog postoperativnog dana učinjene su CT angiografija i ultrazvučno vođena biopsija. CT angiografijom nisu potvrđene značajne vaskularne komplikacije, dok je patohistološkim pregledom potvrđeno akutno celularno odbacivanje grafta. Nakon intenziviranja imunosupresivne terapije uslijedio je progresivan oporavak funkcije grafta, uz značajan pad serumskog kreatinina i bez potrebe za daljim hemodijaliznim tretmanima. Pacijent je otpušten kući dobrog opšteg stanja, uz očuvanu diurezu i nastavak redovnog nefrološkog praćenja.

Zaključak: Očuvana diureza ne isključuje ranu disfunkciju bubrežnog grafta. Izostanak očekivanog pada serumskog kreatinina zahtijeva pravovremenu i sistematsku dijagnostičku obradu, pri čemu biopsija grafta ima ključnu ulogu u postavljanju dijagnoze i usmjeravanju terapije [5]. Rano prepoznavanje disfunkcije, multidisciplinarni pristup i pravovremeno liječenje ključni su za povoljan ishod i očuvanje funkcije grafta.

Literatura:
1. Haq K, Yadav A, Mejia C. Approach to kidney allograft dysfunction: a brief review. Adv Kidney Dis Health. 2024;31(5):416–426. doi:10.1053/j.akdh.2024.06.002.
2. Tirtayasa PMW, Situmorang GR, Duarsa GWK, et al. Risk factors of delayed graft function following living donor kidney transplantation: a meta-analysis. Transpl Immunol. 2024;86:102094. doi:10.1016/j.trim.2024.102094.
3. Raina R, Jothi S, Haffner D, et al. Post-transplant recurrence of focal segmental glomerular sclerosis: consensus statements. Kidney Int. 2024;105(3):450–463. doi:10.1016/j.kint.2023.10.017.
4. Shan S, Li X, Zhang Y, Luo Z, Sun Q. Post-transplant recurrence of focal segmental glomerulosclerosis: circulating factors, molecular biomarkers, and treatments. Kidney Dis (Basel). 2025;11:560–583. doi:10.1159/000547336.
5. Naesens M, Roufosse C, Cornell LD, et al. The Banff 2024 Kidney Meeting Report: rejection as a spectrum of phenotypes and focus on differential diagnostic reasoning. Am J Transplant. 2026;26(5):922–936. doi:10.1016/j.ajt.2026.01.018.

DIAGNOSTIC CHALLENGE FOLLOWING KIDNEY TRANSPLANTATION

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Introduction: Early renal allograft function depends on numerous donor and recipient - related factors, ischaemia – reperfusion injury, haemodynamic status, and immunological and vascular complications [1,2]. Preserved urine output represents a favourable early sign but does not exclude allograft dysfunction. In patients with focal segmental glomerulosclerosis (FSGS), an additional diagnostic challenge is the possibility of recurrence of the underlying disease following transplantation [3,4].

Objective: To present the diagnostic and therapeutic approach to early renal graft dysfunction with preserved urine output following living - related kidney transplantation.

Case report: A 36-year - old male patient with end - stage renal disease caused by FSGS underwent living - related kidney transplantation after four months of chronic haemodialysis. His mother was the kidney donor. Nine years earlier FSGS was confirmed by kidney biopsy and was initially treated with corticosteroids. Five years later, corticosteroid therapy was discontinued due to suspected Alport syndrome. Because of the risk of recurrence of the underlying disease, therapeutic plasma exchange was performed as part of the pre - transplant preparation. The transplantation was performed without complications and with immediate urine production after graft reperfusion. Despite preserved postoperative urine output, the expected decrease in serum creatinine did not occur. Graft perfusion was monitored daily using colour Doppler ultrasonography. Due to persistent graft dysfunction, CT angiography and ultrasound - guided graft biopsy were performed on the sixth postoperative day. CT angiography did not show any significant vascular complications, while histopathological examination confirmed acute cellular rejection of the graft. Following adjustment of immunosuppressive therapy graft function gradually improved, with a significant decrease in serum creatinine and no need for further haemodialysis. The patient was
discharged in good general condition, with preserved urine output and was followed regularly by a nephrologist.

Conclusion: Preserved urine output does not exclude early renal graft dysfunction. Failure of serum creatinine to decrease as expected requires systematic diagnostic evaluation, with graft biopsy having an important role in establishing the diagnosis and guiding treatment [5]. Early recognition of graft dysfunction, a multidisciplinary approach, and early treatment are important for achieving a good outcome and preserving graft function.

References:
1. Haq K, Yadav A, Mejia C. Approach to kidney allograft dysfunction: a brief review. Adv Kidney Dis Health. 2024;31(5):416–426. doi:10.1053/j.akdh.2024.06.002.
2. Tirtayasa PMW, Situmorang GR, Duarsa GWK, et al. Risk factors of delayed graft function following living donor kidney transplantation: a meta-analysis. Transpl Immunol. 2024;86:102094. doi:10.1016/j.trim.2024.102094.
3. Raina R, Jothi S, Haffner D, et al. Post-transplant recurrence of focal segmental glomerular sclerosis: consensus statements. Kidney Int. 2024;105(3):450–463. doi:10.1016/j.kint.2023.10.017.
4. Shan S, Li X, Zhang Y, Luo Z, Sun Q. Post-transplant recurrence of focal segmental glomerulosclerosis: circulating factors, molecular biomarkers, and treatments. Kidney Dis (Basel). 2025;11:560–583. doi:10.1159/000547336.
5. Naesens M, Roufosse C, Cornell LD, et al. The Banff 2024 Kidney Meeting Report: rejection as a spectrum of phenotypes and focus on differential diagnostic reasoning. Am J Transplant. 2026;26(5):922–936. doi:10.1016/j.ajt.2026.01.018.

SPECIFIČNOSTI ANESTEZIJE ZA CITOREDUKTIVNU HIRURGIJU UZ HIPERTERMIJSKU INTRAPERITONEALNU HEMOTERAPIJU

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Uvod: Citoreduktivna hirurgija (CRS) uz hipertermijsku intraperitonealnu hemoterapiju (HIPEC) predstavlja složen terapijski pristup u liječenju peritonealne diseminacije intraabdominalnog maligniteta. CRS podrazumijeva opsežan hirurški zahvat, koji se izvodi prije HIPEC-a, otvorenim ili laparoskopskim pristupom, a obuhvata resekciju primarnog tumora, eksciziju svih drugih vidljivih tumorskih promjena, te prema potrebi: peritonektomiju, omentektomiju i resekciju crijeva. Nakon CRS slijedi HIPEC odnosno primjena zagrijanog citostatika, koji se infuzira u peritonealnu šupljinu, što dovodi do značajnih hemodinamskih, respiratornih, metaboličkih i termoregulacijskih promjena.

Cilj: Prikazati specifičnosti anesteziološkog zbrinjavanja pacijenata podvrgnutih CRS uz HIPEC, s posebnim osvrtom na perioperativni monitoring, održavanje hemodinamske stabilnosti, upravljanje volumenskim statusom, regulaciju tjelesne temperature i postoperativno liječenje.

Materijal i metode: Ovaj rad predstavlja pregled dostupne savremene literature i važećih preporuka o anesteziološkom zbrinjavanju pacijenata tokom CRS uz HIPEC s posebnim naglaskom na perioperativne izazove i organizacione aspekte uvođenja ove kompleksne procedure u kliničku praksu, s ciljem približavanja savremenih anesteziooloških principa centrima u kojima se ova metoda tek uvodi.

Diskusija: CRS uz HIPEC predstavlja jedan od najzahtjevnijih abdominalnih operativnih zahvata sa stanovišta anesteziologije. Tokom ove procedure dolazi do izraženih hemodinamskih oscilacija, značajnih gubitaka tečnosti i krvi, poremećaja acidobazne ravnoteže, elektrolitnih promjena i promjena tjelesne temperature. Primjena savremenih principa perioperativne medicine, naprednog hemodinamskog monitoringa, ciljane volumenske terapije, aktivne kontrole temperature, adekvatne transfuzijske strategije i multimodalne analgezije doprinosi smanjenju perioperativnih komplikacija i poboljšanju ishoda liječenja. Uspješno zbrinjavanje ovih pacijenata zahtijeva visok stepen koordinacije i blisku saradnju anesteziologa, hirurga, onkologa, perfuzionista i intenzivista.

Zaključak: Citoreduktivna hirurgija uz HIPEC predstavlja kompleksnu proceduru koja zahtijeva visok nivo anesteziološke stručnosti, kontinuirani monitoring i individualiziran pristup svakom pacijentu. Pravovremeno prepoznavanje i adekvatno liječenje perioperativnih fizioloških promjena ključni su za smanjenje komplikacija i poboljšanje postoperativnog oporavka. Kontinuirana edukacija, primjena standardizovanih protokola i multidisciplinarna saradnja predstavljaju osnovu sigurnog izvođenja ove zahtjevne procedure uz unapređenje kvaliteta liječenja pacijenata.

Ključne riječi: citoreduktivna hirurgija, hipertermijska intraperitonealna hemoterapija, preoperativna evaluacija, opšta anestezija, ciljano vođena terapija tečnostima, kontrola temperature, postoperativni oporavak.

Literatura:
1. Durnford S, Boss L, Bell J. Cytoreductive surgery and hypertermic intraperitoneal chemotherapy. BJA Education. 2021;21(5):187-193.
2. Karimi M, Shirsalimi N, Sedighi E. Challenges following CRS and HIPEC surgery in cancer patients with peritoneal metastasis: a comprehensive review of clinical outcomes. Front Surg. 2024; 11:1498529.
3. Ghabra S, Blakely AM, Mannes A, Miao N. HIPEC. In: Anesthesia for Oncological Surgery. Cham: Springer; 2023. p. 557-570.
4. Hübner M, Kusamura S, Villeneuve L, Al-Niaimi A, Alyami M, Balonov K, et al. Guidelines for perioperative care in cytoreductive surgery (CRS) with or without hyperthermic intraperitoneal chemotherapy (HIPEC): Enhanced Recovery After Surgery (ERAS®) Society recommendations—Part I: Preoperative and intraoperative management. Eur J Surg Oncol. 2020;46(12):2292-2310.
5. Hübner M, Kusamura S, Villeneuve L, Al-Niaimi A, Alyami M, Balonov K, et al. Guidelines for perioperative care in cytoreductive surgery (CRS) with or without hyperthermic intraperitoneal chemotherapy (HIPEC): Enhanced Recovery After Surgery (ERAS®) Society recommendations—Part II: Postoperative management and special considerations. Eur J Surg Oncol. 2020;46(12):2311-2323.

SPECIFIC ASPECTS OF ANESTHETIC MANAGEMENT FOR CYTOREDUCTIVE SURGERY COMBINED WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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Introduction: Cytoreductive surgery (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) represents a complex therapeutic approach in the treatment of peritoneal dissemination of intraabdominal malignancies. CRS involves an extensive surgical procedure performed prior to HIPEC, via an open or laparoscopic approach, and encompasses resection of the primary tumor, excision of all other visible tumor lesions, and, as required: peritonectomy, omentectomy, and bowel resection. CRS is followed by HIPEC, namely the administration of a heated cytostatic agent infused into the peritoneal cavity, which induces significant hemodynamic, respiratory, metabolic, and thermoregulatory alterations. **Objective:** To present the specific aspects of anesthetic management in patients undergoing CRS combined with HIPEC, with particular emphasis on perioperative monitoring, maintenance of hemodynamic stability, fluid volume management, core body temperature regulation, and postoperative care.

Material and Methods: This review examines the available contemporary literature and current guidelines regarding the anesthetic management of patients during CRS with HIPEC, emphasizing the perioperative challenges and organizational aspects of implementing this complex procedure into clinical practice, with the aim of introducing modern anesthetic principles to centers where this method is currently being established.

Discussion: CRS with HIPEC represents one of the most challenging abdominal surgical procedures from an anesthesia perspective. During this procedure, pronounced hemodynamic fluctuations, substantial fluid and blood losses, acid-base imbalances, electrolyte alterations, and body temperature alterations occur. The implementation of modern perioperative medicine principles, advanced hemodynamic monitoring, goal-directed fluid therapy, active temperature control, appropriate transfusion strategies, and multimodal analgesia contributes to reducing perioperative complications and improving treatment outcomes. Successful management of these patients requires a high degree of coordination and close collaboration among anesthesiologists, surgeons, oncologists, perfusionists, and intensivists.

Conclusion: Cytoreductive surgery combined with HIPEC is a complex procedure that demands a high level of anesthetic expertise, continuous monitoring, and an individualized approach to each patient. Timely recognition and appropriate management of perioperative physiological alterations are crucial for minimizing complications and enhancing postoperative recovery. Continuous education, the implementation of standardized protocols, and multidisciplinary collaboration form the foundation for the safe performance of this demanding procedure while improving the quality of patient care.

Keywords: cytoreductive surgery, hyperthermic intraperitoneal chemotherapy, preoperative evaluation, general anesthesia, goal-directed fluid therapy, temperature control, postoperative recovery.

References:

1. Durnford S, Boss L, Bell J. Cytoreductive surgery and hypertermic intraperitoneal chemotherapy. BJA Education. 2021;21(5):187-193.
2. Karimi M, Shirsalimi N, Sedighi E. Challenges following CRS and HIPEC surgery in cancer patients with peritoneal metastasis: a comprehensive review of clinical outcomes. Front Surg. 2024; 11:1498529.
3. Ghabra S, Blakely AM, Mannes A, Miao N. HIPEC. In: Anesthesia for Oncological Surgery. Cham: Springer; 2023. p. 557-570.
4. Hübner M, Kusamura S, Villeneuve L, Al-Niaimi A, Alyami M, Balonov K, et al. Guidelines for perioperative care in cytoreductive surgery (CRS) with or without hyperthermic intraperitoneal chemotherapy (HIPEC): Enhanced Recovery After Surgery (ERAS®) Society recommendations—Part I: Preoperative and intraoperative management. Eur J Surg Oncol. 2020;46(12):2292-2310.
5. Hübner M, Kusamura S, Villeneuve L, Al-Niaimi A, Alyami M, Balonov K, et al. Guidelines for perioperative care in cytoreductive surgery (CRS) with or without hyperthermic intraperitoneal chemotherapy (HIPEC): Enhanced Recovery After Surgery (ERAS®) Society recommendations—Part II: Postoperative management and special considerations. Eur J Surg Oncol. 2020;46(12):2311-2323.

ODRŽAVANJE DIŠNOG PUTA KOD OZLJEDE JEZIČNE KOSTI-PRIKAZ SLUČAJA

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Uvod: Hioidna kost, odnosno jezična kost, je pokretna kost u obliku slova U, smještena u prednjem dijelu vrata u razini trećeg vratnog kralješka (C3), u kutu između donje čeljusti i štitne hrskavice.1

Primarna funkcija joj je osiguravanje hvatišta za jezik, grkljan i ždrijelo. Zbog svoje morfologije i položaja među ostalim anatomskim strukturama vrata, povezana je ne samo s proizvodnjom glasa i jasno artikuliranim ljudskim govorom, već i s nesmetanom funkcijom dišnog puta te, moguće i s normalnim procesom gutanja.2

Cilj rada: Predstaviti ozljedu jezične kosti, s naglaskom na njenu mogućnost kompromitiranja dišnog puta, uz prikaz tipične kliničke prezentacije u bolesnika liječenog na našem Odsjeku. Koristeći ga kao primjer namjeravamo prezentirati najnovija saznanja i smjernice u inicijalnom zbrinjavanju bolesnika s ovom patologijom.

Prikaz slučaja: Predstavit ćemo bolesnika u dobi od 24 godine koji je zadobio ozljede glave, vrata i toraksa u prometnoj nesreći u kojoj je sudjelovao kao motociklist bez zaštitne opreme. Zadobio je ozljede viscerokranija i torakalne kralježnice te SAH.

Pri prijemu u Centar urgentne medicine disao je spontano i bio stabilnih vitalnih parametara no poremećena stanja svijesti do razine kome. Odmah je intubiran postupkom brzog slijeda, bez komplikacija.

Učinjenom radiološkom dijagnostikom, odnosno CT-om cijelog tijela, uz ostale ozljede utvrđena je i fraktura jezične kosti.

Učinjen je MSCT vrata na kojem se verificira u području farinksa i gornjeg dišnog puta, kranijalno od balončića endotrahealnog tubusa, opsežan heterogeni hematom s manjim inkluzijama zraka, koji gotovo u cijelosti ispunjava lumen i uzrokuje izraženu kompresiju gornjeg dišnog puta. Velike krvne žile vrata bile su slobodne. Inspekcijski vrat je bio uredan.

S obzirom na opsežan hematom ždrijela s izraženom kompresijom gornjeg dišnog puta, teško neurološko stanje bolesnika te očekivanu potrebu za dugotrajnom mehaničkom ventilacijom, donesena je odluka o ranoj elektivnoj kirurškoj traheotomiji.

Unutar sat vremena od prijema učinjena je dekompresivna kraniotomija potom evakuiran hematom i plasirana sonda za mjerenje intrakranijskog tlaka putem koje u realnom vremenu dobijamo podatke ključne za daljnje liječenje bolesnika u jedinici intenzivnog liječenja3.

Zaključak: Ovim prikazom slučaja želimo istaknuti važnost ranog prepoznavanja frakture jezične kosti i njezinih mogućih komplikacija. Pravodobnim prepoznavanjem ozljede i pomnim praćenjem bolesnika moguće je spriječiti iznenadnu kompromitaciju dišnog puta, koja može imati katastrofalne posljedice.4 Posebnu vrijednost ovom prikazu daje činjenica da je riječ o iznimno rijetkoj ozljedi.

Reference:
1. Alwasiyah BM, Aljehani ZH, Farag NH. A rare isolated hyoid bone fracture: a case report and review of the literature. Cureus. 2023;15(4):e37165. doi:10.7759/cureus.37165.
2. Angoules AG, Boutsikari EC. Traumatic hyoid bone fractures: rare but potentially life threatening injuries. Emerg Med. 2013;3:e128. doi:10.4172/2165-7548.1000e128.
3. Sauvigny T, Göttsche J, Czorlich P, Vettorazzi E, Westphal M, Regelsberger J. Intracranial pressure in patients undergoing decompressive craniectomy: new perspective on thresholds. J Neurosurg. 2018 Mar;128(3):819-827.
4. Kaufman HJ, Ciraulo DL, Burns RP. Traumatic fracture of the hyoid bone: three case presentations of cardiorespiratory compromise secondary to missed diagnosis. Am Surg. 1999;65(9):877-880.

AIRWAY MANAGEMENT IN HYOID BONE INJURY – A CASE REPORT

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Introduction: The hyoid bone is a U-shaped mobile bone situated in the anterior portion of the neck at the level of the C3 vertebra, in the angle between the mandible and the thyroid cartilage.1

The primary function of hyoid bone is to provide attachment to the tongue, the larynx and the pharynx. Because of its morphology and its position amongst the other anatomical structures of the neck, it is associated not only with the sound production and the fully articulate human speech, but also with the smooth function of the airway and possibly with the normal swallowing.2

The aim of the work: To present an injury of the hyoid bone, with particular emphasis on its potential to compromise the airway, through a case presentation of a patient treated at our department. Using this case as an example, we aim to present the latest knowledge and current recommendations regarding the initial management of patients with this pathology.

Case report: We present the case of a 24-year-old patient who sustained head, neck, and thoracic injuries in a road traffic accident while riding a motorcycle without protective equipment. He sustained viscerocranial and thoracic spine injuries, as well as subarachnoid hemorrhage (SAH).

Upon admission to the Emergency Medicine Center, the patient was breathing spontaneously and had stable vital signs; however, his level of consciousness was severely impaired, with progression to coma. He was immediately intubated using a rapid sequence intubation technique, without complications.

Whole-body computed tomography (CT) performed as part of the radiological assessment revealed, among other injuries, a fracture of the hyoid bone.

A MSCT of the neck demonstrated an extensive heterogeneous hematoma in the pharyngeal and upper airway region, cranial to the cuff of the endotracheal tube, with small air inclusions. The hematoma almost completely occupied the lumen and caused marked compression of the upper airway. The major cervical blood vessels were patent. On inspection, the neck appeared unremarkable.

Given the extensive pharyngeal hematoma with significant upper airway compression, the patient's severe neurological condition, and the anticipated need for prolonged mechanical ventilation, the decision was made to perform an early elective surgical tracheostomy.

Within one hour of admission, a decompressive craniotomy was performed, followed by evacuation of the hematoma and placement of an intracranial pressure monitoring probe, providing real-time data essential for further management of the patient in the intensive care unit.[3]

Conclusion: With this case report, we aim to emphasize the importance of early recognition of hyoid bone fractures and their potential complications. Timely identification of the injury and close monitoring of the patient may prevent sudden airway compromise, which can have catastrophic consequences.[4] The particular value of this case report lies in the fact that it describes an extremely rare injury.

References:
1. Alwasiyah BM, Aljehani ZH, Farag NH. A rare isolated hyoid bone fracture: a case report and review of the literature. Cureus. 2023;15(4):e37165. doi:10.7759/cureus.37165.
2. Angoules AG, Boutsikari EC. Traumatic hyoid bone fractures: rare but potentially life threatening injuries. Emerg Med. 2013;3:e128. doi:10.4172/2165-7548.1000e128.
3. Sauvigny T, Göttsche J, Czorlich P, Vettorazzi E, Westphal M, Regelsberger J. Intracranial pressure in patients undergoing decompressive craniectomy: new perspective on thresholds. J Neurosurg. 2018 Mar;128(3):819-827.
4. Kaufman HJ, Ciraulo DL, Burns RP. Traumatic fracture of the hyoid bone: three case presentations of cardiorespiratory compromise secondary to missed diagnosis. Am Surg. 1999;65(9):877-880.

STAFILOKOKNI SINDROM OPEČENE KOŽE KOD ADOLESCENTKINJE SA POLITRAUMOM: PRIKAZ SLUČAJA

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Uvod: Stafilokokni sindrom opečene kože (SSSS) je rijetka, teška eksfolijativna dermatološka bolest uzrokovana epidermolitičkim toksinima bakterije Staphylococcus aureus. Iako se prvenstveno javlja kod novorođenčadi i male djece, u izuzetno rijetkim slučajevima može se razviti i kod odraslih i adolescenata, naročito u stanjima teške imunosupresije, sistemske infekcije i politraume.

Cilj rada: Prikazati rijedak slučaj razvoja SSSS-a uzrokovanog MRSA bakterijemijom kod adolescentkinje sa teškom politraumom u jedinici intenzivnog liječenja.

Materijal i metode: Prikaz slučaja 17-godišnje pacijentkinje sa teškom politraumom nastalom u saobraćajnoj nesreći (kraniofacijalne povrede, kontuzija pluća, prelomi ekstremiteta). Analizirani su klinički tok, dijagnostičke procedure, mikrobiološki nalazi i primijenjeni terapijski protokoli.

Rezultat rada i diskusija: Tokom hospitalizacije u jedinici intenzivnog liječenja, u sklopu teškog opšteg stanja i sepsa-like sindroma, dolazi do pojave difuznog eritema kože, stvaranja bula i pozitivnog Nikolsky znaka sa ekstenzivnim ljuštenjem epiderma. Iz hemokulture je izolovan meticilin-rezistentni Staphylococcus aureus (MRSA). Odmah je započeta ciljana parenteralna antibiotska terapija (vancomycin), uz suportivnu terapiju, obradu opekotinskih površina, analgosedaciju i nadoknadu tečnosti i elektrolita. Primjenom agresivnog multidisciplinarnog pristupa postignuta je stabilizacija pacijentkinje, sanacija bakterijemije i postepena epitelizacija kože bez posljedica.

Zaključak: SSSS kod adolescentkinje sa politraumom predstavlja izuzetno dijagnostički i terapijski izazovno stanje. Rano prepoznavanje karakterističnih promjena na koži, brza mikrobiološka identifikacija MRSA bakterijemije i urgentno uvođenje adekvatne antibiotske i suportivne terapije ključni su za povoljan ishod i sprečavanje fatalnih komplikacija.

Literatura:
1. Ladhani S, et al. Clinical spectrum of staphylococcal scalded skin syndrome. Arch Dis Child. 2002;87(6):536-539.
2. Mishra AK, et al. Staphylococcal scalded skin syndrome in an adult: A case report and review of literature. BMJ Case Rep. 2016;2016:bcr2016216405.
3. Bukowski JA, et al. Exfoliative toxins of Staphylococcus aureus. Toxins (Basel). 2010;2(5):1148-1165.
4. Trainer H, et al. Staphylococcal scalded skin syndrome in systemic compromise. J Intensive Care Med. 2018;33(4):220-225.
5. Patel GK, et al. Management of MRSA bacteremia and severe skin complications in trauma patients. Crit Care Med. 2020;48(2):185-192.

STAPHYLOCOCCAL SCALDED SKIN SYNDROME IN AN ADOLESCENT FEMALE PATIENT WITH POLYTRAUMA: A CASE REPORT

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Introduction: Staphylococcal scalded skin syndrome (SSSS) is a rare, severe exfoliative dermatological condition caused by epidermolytic toxins produced by Staphylococcus aureus. Although predominantly observed in neonates and young children, it can extremely rarely develop in adults and adolescents, particularly in settings of severe immunosuppression, systemic infection, and severe polytrauma.

Aim: To present a rare case of SSSS induced by MRSA bacteremia in an adolescent female patient with severe polytrauma admitted to the intensive care unit.

Material and Methods: A case report of a 17-year-old female patient with severe polytrauma resulting from a traffic accident (craniofacial injuries, pulmonary contusion, limb fractures). The clinical course, diagnostic procedures, microbiological findings, and therapeutic protocols were analyzed.

Results and Discussion: During ICU hospitalization, amidst a critical general condition and a sepsis-like syndrome, the patient developed diffuse skin erythema, bullae formation, and a positive Nikolsky sign with extensive epidermal desquamation. Methicillin-resistant Staphylococcus aureus (MRSA) was isolated from blood cultures. Targeted parenteral antibiotic therapy (vancomycin) was immediately initiated alongside supportive care, meticulous wound/burn care management, analgosedation, and fluid/electrolyte balance maintenance. Through an aggressive multidisciplinary approach, patient stabilization, clearance of bacteremia, and gradual skin re-epithelialization without scarring were achieved.

Conclusion: SSSS in an adolescent polytrauma patient represents an exceptionally challenging condition in terms of diagnosis and treatment. Early recognition of characteristic skin lesions, prompt microbiological identification of MRSA bacteremia, and immediate administration of appropriate targeted antibiotics and supportive care are essential for a favorable outcome and prevention of fatal complications.

References:
1. Ladhani S, et al. Clinical spectrum of staphylococcal scalded skin syndrome. Arch Dis Child. 2002;87(6):536-539.
2. Mishra AK, et al. Staphylococcal scalded skin syndrome in an adult: A case report and review of literature. BMJ Case Rep. 2016;2016:bcr2016216405.
3. Bukowski JA, et al. Exfoliative toxins of Staphylococcus aureus. Toxins (Basel). 2010;2(5):1148-1165.
4. Trainer H, et al. Staphylococcal scalded skin syndrome in systemic compromise. J Intensive Care Med. 2018;33(4):220-225.
5. Patel GK, et al. Management of MRSA bacteremia and severe skin complications in trauma patients. Crit Care Med. 2020;48(2):185-192.

PRIKAZ SLUČAJA: ANESTEZIOLOŠKI PRISTUP U LIJEČENJU NEUROBLASTOMA NADBUBREŽNE ŽLIJEZDE

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Neuroblastom je tip raka koji nastaje iz nezrelih nervnih ćelija, najčešće u jednoj od nadbubrežnih žlijezda. Javlja se uglavnom kod djece, u 90% slučajeva kod djece ispod pet godina. Tretman obuhvata opservaciju, operativni zahvat, radijacijsku terapiju, hemoterapiju, i transplantaciju matičnih ćelija, te zahtijeva multidisciplinarni pristup. Među tim disciplinama je anesteziologija, koja je ključna za čitav proces, od dijagnoze, operativnog zahvata, do terapije bola. Anesteziološki pristup zavisi od lokacije tumora i vrste operativnog zahvata. Ključno je uzeti u obzir i fiziopatološke promjene uzrokovane tumorom, hemoterapijom, kao i odgovor pacijentovih ostalih fizioloskih sistema. Detaljna priprema je obavezna kako bi se umanjio rizik, kako pri hirurškom zahvatu, tako i postoperativno. U ovom prikazu, prezentuje se slučaj pacijenta muškog spola, dobi 1,8 godina, koji biva primljen u Kliniku za dječije bolesti zbog blijedila, uvećanog stomaka i povišene temperature. Obavlja se hematološka, mikrobiološka, imunološka i slikovna obrada. Ultrazvukom abdomena se verifikuje tumorska masa suspektna na tumor nadbubrega. Započinje onkološka obrada, planiraju se specifični tumor markeri, Neuron specifična enalaza uz vanilmandeličnu, homovaniličnu kiselinu uz kateholamine u dvadesetčetverosatnom urinu. Rezultati pokazuju da je Neuron specifična enalaza jako povećana (>740), a specifični tumor marker i laktat-dehidrogenaza enormno povišeni. Radi se radiološka evaluacija u svrhu razmatranja proširenosti bolesti, a zatim i konsultacija sa dječijim hirurgom, kada se planira dijagnostička biopsija tumora. Patohistološka dijagnoza verifikuje neuroblastom gradus IV. Radi se cjelokupna obrada pacijenta uz korigovanje hematoloških i biohemijskih nalaza. Po kompletiranju obrade, odlukom Onkološkog konzilija započinje se hemoterapija po protokolu HR-NBL-1.7/SIOPEN 2014. Nakon verifikacije odgovora na realizovanu terapiju, planira se operativni tretman i pripremu za autolognu transplantaciju matičnih ćelija hematopoeze. U sklopu pripreme, načinjena je i magnetna rezonanca u anesteziji, koja pokazuje perzistirajuću leziju ishodišta desne nadbubrežne žlijezde. Pacijent biva pregledan od strane anesteziologa. Urađen je operativni zahvat koji podrazumijeva obostranu subkostalnu laparatomiu, ekstirpaciju tumorskog tkiva, nefrektomiju desno i apendektomiju.

Ključne riječi: neuroblastoma, pedijatrijska anestezija, perioperativno zbrinjavanje, hirurško liječenje, hemoterapija, autologna transplantacija matičnih ćelija.

CASE REPORT: ANESTHESIOLOGICAL APPROACH TO THE TREATMENT OF ADRENAL NEUROBLASTOMA

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Neuroblastoma is a type of cancer arising from immature nerve cells, most commonly in one of the adrenal glands. It primarily affects children, with approximately 90% of cases occurring in children under five years of age. Treatment includes observation, surgery, radiotherapy, chemotherapy, and stem cell transplantation, requiring a multidisciplinary approach. Anesthesiology is an essential part of this process, from diagnosis and surgery to pain management. The anesthetic approach depends on tumor location and the type of surgical procedure. It is also crucial to consider pathophysiological changes caused by the tumor and chemotherapy, as well as the patient's overall physiological response. Detailed preoperative preparation is mandatory to minimize perioperative and postoperative risks. Presented here is the case of a 1.8-year-old male patient admitted to the Pediatric Clinic due to pallor, abdominal distension, and fever. Hematological, microbiological, immunological, and imaging investigations were performed. Abdominal ultrasound revealed a tumor mass suspicious for an adrenal tumor. Oncological evaluation was initiated, including measurement of specific tumor markers: neuron-specific enolase, vanillylmandelic acid, homovanillic acid, and catecholamines in 24-hour urine. NSE was markedly elevated (>740), while the specific tumor marker and lactate dehydrogenase were also significantly elevated. Radiological evaluation was performed to assess disease extent, followed by consultation with a pediatric surgeon, and tumor biopsy was planned. Histopathological examination confirmed grade IV neuroblastoma. After correction of hematological and biochemical abnormalities and completion of the diagnostic workup, chemotherapy was initiated according to the HR-NBL-1.7/SIOPEN 2014 protocol. Following assessment of treatment response, surgical treatment and preparation for autologous hematopoietic stem cell transplantation were planned. As part of the preparation, MRI under anesthesia demonstrated a persistent lesion originating from the right adrenal gland. The patient was assessed by an anesthesiologist and underwent bilateral subcostal laparotomy, tumor excision, right nephrectomy, and appendectomy.

Key words: neuroblastoma, pediatric anesthesia, perioperative management, surgical treatment, chemotherapy, autologous hematopoietic stem cell transplantation.

MULTIDISCIPLINARNO INTENZIVNO LIJEČENJE PACIJENTICE NAKON BILATERALNE NEFREKTOMIJE: PRIKAZ SLUČAJA

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Uvod: Pacijenti bez funkcionalnog bubrežnog parenhima predstavljaju poseban izazov u intenzivnoj medicini zbog potpune zavisnosti od nadomjesne bubrežne terapije, visokog rizika od poremećaja volumena, elektrolita i acidobazne ravnoteže, infekcije te respiratornih komplikacija. Prikazujemo kompleksan tok liječenja pacijentice nakon hitne nefrektomije jedinog preostalog bubrega.

Cilj rada: Prikazati značaj kontinuiranog intenzivnog nadzora, individualizirane dijalizne strategije i multidisciplinarnog pristupa kod pacijentice sa sepsom, bilateralnom nefrektomijom i ponavljanim epizodama respiratorne insuficijencije.

Prikaz slučaja: Analiziran je klinički tok 48-godišnje pacijentice prethodno podvrgnute lijevoj nefrektomiji, primljene zbog sepse i akutne renalne insuficijencije usljed emfizematoznog pijelonefritisa jedinog desnog bubrega. Zbog pogoršanja stanja učinjena je hitna desna nefrektomija sa drenažom. Praćeni su respiratorni i hemodinamski status, laboratorijski i radiološki nalazi, potreba za mehaničkom ventilacijom/HFOT te modaliteti nadomjesne bubrežne terapije.

Diskusija: Postoperativno je pacijentica liječena u OIT-u uz invazivnu ventilaciju, potom HFOT i serijske hemodijalizne/HDF tretmane. Tok je bio obilježen ponovnim prijemima zbog respiratorne insuficijencije, hipervolemije, pleuralnih izljeva i infiltrativnih plućnih promjena, uz potrebu za učestalim ultrafiltracijama. Razvile su se i opsežne kožne promjene, zbog čega je provedena multidisciplinarna obrada i prilagođena antimikrobna terapija. CT toraksa, abdomena i karlice isključio je značajnu kolekciju koja bi zahtijevala novu hiruršku intervenciju. Postepenom optimizacijom volumenskog statusa, respiratorne potpore i terapije postignuta je hemodinamska i respiratorna stabilizacija.

Zaključak: Kod pacijenata nakon bilateralne nefrektomije kliničko stanje može brzo oscilirati prvenstveno zbog promjena volumenskog statusa, infekcije i respiratornih komplikacija. Pravovremena dijaliza sa ciljanim uklanjanjem tečnosti, intenzivni monitoring i koordinacija anesteziologa-intenziviste, nefrologa, urologa, infektologa, dermatologa i drugih specijalnosti ključni su za povoljan ishod.

Ključne riječi: bilateralna nefrektomija; intenzivna terapija; hemodijaliza; respiratorna insuficijencija; sepsa

MULTIDISCIPLINARY INTENSIVE CARE AFTER BILATERAL NEPHRECTOMY: A CASE REPORT

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Introduction: Patients without functional renal parenchyma pose a major challenge in intensive care because of complete dependence on renal replacement therapy and a high risk of volume, electrolyte, acid-base, infectious, and respiratory complications. We present the complex course of a patient after emergency nephrectomy of her only remaining kidney.

Aim: To demonstrate the importance of continuous intensive monitoring, individualized dialysis strategy, and a multidisciplinary approach in a patient with sepsis, bilateral nephrectomy, and recurrent episodes of respiratory failure.

Case report: We analyzed the clinical course of a 48-year-old woman with a previous left nephrectomy who was admitted with sepsis and acute renal failure caused by emphysematous pyelonephritis of the solitary right kidney. Clinical deterioration required emergency right nephrectomy with drainage. Respiratory and hemodynamic status, laboratory and radiological findings, need for mechanical ventilation/high-flow oxygen therapy (HFOT), and renal replacement modalities were followed.

Discussion: Postoperatively, the patient was treated in the ICU with invasive mechanical ventilation followed by HFOT and serial hemodialysis/hemodiafiltration sessions. The course was complicated by recurrent ICU admissions for respiratory failure, hypervolemia, pleural effusions, and pulmonary infiltrative changes, requiring frequent ultrafiltration. Extensive skin lesions also developed, prompting multidisciplinary evaluation and adjustment of antimicrobial therapy. CT of the chest, abdomen, and pelvis excluded a significant collection requiring further surgery. Gradual optimization of volume status, respiratory support, and medical therapy resulted in hemodynamic and respiratory stabilization.

Conclusion: After bilateral nephrectomy, clinical status may fluctuate rapidly, particularly because of changes in volume status, infection, and respiratory complications. Timely dialysis with targeted fluid removal, intensive monitoring, and coordinated management by intensivists, nephrologists, urologists, infectious disease specialists, dermatologists, and other disciplines are essential for a favorable outcome.

Keywords: bilateral nephrectomy; intensive care; hemodialysis; respiratory failure; sepsis

TRETMAN PACIJENTICE SA POLITRAUMATSKIM POVREDAMA, PRIKAZ SLUČAJA

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Uvod: Politrauma je istodobno oštećenje najmanje dvaju organskih sistema ili anatomskih regija, pri čemu barem jedna ozljeda ili kombinacija više njih izravno ugrožava život.
Zbrinjavanje politraume zahtijeva multidisciplinaran timski pristup, rano prepoznavanje teških tjelesnih povreda te primjenu savremenih protokola, prema smjernicama ATLS
(advanced trauma life suport) i ABCDE protokola za prepoznavanje po život opasnih stanja.
Politrauma je jedan od vodećih uzroka smrtnosti i invaliditeta.

Prikaz slučaja: Pacijentica u dobi od trinaest godina dovezena je kolima HMP u KUM KCUS-a zbog višestrukih povreda zadobijenih u saobraćajnoj nesreći sa vozom u kojoj je učestvovala kao pješak. Na KUM-u KCUS-a pacijentica je teškog opšteg stanja bez svijesti, reaguje na bolne draži, respiratorno i hemodinamski relativno stabilna. Hitno se pozove se anesteziolog koji uz blagu sedaciju intubira pacijenticu i mehanički ventilira, ordinira se adekvatna terapija, uradi se laboratorija i CT dijagnostika po protokolu za politraume. Nakon hitnih konzilijarnih pregleda (ljekar urgentne medicine, anesteziolолog, dječiji hirurg, pedijatar, neurohirurg, torakalni hirurg) indiciran je prijem u jedinicu intenzivne medicine Klinike za neurohirurgiju i hitni operativni zahvat od strane neurohirurga i dječijeg hirurga koji se i urade u neurohirurškoj operacionoj sali. Potom se pacijentica intubirana,sedirana, ventilirana portabilnim respiratorom u pratnji anesteziologa proslijedi u JIT Klinike za anesteziju i reanimaciju radi nastavka KMV uz analgosedaciju, monitoringa vitalnih parametara i intenzivnog reanimacionog tremana. Dugotrajan intenzivan anesteziološki tretman uz adekvatnu terapiju i multidisciplinarne konzilijarne preglede uz redovnu kontrolnu dijagnostiku(CT, UZV, RTG) rezultiralo je postepenim oporavkom te ekstubacijom pacijentice i premještajem na Kliniku za ortopediju radi saniranja ortopedskih povreda a potom i fizikalna rehabilitacija pacijentice.

Zaključak: Zbog složenosti samih povreda, kao i zbog nedovoljno objašnjenih odgovora organizma na samu traumu i na terapijske postupke, jedno je od najsloženijih u savremenoj medicini. Osnovni princip liječenja politraume jeste da započinje na mjestu nezgode, traje tokom transporta i nastavlja se u urgentnom centru (tokom dijagnostike i terapijskih postupaka, multidisciplinarnih pregleda) u zavisnosti od opšteg stanja pacijenta, sve do konačnog zbrinjavanja pacijenta u jedinicama intenzivne terapije uz neodložne hitne operativne zahvate, ukoliko je pacijent vitalno ugrožen.

Važnost anesteziologa je neprocjenjiva.

Ključne riječi, politrauma, trijaža, protokoli, timski rad, terapija...

SUBDURALNI HEMATOM - PRIKAZ SLUČAJA

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Uvod: Subduralni hematom je nakupina krvi između mozga i tvrde moždane ovojnice. Ima polumjesečastu formu jer se krv slobodno širi preko konveksiteta mozga. Može biti akutni, subakutni i hronični. Akutni hematom sastoji se od koagulirane krvi a razvija se unutar 24 h od povrede. Nastaje kao posljedica povrede glave ili iz rupturiranih mostnih vena i najčešće se javlja kod pacijenata koji koriste antikoagulantnu terapiju.

Ako je akutni subduralni hematom debljine od 10 mm i više sa pomakom MSS preko 5 mm, mora biti hirurški evakuiran bez obzira na GCS pacijenta.

Hronični subduralni hematom nastaje 21 ili više dana od povrede, a prati ga postojanje tečne krvi, kolikvirane krvi koja je učahurena. 4 A, AGE, atrofija,alkohol, antikoagulansi.

Klinički su prisutni znaci povišenog ICP, fokalni neurodeficiti (hemipareza, disfazija), progresivne dementne promjene.

Prikaz slučaja: Pacijent u dobi od 50 godina, EA, zbog pogoršanja stanja svijesti hitno spusten u operacionu neurohiruršku salu (a nakon CT dijagnostike i hitne preoperativne pripreme) a radi kraniotomije i evakuacije subduralnog hematoma. Uvidom u historiju bolesti, pacijent koristi antikoagulantnu terapiju (tikagrelol i aspirin) već četiri mjeseca a nakon prelezanog infarkta miokarda i plasiranja jednog stenta.

Pacijent navodno pao u kući, nakon kratkotrajnog, iznenadnog gubitka svijesti
dovezen kolima HMP U Opću bolnicu a potom nakon primarne obrade i dijagnostike poslan u KCUS. Postoperativno pacijent svjestan, komunikativan, stabilnih vitalnih parametara, kratkotrajno zadržan u intenzivnoj njezi, potom proslijeđen na odjel radi rehabilitacije i otpušten kući bez neurološkog deficita.

Zaključak: Vaznost adekvatnog prepoznavanja i dijagnostikovanja subduralnog hematoma te pravovremenog operativnog zahvata moze smanjiti neurološke deficite kod pacijenata a samim tim i smrtni ishod.
Adekvatno titriranje doza antikoagulantne terapije kod kardioloških i kardiohirurških pacijenata moze uticati na smanjenje pojave hroničnog subduralnog hematoma.
Vaznost anesteziologa prije, u toku i poslije operativnih zahvata je neprocjenjiva.

Ključne riječi: subduralni hematom, povreda mozga, antikoagulansi, timski rad, terapija..

ANESTEZIOLOŠKI PRISTUP U TRANSPLANTACIJI BUBREGA – ISKUSTVO JEDNOG CENTRA

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Uvod: Transplantacija bubrega predstavlja zlatni standard liječenja terminalne hronične bubrežne bolesti. Uspjeh transplantacije ne zavisi samo od hirurške tehnike i kvaliteta grafta, već i od adekvatnog intraoperativnog anesteziološkog vođenja. Osnovni ciljevi anesteziološkog zbrinjavanja su održavanje hemodinamske stabilnosti, adekvatne perfuzije grafta, optimalne nadoknade tečnosti i normotermije (1,2).

Cilj: Prikazati iskustvo našeg centra u intraoperativnom anesteziološkom zbrinjavanju pacijenata podvrgnutih transplantaciji bubrega.

Materijal i metode: Retrospektivno su analizirani podaci pacijenata podvrgnutih transplantaciji bubrega u periodu od 17. aprila 2024. do 29. jula 2026. godine. Analizirani su demografski podaci recipijenata, tip transplantacije i osnovni elementi anesteziološkog pristupa.

Rezultati: U analiziranom periodu izvedeno je ukupno 35 transplantacija bubrega, od čega 15 živih srodnih, 5 živih nesrodnih i 15 kadaveričnih transplantacija. Od ukupnog broja recipijenata, 31 (88,6%) bili su muškarci, a 4 (11,4%) žene, prosječne starosti 46 godina. Anesteziološki pristup uključivao je invazivni hemodinamski monitoring (arterijska linija i centralni venski kateter), održavanje adekvatne perfuzije transplantiranog bubrega kroz stabilnu hemodinamiku, održavanje srednjeg arterijskog pritiska, adekvatne tjelesne temperature te pažljivo prilagođenu nadoknadu tečnostima. Posebna pažnja posvećena je periodu reperfuzije grafta uz primjenu manitola, furosemida i verapamila prema protokolu centra, dok su vazopresori primjenjivani prema kliničkoj potrebi (3,4). Kod svih pacijenata postignuta je uredna funkcija grafta u neposrednom postoperativnom periodu.

Zaključak: Važan faktor uspješne transplantacije bubrega predstavlja optimalno anesteziološko zbrinjavanje zasnovano na invazivnom monitoringu, održavanju hemodinamske stabilnosti, adekvatnoj perfuziji grafta i pažljivo titriranoj nadoknadi tečnosti. Naše iskustvo potvrđuje da su adekvatno anesteziološko vođenje, optimalna nadoknada tečnosti i multidisciplinarna saradnja ključni faktori uspješnog ishoda transplantacije bubrega (1-5).

Ključne riječi: transplantacija bubrega, anestezija, reperfuzija, hemodinamika, graft

Literatura:
1. Kim H, Jung H. Considerations regarding anesthesia for renal transplantation. Anesth Pain Med. 2024;19(1):5-11.
2. Goyal VK, Shekhrajka P, Mittal S, et al. Perioperative considerations in kidney transplantation: An anaesthesiologist's perspective. World J Transplant. 2025;15(4):107662.
3. Collange O, Mertes PM. Hemodynamic Management During Kidney Transplantation. Transplant Proc. 2021;53(5):1450-1453.
4. Wagener G, Bezinover D, Wang C, et al. Fluid Management During Kidney Transplantation: A Consensus Statement... Transplantation. 2021;105(8):1677-1684.
5. Goyal VK, Shekhrajka P, Bhargava SK, Mittal S. Perioperative fluid management in kidney transplantation: What's new and future directives? World J Nephrol 2026; 15(1): 113474

ANESTHESIOLOGICAL APPROACH TO KIDNEY TRANSPLANTATION – A SINGLE - CENTER EXPERIENCE

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Introduction: Kidney transplantation is the gold standard treatment for end-stage chronic kidney disease. The success of transplantation depends not only on surgical technique and graft quality, but also on adequate intraoperative anesthetic management. The main goals of anesthetic care are the maintenance of hemodynamic stability, adequate graft perfusion, optimal fluid management,, and normothermia (1,2).

Objective: To present our center's experience in intraoperative anesthetic management of patients undergoing kidney transplantation.

Materials and Methods: A retrospective analysis was performed on patients who underwent kidney transplantation between April 17, 2024, and July 29, 2026. Recipient demographic characteristics, type of transplantation, and the main elements of the intraoperative anesthetic approach were analyzed.

Results: During the study period, a total of 35 kidney transplantations were performed, including 15 living-related, 5 living-unrelated, and 15 deceased-donor transplantations. Of all recipients, 31 (88.6%) were male and 4 (11.4%) were female, with a mean age of 46 years. The anesthetic approach included invasive hemodynamic monitoring (arterial line and central venous catheter), maintenance of adequate graft perfusion through stable hemodynamics, preservation of mean arterial pressure, normothermia, and carefully individualized fluid therapy. Special attention was paid to the graft reperfusion period, during which mannitol, furosemide, and verapamil were administered according to the institutional protocol, while vasopressors were used as clinically indicated (3,4). Immediate postoperative graft function was achieved in all patients.

Conclusion: Optimal anesthetic management based on invasive monitoring, maintenance of hemodynamic stability, adequate graft perfusion, and carefully titrated fluid therapy is an important factor in successful kidney transplantation. Our experience confirms that appropriate anesthetic management, optimal fluid management, and multidisciplinary collaboration are key determinants of favorable outcomes in kidney transplantation (1–5).

Keywords: kidney transplantation, anesthesia, reperfusion, hemodynamics, graft.

Literatura:

1. Kim H, Jung H. Considerations regarding anesthesia for renal transplantation. Anesth Pain Med. 2024;19(1):5-11.
2. Goyal VK, Shekhrajka P, Mittal S, et al. Perioperative considerations in kidney transplantation: An anaesthesiologist's perspective. World J Transplant. 2025;15(4):107662.
3. Collange O, Mertes PM. Hemodynamic Management During Kidney Transplantation. Transplant Proc. 2021;53(5):1450-1453.
4. Wagener G, Bezinover D, Wang C, et al. Fluid Management During Kidney Transplantation: A Consensus Statement... Transplantation. 2021;105(8):1677-1684.
5. Goyal VK, Shekhrajka P, Bhargava SK, Mittal S. Perioperative fluid management in kidney transplantation: What's new and future directives? World J Nephrol 2026; 15(1): 113474

LOW-FLOW ANESTEZIJA KOD HEMODINAMSKI NESTABILNOG PACIJENTA SA MASIVNIM GASTROINTESTINALNIM KRVARENJEM – PRIKAZ SLUČAJA

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Uvod: Low-flow flow anestezija se definiše kao inhalaciona anestezиološka tehnika koja se izvodi putem kružnog sistema sa protokom svježeg gasa koji je značajno niži od minutnog volumena, uz očuvanje adekvatnih uslova za sigurnu primjenu opće anestezije. Njena primjena kod hemodinamski nestabilnih pacijenata s aktivnim gastrointestinalnim krvarenjem predstavlja poseban izazov zbog potrebe za preciznom titracijom anestetika i kontinuiranim održavanjem hemodinamske i respiratorne stabilnosti.

Prikaz slučaja: Pacijent u dobi od 55 godina primljen je u jedinicu intenzivnog liječenja sa odjela za interne bolesti a zbog masivnog gastrointestinalnog krvarenja i progresivnog pogoršanja općeg stanja. Laboratorijski nalazi na prijemu pokazali su tešku anemiju, s vrijednostima hemoglobina 75 g/L i hematokrita 0,20. Nakon inicijalne pripreme i stabilizacije, pacijent transportovan hitno u operacionu salu radi hitnog hirurškog zbrinjavanja.

Uvod u opću anesteziju proveden je prema protokolu za hitne operativne zahvate, uz primjenu brze sekvencijalne indukcije i intubacije (RSI) te minimalnih efektivnih doza anestetika. Opća anestezija vođena je low-flow tehnikom uz protok svježeg plina od 0,7 L/min, MAC sevoflurana 0,7- 1,0 te FiO2 0,4. Uprkos teškom općem stanju i aktivnom krvarenju, hemodinamska stabilnost održavana je pažljivim doziranjem anestetika i kontinuiranom infuzijom niskih doza vazopresora, te adekvatnom intraoperativnom nadoknadom krvi uz pažljivo vođenje bilansa tekućina u cilju očuvanja bubrežne funkcije. Intraoperativno vršen kontinuirani invazivni i neinvazivni monitoring vitalnih parametara. Intraoperativno acidobazni status zadovoljavajući uz kontinuirani pad nivoa laktata.

U toku operativnog zbrinjavanja urađene su kolonoskopija, gastroskopija, enterotomija i enteroskopija, čime je identifikovano mjesto krvarenja, nakon čega je urađena hirurška resekcija. Na prijemu u jedinicu intenzivnog liječenja pacijent hemodinamski i respiratorno stabilan. Acidobazni status uredan.

Zaključak: Low-flow anestezija može se uspješno primijeniti i kod hemodinamski nestabilnih pacijenata s masivnim gastrointestinalnim krvarenjem. Pažljiva titracija doza anestetika i vazoaktivnih lijekova, uz kontinuirani invazivni i neinvazivni monitoring i individualizirani pristup, od ključnog su značaja za sigurnost pacijenta i održavanje hemodinamske stabilnosti.

Ključne riječi: low flow anestezija, gastrointenstinalno krvarenje, hemodinamika

LOW-FLOW ANESTHESIA IN A HEMODYNAMICALLY UNSTABLE PATIENT WITH MASSIVE GASTROINTESTINAL BLEEDING – A CASE REPORT

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Introduction: Low-flow anesthesia is defined as an inhalational anesthetic technique performed using a circle breathing system with a fresh gas flow significantly lower than the patient's minute ventilation while maintaining adequate conditions for the safe administration of general anesthesia. Its use in hemodynamically unstable patients with active gastrointestinal bleeding represents a particular challenge due to the need for precise titration of anesthetic agents and continuous maintenance of hemodynamic and respiratory stability.

CaseReport: A 55-year-old patient was admitted to the intensive care unit from the Department of Internal Medicine because of massive gastrointestinal bleeding and progressive deterioration of his general condition. Laboratory findings on admission demonstrated severe anemia, with a hemoglobin level of 75 g/L and a hematocrit of 0.20, despite prior transfusion of 14 units of packed red blood cells, 10 units of fresh frozen plasma, 2 units of platelets, and cryoprecipitate. Following initial resuscitation and stabilization, the patient was urgently transferred to the operating room for surgical management.

General anesthesia was induced according to the protocol for emergency surgery using rapid sequence induction and intubation (RSI) with the minimum effective doses of anesthetic agents. Anesthesia was maintained using a low-flow technique with a fresh gas flow of 0.7 L/min, a sevoflurane MAC of 0.7–1,0, and an FiO_2 of 0.4. Despite the patient's critical condition and ongoing hemorrhage, hemodynamic stability was maintained through careful titration of anesthetic agents, continuous infusion of low-dose vasopressors, adequate intraoperative blood product replacement, and meticulous fluid balance management while preserving renal function. Continuous invasive and non-invasive monitoring of vital parameters was performed throughout the procedure. Intraoperative acid–base status remained satisfactory, with a continuous decrease in serum lactate levels.

During the procedure, colonoscopy, gastroscopy, enterotomy, and enteroscopy were performed, allowing identification of the bleeding source, followed by surgical resection. Upon admission to the intensive care unit after surgery, the patient was hemodynamically and respiratory stable, with a normal acid–base status.

Conclusion: Low-flow anesthesia can be successfully applied even in hemodynamically unstable patients with massive gastrointestinal bleeding. Careful titration of anesthetic agents and vasoactive medications, together with continuous invasive and non-invasive monitoring and an individualized approach, are essential for ensuring patient safety and maintaining hemodynamic stability.

Keywords: Low-flow anesthesia; Gastrointestinal bleeding; Hemodynamics.

MIASTENIA GRAVIS ZAMASKIRANA HIPERTIREOZOM: IZAZOVI U LIJEČENJU - PRIKAZ SLUČAJA

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Uvod: Miastenija gravis je autoimuna bolest koja zahvata postsinaptički dio neuromišićne spojnice. Karakterizira je stvaranje specifičnih antitijela protiv postsinaptičkih receptora za acetilholin što dovodi do promjenjive mišićne slabosti. Kod Gravesove bolesti dolazi do stvaranja autoantitijela protiv receptora za tireostimulirajući hormon što dovodi do tireotoksikoze.

Prikaz slučaja: Pacijentica mlađe životne dobi primljena u Odjel endokrinologije Klinike za interne bolesti zbog tegoba u vidu otežanog gutanja, gubitka glasa, ptoze lijevog kapka. Od ranije se pacijentica liječi od hipertireoze (Mb Grawes Basedow). Odlukom Konzilijuma za bolesti štitne žlijezde a s obzirom na izraženu hipertireozu i nemogućnost postizanja remisije indicirano operativno zbrinjavanje pacijentice te se pacijentica sedmog dana premješta u Kliniku za bolesti uha, grla i nosa i hirurgiju glave i vrata. Uradi se planirani operativni zahvat (Thyreidectomio totalis). Intraoperativni i postoperativni tok uredan. Trećeg dana od operativnog zahavta nastupi kardiorespiratorni arest. Odmah započete mjere kardiopulmonalne reanimacije (Adrenalin a 4 mg, vanjska masaža srca), pacijentica intubirana te se premjesti u OIT (Hirurški blok) Klinike za anesteziologiju i reanimatologiju zbog potrebe za mehaničkom ventilacionom potporom, intenzivnim liječenjem i monitoringom. Po prijemu se uključi odgovarajuća infuziona i medikamentozna terapija. Mehanička ventilaciona potpora prilagođena respiratornim mogućnostima pacijentice. Pacijentica multidisciplinarno liječena. Od strane neurologa preporučeno uraditi test antitijela na acetilholinske receptore koji je pozitivan te prostigminski test koji je pozitivan. U terapiju se uključi Mesiton. Desetog dana od prijema u OIT načinjena hirurška traheotomija te se šesnaestog dana od prijema pacijentica premješta hemodinamski i respiratorno stabilna u Kliniku za boleati uha, grla i nosa i hirurgiju glave i vrata.

Zaključak: Miastenija gravis i autoimuna bolest štitne žlijezde, Gravesova bolest, predstavljaju kompleksna autoimuna oboljenja koja mogu istovremeno biti prisutna kod istog pacijenta. Multidisciplinarni pristup i individualizirano liječenje pacijenata ključni su za postizanje boljih ishoda i kvalitetniju kontrolu obje bolesti.

Ključne riječi: miasteni gravis, hipertireoza, multidisciplinarni pristup

MYASTHENIA GRAVIS MASKED BY HYPERTHYROIDISM: CHALLENGES IN MANAGEMENT-CASE REPORT

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Introduction: Myasthenia gravis (MG) is an autoimmune disorder affecting the postsynaptic component of the neuromuscular junction. It is characterized by the production of specific autoantibodies against postsynaptic acetylcholine receptors, resulting in fluctuating skeletal muscle weakness. Graves disease is an autoimmune disorder characterized by the production of autoantibodies against the thyroid-stimulating hormone (TSH) receptor, leading to thyrotoxicosis.

Case Report: A young female patient was admitted to the Department of Endocrinology, Clinic of Internal Medicine, with dysphagia, loss of voice, and left-sided ptosis. The patient had a known history of hyperthyroidism due to Graves disease. Following evaluation by the Thyroid Disease Multidisciplinary Board, and considering the severity of hyperthyroidism and failure to achieve remission, definitive surgical treatment was indicated. On the seventh day of hospitalization, the patient was transferred to the Clinic of ENT, where a planned total thyroidectomy was performed. The intraoperative and immediate postoperative courses were uneventful. On the third postoperative day, the patient developed cardiorespiratory arrest. Cardiopulmonary resuscitation was initiated immediately, including administration of epinephrine and external chest compressions. The patient was intubated and transferred to ICU of the Clinic of Anesthesiology and Resuscitation for mechanical ventilatory support, intensive treatment, and continuous monitoring. Appropriate fluid and pharmacological therapy was initiated upon admission. During hospitalization, the patient required prolonged mechanical ventilatory support according to her respiratory status and was managed by a multidisciplinary team. Neurological evaluation raised suspicion of myasthenia gravis. Testing for antibodies against acetylcholine receptors (AChR antibodies) was positive, as was the prostigmin test, confirming the diagnosis of myasthenia gravis. Treatment with pyridostigmine (Mestinon) was initiated. On the tenth day after admission to the ICU, a surgical tracheostomy was performed. On the sixteenth day of ICU hospitalization, the patient was transferred to the Clinic of ENT in a hemodynamically and respiratory stable condition.

Conclusion: Myasthenia gravis and Graves disease are complex autoimmune disorders that may coexist in the same patient. The coexistence of these conditions can present significant diagnostic and therapeutic challenges, particularly when symptoms of myasthenia gravis are initially attributed to thyrotoxicosis. A multidisciplinary approach and individualized treatment are essential for achieving optimal clinical outcomes and effective control of both disorders.

Keywords: myasthenia gravis, hyperthyroidism, Graves disease, multidisciplinary approach

SINUSITIS KOMPLIKOVAN SUBDURALNIM EMPIJEMOM KOD 58-GODIŠNJE ŽENE: PRIKAZ SLUČAJA

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Uvod: Subduralni empijem (SDE) rijetka je komplikacija sinusitisa, ali može dovesti do ozbiljnih neuroloških komplikacija ukoliko se liječenje odgodi. Infekcija frontalnog sinusa može se proširiti izvan paranazalnih sinusa i zahvatiti intrakranijalni prostor, što može rezultirati subduralnom infekcijom, cerebralnim edemom, epileptičkim napadima, efektom mase i pogoršanjem neurološkog statusa.

Cilj: Prikazati slučaj frontalnog sinusitisa komplikovanog subduralnim empijemom kod 58-godišnje žene te opisati kliničku prezentaciju, dijagnostičku obradu, liječenje i ishod.

Materijal i metode: Retrospektivno su analizirani podaci iz medicinske dokumentacije 58-godišnje žene koja je hospitalizirana zbog sumnje na komplikovani sinusitis. Pri prijemu se žalila na glavobolju, povišenu temperaturu, zimicu, umor, dizuriju i otok lica. Laboratorijske analize krvi pokazale su leukocitozu, neutrofiliju i povišene vrijednosti C-reaktivnog proteina (CRP). Nakon rendgenskog snimanja paranazalnih sinusa urađena je CT pretraga kranijuma, koja je pokazala frontalni sinusitis s intrakranijalnom subduralnom kolekcijom i efektom mase. Pacijenticu su pregledali specijalisti neurologije, neurohirurgije i infektologije. Zbog pogoršanja stanja svijesti premještena je u odjeljenje intenzivne terapije (OIT) radi daljnjeg zbrinjavanja.

Rezultati i diskusija: Subduralna kolekcija hirurški je drenirana od strane neurohirurškog tima. Mikrobiološka analiza drenažnog materijala bila je negativna. Empirijski je započeto liječenje intravenskim vankomicinom i ceftriaksonom. Tokom petnaest dana hospitalizacije, pacijentica je praćena u OIT-u uz redovno kliničko i laboratorijsko praćenje te ponavljanje dijagnostičkih pretraga prema potrebi. Njeno stanje se postepeno poboljšavalo i stabilizovalo. Nakon izlaska iz JIL-a nastavila je antikonvulzivnu terapiju te je ostala pod neurološkim i neurohirurškim nadzorom. Intrakranijalne komplikacije sinusitisa su rijetke, ali subduralni empijem može brzo napredovati i dovesti do značajnog neurološkog pogoršanja. CT se često koristi u početnoj procjeni zbog svoje brzine i široke dostupnosti. Međutim, MR, posebno difuzijski ponderisane sekvence (DWI), osjetljiviji je za identifikaciju intrakranijalne infekcije i preciznije određivanje proširenosti subduralne kolekcije. Liječenje najčešće zahtijeva kombinaciju hirurške drenaže i antimikrobne terapije, uz intenzivno neurološko praćenje.

Zaključak: Na subduralni empijem treba posumnjati kod pacijenata sa sinusitisom koji razviju neurološke simptome ili kod kojih dođe do pogoršanja stanja svijesti. U prikazanom slučaju CT snimanje omogućilo je pravovremeno prepoznavanje intrakranijalne komplikacije, nakon čega su uslijedile hitna neurohirurška drenaža i antimikrobna terapija. Rano prepoznavanje komplikacije i koordinirano liječenje od ključnog su značaja za smanjenje rizika od neuroloških komplikacija i poboljšanje ishoda liječenja.

Ključne riječi: frontalni sinusitis; subduralni empijem; intrakranijalna komplikacija; intrakranijalna infekcija; neurohirurška drenaža; antibiotska terapija; intenzivno liječenje; prikaz slučaja.

Reference

1. Chokkappan K, Lohan R. Rapidly developing subdural empyema in an adult with sinusitis: A neurosurgical threat alert. Asian Journal of Neurosurgery. 2018;13(2):458–461.
2. Eça R, Graça A, Francisco R, Pamplona J. Subdural empyema as a complication of sinusitis: A diagnosis to keep in mind. Cureus. 2024;16(1):e53249.
3. Hallak B, Bouayed S, Ghika JA, Teiga PS, Alvarez V. Management strategy of intracranial complications of sinusitis: Our experience and review of the literature. Allergy & Rhinology. 2022;13:1–8.
4. Martines F, Salvago P, Ferrara S, Mucia M, Gambino A, Sireci F. Parietal subdural empyema as complication of acute odontogenic sinusitis: A case report. Journal of Medical Case Reports. 2014;8:282.
5. Ziegler A, Patadia M, Stankiewicz J. Neurological complications of acute and chronic sinusitis. Current Neurology and Neuroscience Reports. 2018;18(7):45.

SINUSITIS COMPLICATED BY SUBDURAL EMPYEMA IN A 58-YEAR-OLD WOMAN: A CASE REPORT

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Introduction: Subdural empyema (SDE) is a rare complication of sinusitis, but it can lead to serious neurological complications if treatment is delayed. Frontal sinus infection can spread beyond the paranasal sinuses and involve the intracranial space, resulting in subdural infection, cerebral oedema, seizures, mass effect, and deterioration in neurological status.

Objective: To report a case of frontal sinusitis complicated by subdural empyema in a 58-year-old woman and to describe the clinical presentation, investigation, treatment, and outcome.

Materials and Methods: We retrospectively reviewed the clinical records of a 58-year-old woman who was admitted with suspected complicated sinusitis. At presentation, she complained of headache, fever, chills, fatigue, dysuria, and facial oedema. Blood tests showed leukocytosis, neutrophilia, and an increased CRP level. Paranasal sinus radiography was followed by cranial CT, which demonstrated frontal sinusitis with an intracranial subdural collection and mass effect. The patient was reviewed by neurology, neurosurgery, and infectious disease specialists. As her level of consciousness deteriorated, she was transferred to the ICU for further management.

Results and Discussion: The subdural collection was surgically drained by the neurosurgical team. Microbiological analysis of the drainage material was negative. Treatment with intravenous vancomycin and ceftriaxone was started empirically. During 15-day hospitalization, the patient was monitored in the ICU with regular clinical and laboratory assessment and repeat diagnostic investigations as required. Her condition gradually improved and stabilised. After leaving the ICU, she continued anticonvulsant treatment and remained under neurological and neurosurgical follow-up.
Intracranial complications of sinusitis are uncommon, but subdural empyema can progress quickly and may cause significant neurological deterioration. CT is commonly used for the initial assessment because it is rapid and widely available. However, MRI, particularly diffusion-weighted imaging, is more sensitive for identifying intracranial infection and defining the extent of a subdural collection. Management usually requires a combination of surgical drainage and antimicrobial treatment, with close neurological monitoring.

Conclusion: A subdural empyema should be considered in patients with sinusitis who develop neurological symptoms or a deterioration in consciousness. In the present case, CT imaging allowed the intracranial complication to be identified, followed by urgent neurosurgical drainage and antimicrobial treatment. Early recognition and coordinated management are important in reducing the risk of neurological complications and improving the outcome.

Keywords: Frontal sinusitis; subdural empyema; intracranial complication; intracranial infection; neurosurgical drainage; antibiotic therapy; intensive care; case report.

References

1. Chokkappan, K. and Lohan, R. (2018) 'Rapidly developing subdural empyema in an adult with sinusitis: A neurosurgical threat alert', Asian Journal of Neurosurgery, 13(2), pp. 458–461.
2. Eça, R., Graça, A., Francisco, R. and Pamplona, J. (2024) 'Subdural empyema as a complication of sinusitis: A diagnosis to keep in mind', Cureus, 16(1), e53249.
3. Hallak, B., Bouayed, S., Ghika, J.A., Teiga, P.S. and Alvarez, V. (2022) 'Management strategy of intracranial complications of sinusitis: Our experience and review of the literature', Allergy & Rhinology, 13, pp. 1–8.
4. Martines, F., Salvago, P., Ferrara, S., Mucia, M., Gambino, A. and Sireci, F. (2014) 'Parietal subdural empyema as complication of acute odontogenic sinusitis: A case report', Journal of Medical Case Reports, 8, 282.
5. Ziegler, A., Patadia, M. and Stankiewicz, J. (2018) 'Neurological complications of acute and chronic sinusitis', Current Neurology and Neuroscience Reports, 18(7), 45.

BEZBOLNI PORODI – NAŠA ISKUSTVA, KLINIKA ZA GINEKOLOGIJU I AKUŠERSTVO, KLINIČKI CENTAR UNIVERZITETA U SARAJEVU, 2022-2026. GODINA

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Uvod: Neuroaksijalna analgezija predstavlja zlatni standard u obezboljavanju poroda i preporučuje se svim porodiljama koje to žele, u skladu sa smjernicama Svjetske zdravstvene organizacije (WHO), Američkog društva anesteziologa (ASA) i Američkog koledža opstetričara i ginekologa (ACOG) (1). Osim efikasnog ublažavanja porođajne boli, smanjuje maternalni odgovor na stres, poboljšava uteroplacentarnu perfuziju i doprinosi sigurnijem ishodu za majku i novorođenče (2). Svakako postoje određene kategorije pacijentica koje će imati više benefita od epiduralne analgezije, a to su pacijentice sa hipertenzijom, astmom, dijabetesom, kardijalnim ili intrakranijalnim neurovaskularnim bolestima. Epiduralna analgezija je posebno indikovana I onda kada je opšta anestezija, koja obuhvata otežanu intubaciju u pitanju jer se blok može prevesti u epiduralnu anesteziju po potrebi. Obstetričke indikacije obuhvataju produžen porod, povećanje količine oksiticina u porodu, kao I svaki faktor koji predisponira operativno završenje poroda. Fetalne indikacije uključuju prematuritet, breech prezenacije ploda, multiple gestacije.(3)

Cilj: Prikazati iskustva Ginekološko-akušerske klinike Kliničkog centra Univerziteta u Sarajevu u primjeni bezbolnog poroda i analizirati trend primjene neuroaksijalne analgezije u periodu 2022–2026. godine.

Materijal i metode: Retrospektivno je analizirana primjena neuroaksijalnih tehnika analgezije u porodu na GAK KCUS u periodu od 2022. do 2026. godine. Analiziran je godišnji udio poroda obavljenih uz bezbolnu analgeziju, uz osvrt na savremene tehnike koje uključuju epiduralnu i single shot spinalnu analgeziju. Rezultati su prikazani deskriptivnom analizom.

Rezultati: Zabilježen je kontinuiran porast primjene bezbolnog poroda tokom posmatranog perioda. Udio poroda uz neuroaksijalnu analgeziju povećan je sa 2,3% u 2022. godini na 8,36% u 2023, 13,3% u 2024, 16,9% u 2025. te 24,9% u 2026. godini. Epiduralna analgezija je najčešće primjenjivana tehnika zbog efikasnog i kontinuiranog obezboljavanja te mogućnosti brze konverzije u hiruršku anesteziju ukoliko je potrebno operativno dovršenje poroda.

Zaključak: Kontinuirani porast primjene neuroaksijalne analgezije na GAK KCUS ukazuje na unapređenje organizacije opstetričke anestezije, veću dostupnost bezbolnog poroda i rastuće povjerenje porodilja u ovu metodu, te predstavlja značajan doprinos unapređenju kvaliteta i sigurnosti perinatalne zdravstvene zaštite, uz poboljšanje iskustva porođaja za majku i očuvanje povoljnih neonatalnih ishoda (4,5)

Daljnji razvoj programa i edukacija zdravstvenih radnika i trudnica mogu doprinijeti još većoj dostupnosti i kvaliteti perinatalne zdravstvene zaštite.

Literatura

1. American Society of Anesthesiologists Task Force on Obstetric Anesthesia. Practice Guidelines for Obstetric Anesthesia: An Updated Report. Anesthesiology. 2007;106:843–863.
2. Hollmen AI, Jouppila R, Jouppila P, et al. Effect of Extradural Analgesia Using Bupivacaine and 2-Chloroprocaine on Intervillous Blood Flow During Normal Labour. British Journal of Anaesthesia. 1982;54:837–842.
3. Guglielminotti J, Landau R, Daw J, et al. Use of Labor Neuraxial Analgesia for Vaginal Delivery and Severe Maternal Morbidity. JAMA Network Open. 2022;5(2):e220137.
4. Cochrane Pregnancy and Childbirth Group. Epidurals for Pain Relief in Labour. Cochrane Database of Systematic Reviews. CD000331.
5. Anim-Somuah M, Smyth RMD, Cyna AM, et al. Epidural versus Non-Epidural or No Analgesia for Pain Management in Labour. Cochrane Database of Systematic Reviews. 2018;CD000331.

PAINLESS LABOR – OUR EXPERIENCE, CLINIC OF GYNECOLOGY AND OBSTETRICS, UNIVERSITY CLINICAL CENTER SARAJEVO, 2022–2026 YEAR

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Introduction: Neuraxial labor analgesia is considered the gold standard for pain relief during childbirth and is recommended for all women who request it, in accordance with the recommendations of the World Health Organization (WHO), the American Society of Anesthesiologists (ASA), and the American College of Obstetricians and Gynecologists (ACOG) (1). In addition to providing effective pain relief, neuraxial analgesia attenuates the maternal stress response, improves uteroplacental perfusion, and contributes to favorable maternal and neonatal outcomes (2). Certain categories of patients are expected to derive greater benefit from epidural analgesia, particularly women with hypertension, asthma, diabetes mellitus, cardiovascular disease, or intracranial cerebrovascular disorders. Epidural analgesia is also especially indicated in situations where general anesthesia may be required but is anticipated to be challenging, such as in patients with a difficult airway, because the epidural block can be extended to provide surgical anesthesia if necessary. Obstetric indications include prolonged labor, the need for increased oxytocin augmentation during labor, and any condition that predisposes to operative delivery. Fetal indications include prematurity, breech presentation, and multiple gestation. (3)

Objective: To present the experience of the Clinic of Gynecology and Obstetrics, University Clinical Center Sarajevo (KCUS), and to analyze the trend in the use of neuraxial labor analgesia during the period 2022–2026.

Materials and Methods: A retrospective analysis was performed of neuraxial labor analgesia administered at the Clinic of Gynecology and Obstetrics, University Clinical Center Sarajevo, between years 2022 and 2026. The annual proportion of deliveries performed with labor analgesia was evaluated. The analysis included epidural and single shot spinal analgesia techniques. Data were analyzed using descriptive statistical methods.

Results: A continuous increase in the use of labor analgesia was observed throughout the study period. The proportion of painless deliveries increased from 2.3% in 2022 to 8.36% in 2023, 13.3% in 2024, 16.9% in 2025, and 24.9% in 2026 year. Epidural analgesia is the most frequently used technique due to its effectiveness, ability to provide continuous pain relief, and rapid conversion to surgical anesthesia when operative delivery was required.

Conclusion: The continuous increase in the use of neuraxial analgesia at the Clinic of Gynecology and Obstetrics, Clinical Center University of Sarajevo (GAK KCUS), indicates improvements in the organization of obstetric anesthesia, greater availability of labor analgesia, and growing maternal confidence in this method. It represents a significant contribution to enhancing the quality and safety of perinatal healthcare while improving the childbirth experience for mothers and maintaining favorable neonatal outcomes (4,5).

Further development of the program, together with continued education of healthcare professionals and pregnant women, may enhance the quality and accessibility of perinatal care.

References

1. American Society of Anesthesiologists Task Force on Obstetric Anesthesia. Practice Guidelines for Obstetric Anesthesia: An Updated Report. Anesthesiology. 2007;106:843–863.
2. Hollmen AI, Jouppila R, Jouppila P, et al. Effect of Extradural Analgesia Using Bupivacaine and 2-Chloroprocaine on Intervillous Blood Flow During Normal Labour. British Journal of Anaesthesia. 1982;54:837–842.
3. Guglielminotti J, Landau R, Daw J, et al. Use of Labor Neuraxial Analgesia for Vaginal Delivery and Severe Maternal Morbidity. JAMA Network Open. 2022;5(2):e220137.
4. Cochrane Pregnancy and Childbirth Group. Epidurals for Pain Relief in Labour. Cochrane Database of Systematic Reviews. CD000331.
5. Anim-Somuah M, Smyth RMD, Cyna AM, et al. Epidural versus Non-Epidural or No Analgesia for Pain Management in Labour. Cochrane Database of Systematic Reviews. 2018;CD000331.

CLINICAL COURSE AND FINAL OUTCOME OF CRITICALLY ILL PATIENTS IN THE CLINIC OF ANESTHESIOLOGY AND REANIMATION AT THE UNIVERSITY CLINICAL CENTER OF THE REPUBLIC OF SRPSKA

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Introduction: Critically ill surgical patients represent a heterogeneous population with an increased risk of complications and mortality. Early recognition of clinical deterioration and appropriate intensive care management are essential for improving patient outcomes.

Aim: To analyze the demographic and clinical characteristics, source of admission, and treatment outcomes of critically ill surgical patients treated in the Intensive Care Unit (ICU) during 2023 and 2024, and to identify factors associated with mortality.

Methods: A retrospective observational study was conducted among patients treated in the ICU of the Clinic for Intensive Care Medicine for Surgical Branches at the University Clinical Center of the Republic of Srpska during 2023 and 2024. Demographic and clinical characteristics, source of admission, SAPS II score, use of vasoactive drugs, mechanical ventilation, resuscitation before ICU admission, acute kidney injury (AKI), renal replacement therapy (RRT), duration of treatment, and treatment outcome were analyzed. Pearson's chi-square test and the Mann–Whitney U test were used for statistical analysis.

Results: The overall mortality rate was 27.7%. Older age, particularly the 66–95-year age group, was associated with higher mortality. SAPS II scores were significantly higher among non-survivors. The use of vasoactive drugs, resuscitation before ICU admission, AKI, and the need for RRT were more frequent among patients with a fatal outcome. Longer duration of mechanical ventilation was also associated with an unfavorable outcome. Patients admitted directly from hospital wards had less favorable outcomes compared with patients admitted from the operating room. ICU readmission was associated with a more complex clinical course and a higher risk of an unfavorable outcome.

Conclusion: Disease severity, reflected by higher SAPS II scores, hemodynamic instability, and the development of organ dysfunction are important factors associated with mortality in critically ill surgical patients. Early recognition of clinical deterioration, timely ICU admission, and appropriate management of organ dysfunction may contribute to improved treatment outcomes.

Keywords: intensive care unit; surgical patients; mortality; SAPS II; acute kidney injury; mechanical ventilation.

SLUČAJ POTPUNE OPSTRUKCIJE DISAJNOG UVODA U TOKU UVODA U ANESTEZIJU

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Uvod: Opstrukcija gornjih disajnih puteva (akutna ili hronična) odnosi se na anatomsko suženje ili okluziju, što rezultira otežanom ventilacijom pacijenta. Može biti djelimična ili potpuna. Među najčešćim uzrocima su strana tijela, udahnuti gasovi, otežana intubacija, laringospazam i tumori.

Prikaz slučaja: Pacijentica stara 60 godina pripremljena je za elektivnu eksplorativnu artroskopiju lijevog koljena. Od ranije postavljenih dijagnoza ima pretilost, stabilnu anginu pektoris, hipertenziju, HOPB i emfizem pluća, te cerebrovaskularni inzult prije sedam godina. Prije devet godina imala je operaciju vratne kičme, što je prema njenim navodima prošlo uredno sem postoperativne mučnine i povraćanja. Laboratorijski nalazi su bili u referentnim granicama. Ponuđena je opcija spinalne anestezije, što je pacijentica odbila. Na fizikalnom pregledu govorila je uglavnom nazalano, za šta je navela da je za nju normalno. Nakon uvoda u anesteziju, pacijentica se nije mogla ventilirati niti na masku niti uz pomoć i-Gel laringealne maske. Nakon više neuspjelih pokušaja ventilacije, pacijentica je uspješno intubirana, te je u toku intubacije ustanovljeno postojanje tumora na peteljci koji je uzrokom potpune opstrukcije disajnog puta. Intraoperativni kao i neposredni postoperativni tok su protekli uredno.

Zaključak: Događaji na uvodu u anesteziju zahtijevaju dobru pripremu kako bi se rizici sveli na minimum i pripremila sva oprema, jer slučajevi akutne opstrukcije disajnih puteva mogu brzo postati fatalni. Postavlja se pitanje da li pacijente s nazalnim govorom uvijek treba dodatno pregledati, kao i pacijente s višestrukim kardiovaskularnim i/ili plućnim komorbiditetima, u potrazi za problemom hronične opstrukcije disajnih puteva.

Reference:
1. Brady, Mark F. and Bracken Burns. “Airway Obstruction (Archived).” StatPearls, StatPearls Publishing, 7 August 2023.
2. Yildirim E. Principles of Urgent Management of Acute Airway Obstruction. Thorac Surg Clin. 2018 Aug;28(3):415-428.

A CASE OF A COMPLETE AIRWAY OBSTRUCTION DURING ANESTHESIA INDUCTION

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Introduction: Upper airway obstruction (acute or chronic) refers to an anatomic narrowing or occlusion, resulting in decreased ability to ventilate. It may be partial or complete.1 Causes include foreign bodies, toxic/hot fumes, difficult intubation, laryngeal spasm, and tumors.2

Case report: A 60-year-old female is prepared for an elective explorative arthroscopy of her left knee. Her previous diagnoses include: obesity, stable angina pectoris, hypertension, COPD and lung emphysema, a cerebrovascular insult seven years ago. She has had cervical spine surgery nine years ago, reports no issues except postoperative nausea and vomiting. Her recent lab work was unremarkable. She was given an option of spinal anesthesia, which she refused. Her speech was mostly nasal, which she stated to be normal for her. After anesthesia induction the attempt to mask ventilate the patient failed, an i-Gel laryngeal mask was placed, with the same results. After multiple failed ventilation attempts the patient was successfully intubated and a lumpy mass on a peduncle was found completely obstructing the airway. The patient was stable during anesthesia and also upon waking.

Conclusion: Events on anesthesia induction require a good preparation to minimize risks and prepare all the equipment, as the cases of acute airway obstruction may quickly become fatal. We raise the questions of should patients with nasal speech be further examined always, as well as the patients with multiple cardiovascular and/or pulmonary comorbidities, in search for a chronic airway obstruction problem.

References:
1. Brady, Mark F. and Bracken Burns. “Airway Obstruction (Archived).” StatPearls, StatPearls Publishing, 7 August 2023.
2. Yildirim E. Principles of Urgent Management of Acute Airway Obstruction. Thorac Surg Clin. 2018 Aug;28(3):415-428.

RENOCELLULAR CARCINOMA WITH THROMBOSIS OF THE INFERIOR VENA CAVA AND RIGHT SIDE OF THE HEART: A CASE REPORT

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Introduction: Renal cell carcinoma represents the most common type of kidney cancers, however venous migration and tumor thrombus formation is a rare, occurring in 10% of all cases. Migration of the tumor into the right atrium is an even rarer event and occurs in 1% of cases.

Aim: To explain intensive care treatment for a patient after radical nephrectomy and inferior vena cava thrombectomy, with special reference to the complication in terms of thrombosis of the right side of the heart.

Case description: 72 years old patient without other comorbidities, was admitted after radical nephrectomy and inferior vena cava thrombectomy. Over the past two months, he has complained of abdominal pain and noticed hematuria. Also, a small thrombus floating towards the right atrium was verified on the preoperative ultrasound of the heart. On the sixth postoperative day, after the episode of tachycardia, a control ultrasound of the heart was performed, which verifies a thrombotic mass in the area of the right atrium, which extends through the tricuspid valve, all the way to the right ventricle, with a high embolizing potential. In consultation with cardiovascular surgeons, a decision was made for conservative treatment, and instead of the current low-molecular-weight heparin, unfractionated heparin in the form of continuous infusion was included in the therapy. Fourteen days after the initiation of unfractionated heparin, complete resolution of the thrombotic mass in the right heart chambers is monitored via ultrasound. On the twenty-second postoperative day, the patient was transferred to the home institution for the continuation of oncological treatment.

Conclusion: Renal cell carcinoma with tumor thrombus extending into the inferior vena cava and right side of the heart is an advanced stage of kidney cancer with complex treatment required.

Literature:
1. Blute ML, Leibovich BC, Lohse CM, Cheville JC, Zincke H. The Mayo clinic experience with surgical management, complications and outcome for patients with renal cell carcinoma and venous tumour thrombus. BJU Int. 2004;94:33–41.
2. Ciancio G, Livingstone AS, Soloway M. Surgical management of renal cell carcinoma with tumor thrombus in the renal and inferior vena cava: the University of Miami experience in using liver transplantation techniques. Eur Urol. 2007;51:988–94.

RENOCELULARNI KARCINOM UDRUŽEN SA TROMBOZOM DONJE ŠUPLJE VENE I DESNOG SRCA: PRIKAZ SLUČAJA

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Uvod: Karcinom bubrežnih ćelija najčešći je tip karcinoma bubrega, ali širenje putem vena i stvaranje tumorskog tromba rijetka su pojava koja se javlja u 10% svih slučajeva. Prodor tumora u desnu pretkomoru još je rjeđi događaj i javlja se u 1% slučajeva.

Cilj: Objasniti intenzivni tretman pacijenta nakon radikalne nefrektomije i trombektomije donje šuplje vene, sa posebnim osvrtom na komplikaciju u vidu tromboze desne strane srca.

Opis slučaja: Pacijent star 72 godine, bez drugih komorbiditeta, primljen je nakon radikalne nefrektomije i trombektomije donje šuplje vene. Tokom prethodna dva mjeseca žalio se na bolove u abdomenu i primijetio hematuriju. Također, preoperativnim ultrazvukom srca uočen je manji tromb koji je flotirao prema desnoj pretkomori. Šestog postoperativnog dana, nakon epizode tahikardije, učinjen je kontrolni ultrazvuk srca kojim je potvrđeno prisustvo trombotske mase u području desne pretkomore, koja se protezala kroz trikuspidalnu valvulu sve do desne komore uz visok embolizacijski potencijal. U konsultaciji s kardiovaskularnim hirurzima odlučeno je da se primijeni konzervativno liječenje, te je umjesto dotadašnjeg niskomolekularnog heparina u terapiju uveden nefrakcionirani heparin putem kontinuirane infuzije. Četrnaest dana nakon početka primjene nefrakcioniranog heparina, ultrazvučnim pregledom je zabilježena potpuna rezolucija trombotske mase iz desnih srčanih šupljina. Dvadeset drugog postoperativnog dana pacijent je premješten u matičnu ustanovu radi nastavka onkološkog liječenja.

Zaključak: Renocelularni karcinom s tumorskim trombom koji se širi u donju šuplju venu i desnu stranu srca predstavlja uznapredovali stadij karcinoma bubrega koji zahtijeva složeno liječenje.

Literatura:
1. Blute ML, Leibovich BC, Lohse CM, Cheville JC, Zincke H. The Mayo clinic experience with surgical management, complications and outcome for patients with renal cell carcinoma and venous tumour thrombus. BJU Int. 2004;94:33–41.
2. Ciancio G, Livingstone AS, Soloway M. Surgical management of renal cell carcinoma with tumor thrombus in the renal and inferior vena cava: the University of Miami experience in using liver transplantation techniques. Eur Urol. 2007;51:988–94.

TEŠKA POLITRAUMA U PEDIJATRIJSKOJ POPULACIJI: PRIKAZ SLUČAJA

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Uvod: Pedijatrijska trauma glavni je pojedinačni uzrok smrti (50 %) kod djece, nadmašujući sve ostale patologije zajedno. Kod teško ozlijeđene djece prognoza i smrtnost snažno su povezane sa traumatskom ozljedom mozga i hemoragijskim šokom, uz prisustvo ili odsustvo koagulopatije.

Cilj rada: Ukazati na važnost pravovremenog i efikasnog zbrinjavanja teške pedijatrijske politraume uz multidisciplinarni tretman.

Opis slučaja: Dijete dobi 14 godina primljeno nakon teških politraumatskih povreda. Inicijalno na bolne draži reaguje povlačenjem gornjih ekstremiteta, GCS 5, intubirano, na aparatu za mehaničku ventilaciju, uz izražen otok lijeve polovine lica, sa dominantnim periorbitalnim hematomom lijevo, hipotenzivno. Obzirom da kontrolna CT dijagnostika neurokranijuma pokaže regresiju, bez znakova pneumocefalusa, sa neurohirurške strane odluči se za nastavak konzervativnog tretmana. Šesti dan hospitalizacije zbog pada periferne saturacije kisika i hemograma, realizuje se hitni CT toraksa, abdomena i zdjelice, na kome se verificiraju kontuzije pluća i slobodna tečnost u abdomenu i zdjelici. Od strane dječijeg hirurga indicira se hitni operativni zahvat, a od strane torakalnog hirurga drenaža oba prsišta. Nastavi se multidisciplinarni tretman. Dijete se 17.-i dan od povrede preko asistiranih modusa ventilacije odvoji od aparata, te ekstubira, uz opsežnu toaletu traheobronhalnog stabla i ordiniranje dezopstruktivne terapije. U daljem toku hospitalizacije dijete svjesno, komunikativno, diše spontano suficijentno, hemodinamski stabilno, afebrilno, dostatne diureze, te se premjesti na Ortopediju radi nastavka liječenja i rehabilitacije.

Zaključak: Adekvatno multidisciplinarno zbrinjavanje teške pedijatrijske politraume uz intenzivni reanimacioni tretman povećava šansu za povoljnim ishodom liječenja.

Literatura:
1. Krug SE, Tuggle DW. Management of pediatric trauma .Pediatrics 2008 Apr;121(4):849-54.
2. Murphy CH, Spain DA, Shan H. Coagulopathy and transfusion ratios in pediatric trauma. J Trauma Acute Care Surg. 2020;88:648–653.

SEVERE POLYTRAUMA IN THE PEDIATRIC POPULATION: A CASE REPORT

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Introduction: Pediatric trauma is the leading single cause of death (50%) in children, surpassing all other pathologies combined. In severely injured children, prognosis and mortality are strongly associated with traumatic brain injury and hemorrhagic shock, in the presence or absence of coagulopathy.

Aim: To explain the importance of timely and efficient treatment of severe pediatric polytrauma with multidisciplinary treatment.

Case description: A 14-year-old child was admitted after severe polytraumatic injuries. Initially, reacted to painful stimuli by withdrawing upper extremities, GCS 5, intubated, on continuous mechanical ventilation, with swelling of the left half of the face, with periorbital hematoma on the left, hypotensive. Considering that the control CT of the neurocranium shows regression, without signs of pneumocephalus, the neurosurgical side decided to continue the conservative treatment. On the sixth day of hospitalization due to a drop in peripheral oxygen saturation and hemogram, an emergency CT scan of the thorax, abdomen and pelvis is performed, which verifies lung contusions and free fluid in the abdomen and pelvis. The pediatric surgeon indicated urgent surgery, and the thoracic surgeon indicated drainage of both chests. Multidisciplinary treatment was continued. On the 17th day after the injury, the child was weaned from the mechanical ventilation via assisted ventilation modes, and extubated, with an extensive aspiration of the tracheobronchial tree and the administration of bronchodilator therapy. In the further course of hospitalization, the child is conscious, communicative, breathing spontaneously sufficiently, hemodynamically stable, afebrile, sufficient diuresis, and transferred to the Orthopedics for continued treatment and rehabilitation.

Conclusion: Adequate multidisciplinary treatment of severe pediatric polytrauma increases the chance of a favorable treatment outcome.

Literature:
1. Krug SE, Tuggle DW. Management of pediatric trauma. Pediatrics 2008 Apr;121(4):849-54.
2. Murphy CH, Spain DA, Shan H. Coagulopathy and transfusion ratios in pediatric trauma. J Trauma Acute Care Surg. 2020;88:648–653.

GRANICE PREOPERATIVNE OPTIMIZACIJE KOD VISOKORIZIČNOG PACIJENTA SA SEKUNDARNIM SPONTANIM PNEUMOTORAKSOM: ANESTEZIOLOŠKE DILEME I PRIKAZ SLUČAJA

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Uvod: Preoperativna procjena i optimizacija pacijenata sa teškim kardiopulmonalnim komorbiditetima predstavljaju značajan izazov za anesteziologa, posebno kada akutna respiratorna patologija ograničava primjenu standardnih dijagnostičkih metoda. Kod pacijenata sa sekundarnim spontanim pneumotoraksom i uznapredovalom hroničnom opstruktivnom bolešću pluća (HOBP), odluka o operativnom liječenju zahtijeva pažljivu procjenu perioperativnog rizika i mogućnosti preoperativne optimizacije.

Prikaz slučaja: Muškarac, 67 godina, hospitaliziran je zbog desnostranog sekundarnog spontanog pneumotoraksa na podlozi HOBP GOLD E. Od komorbiditeta su još bili prisutni uznapredovali plućni emfizem, ishemijska bolest srca, stanje nakon infarkta miokarda i paroksizmalna atrijalna fibrilacija. Preoperativna procjena bila je ograničena nemogućnošću izvođenja spirometrije i tehnički insuficijentnim ehokardiografskim pregledom zbog emfizema (procijenjena EF 55%). Inicijalno je primijenjen konzervativni terapijski pristup uz torakalnu drenažu i intenziviranu bronhodilatatornu terapiju, kao manje invazivna terapijska opcija kod pacijenta visokog perioperativnog rizika. Zbog izostanka kliničkog poboljšanja nakon deset dana indicirano je operativno liječenje. Pri dolasku u operacionu salu pacijent je bio hemodinamski nestabilan i respiratorno insuficijentan, zbog čega je zahvat odgođen, a pacijent primljen u Odjel intenzivne terapije, gdje se intubira i spoji na mehaničku ventilaciju. Dva dana kasnije indiciran je ponovo operativni zahvat, te su učinjeni VATS, desnostrana pleurektomija i drenaža pleuralne šupljine. Postoperativno nije bilo moguće odvajanje od mehaničke ventilacije, uz perzistentnu hemodinamsku nestabilnost i potrebu za vazopresornom potporom. Smrtni ishod nastupio je dvanaestog postoperativnog dana.

Zaključak: Kod visokorizičnih pacijenata granice preoperativne optimizacije određene su težinom osnovne bolesti, hitnošću operativnog liječenja i mogućnošću objektivne procjene funkcionalne rezerve. Kada standardna procjena nije moguća, individualizirana anesteziološka procjena i multidisciplinarno odlučivanje ključni su za procjenu odnosa koristi i perioperativnog rizika.

Ključne riječi: anestezija; hronična opstruktivna bolest pluća; perioperativni rizik; preoperativna procjena; sekundarni spontani pneumotoraks.

Literatura:
1. Roberts ME, Rahman NM, Maskell NA, et al. British Thoracic Society Guideline for pleural disease. Thorax. 2023;78(Suppl 3):s1-s42.
2. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for prevention, diagnosis and management of COPD: 2026 report. GOLD; 2026.
3. Thompson A, Fleischmann KE, Smilowitz NR, et al. 2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM guideline for perioperative cardiovascular management for noncardiac surgery. Circulation. 2024;150(19):e351-e442.
4. Miskovic A, Lumb AB. Postoperative pulmonary complications. Br J Anaesth. 2017;118(3):317-334.

CHALLENGES AND LIMITS OF PREOPERATIVE OPTIMIZATION IN A HIGH-RISK PATIENT WITH SECONDARY SPONTANEOUS PNEUMOTHORAX: ANESTHETIC DILEMMAS AND A CASE REPORT

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Introduction: Preoperative assessment and optimization of patients with severe cardiopulmonary comorbidities represent a significant challenge for anesthesiologists, particularly when acute respiratory pathology limits the use of standard diagnostic methods. In patients with secondary spontaneous pneumothorax and advanced chronic obstructive pulmonary disease (COPD), the decision to proceed with surgery requires careful assessment of perioperative risk and the potential for preoperative optimization.

Case Report: A 67-year-old man was hospitalized with a right-sided secondary spontaneous pneumothorax associated with GOLD E COPD. Comorbidities included advanced pulmonary emphysema, ischemic heart disease, previous myocardial infarction, and paroxysmal atrial fibrillation. Preoperative assessment was limited by the inability to perform spirometry and technically inadequate echocardiography due to emphysema (estimated LVEF 55%). Initially, chest tube drainage and intensified bronchodilator therapy were employed as a less invasive treatment strategy in this high-risk patient. Due to the lack of clinical improvement after ten days, surgical treatment was indicated. On arrival in the operating room, the patient was hemodynamically unstable and in respiratory failure; therefore, surgery was postponed, and he was transferred to the intensive care unit, intubated, and mechanically ventilated. Two days later, the indication for surgical treatment was reassessed and confirmed, and right-sided video-assisted thoracoscopic surgery (VATS), pleurectomy, and pleural drainage were performed. Postoperatively, weaning from mechanical ventilation was unsuccessful, with persistent hemodynamic instability requiring vasopressor support. The patient died on the twelfth postoperative day.

Conclusion: In high-risk patients, the limits of preoperative optimization are determined by the severity of the underlying disease, urgency of surgical treatment, and the ability to objectively assess functional reserve. When standard assessment is not feasible, individualized anesthetic evaluation and multidisciplinary decision-making are essential for balancing the potential benefits of surgery against perioperative risk.

Keywords: anesthesia; chronic obstructive pulmonary disease; perioperative risk; preoperative assessment; secondary spontaneous pneumothorax.

References:
1. Roberts ME, Rahman NM, Maskell NA, et al. British Thoracic Society Guideline for pleural disease. Thorax. 2023;78(Suppl 3):s1-s42.
2. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for prevention, diagnosis and management of COPD: 2026 report. GOLD; 2026.
3.Thompson A, Fleischmann KE, Smilowitz NR, et al. 2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM guideline for perioperative cardiovascular management for noncardiac surgery. Circulation. 2024;150(19):e351-e442.
4. Miskovic A, Lumb AB. Postoperative pulmonary complications. Br J Anaesth. 2017;118(3):317-334.

NOVA SAZNANJA O MIDAZOLAMU

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Najnovija medicinska i klinička istraživanja te tehnološki napredak donose značajne promjene u primjeni midazolama, jednog od najvažnijih brzodjelujućih benzodiazepina. Iako je desetljećima zlatni standard u sedaciji i anesteziji, nova saznanja fokusirana su na optimizaciju primjene, praćenje koncentracije kod kritičnih pacijenata i uvođenje novih alternative. Prospektivne studije donose važne podatke o primjeni midazolama kod bolesnika u jedinicama intenzivnog liječenja (JIL) s akutnim respiratornim distres sindromom (ARDS). Istraživanja naglašavaju nužnost stalnog praćenja koncentracije lijeka u plazmi kod pacijenata na mehaničkoj ventilaciji i ECMO uređajima. Zbog zatajenja organa i promjena u metabolizmu pacijenata s teškim respiratornim zatajenjem, standardne doze često dovode do prekomjerne sedacije, pa se preporučuje strogo individualizirano doziranje. Nova klinička ispitivanja potvrdila su da ko-indukcija midazolama u općoj anesteziji donosi važne prednosti za stabilnost pacijenta. Kombinirana primjena značajno smanjuje količinu propofola potrebnu za uvođenje pacijenta u anesteziju. Ova metoda sprječava nagli pad sistoličkog i srednjeg krvnog tlaka odmah nakon indukcije, što štiti kardiovaskularni sistem pacijenta. Dokazano je značajno smanjenje razine hormona stresa (kortizola) tokom hirurškog reza. Na globalnom tržištu farmaceutska industrija ubrzano ulaže u sisteme lakše i brže primjene lijeka u hitnim stanjima. Proizvođači su pojačali fokus na nosne sprejeve koji omogućuju brzu apsorpciju kroz sluznicu nosa bez potrebe za otvaranjem venskog puta. To je ključno za hitno suzbijanje statusa epileptikusa kod djece i odraslih. Uvedeni su novi formati tvornički napunjenih štrcaljki za intravensku injekciju kako bi se smanjile pogreške u doziranju unutar bolničkog sistema. Potvrđeno je da midazolam ciljano smanjuje aktivaciju u hipokampusu i prefrontalnom korteksu. Jedna od najvećih novosti u području sedacije je uspon remimazolama, novog člana porodice benzodiazepina koji se profilira kao izravni nasljednik midazolama.

Ključne riječi: midazolam, sedacija, anestezija,

Reference

1. https://pubmed.ncbi.nlm.nih.gov/42075614/
2. https://pubmed.ncbi.nlm.nih.gov/36397390/
3. https://hrcak.srce.hr/clanak/443886

NEW FINDINGS ABOUT MIDAZOLAM

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The latest medical and clinical research and technological progress bring significant changes in the use of midazolam, one of the most important fast-acting benzodiazepines. Although it has been the gold standard in sedation and anesthesia for decades, new knowledge is focused on optimizing application, monitoring concentration in critical patients and introducing new alternatives. Prospective studies provide important data on the use of midazolam in intensive care unit (ICU) patients with acute respiratory distress syndrome (ARDS). Research emphasizes the necessity of constant monitoring of drug concentration in plasma in patients on mechanical ventilation and ECMO devices.Due to organ failure and metabolic changes in patients with severe respiratory failure, standard doses often lead to excessive sedation, so strictly individualized dosing is recommended. New clinical trials have confirmed that co-induction of midazolam in general anesthesia brings important advantages for patient stability. Combined administration significantly reduces the amount of propofol required to induce anesthesia. This method prevents a sudden drop in systolic and mean blood pressure immediately after induction, which protects the patient's cardiovascular system. A significant reduction in the level of the stress hormone (cortisol) during surgical incision has been demonstrated. On the global market, the pharmaceutical industry is rapidly investing in systems for easier and faster administration of the drug in emergency situations.Manufacturers have increased their focus on nasal sprays that allow rapid absorption through the nasal mucosa without the need to open a venous access. This is essential for the emergency suppression of status epilepticus in children and adults. New formats of prefilled syringes for intravenous injection have been introduced to reduce dosing errors within the hospital system. Midazolam has been confirmed to specifically reduce activation in the hippocampus and prefrontal cortex. One of the biggest developments in the field of sedation is the rise of remimazolam, a new member of the benzodiazepine family that is being profiled as a direct successor to midazolam.

Keywords: midazolam, sedation, anesthesia,

References

1. https://pubmed.ncbi.nlm.nih.gov/42075614/
2. https://pubmed.ncbi.nlm.nih.gov/36397390/
3. https://hrcak.srce.hr/clanak/443886

PROTECT THE BRAIN: ANESTEZIOLOŠKI PRISTUP PACIJENTU SA TEŠKOM KRANIOCEREBRALNOM POVREDOM I POLITRAUMOM - PRIKAZ SLUČAJA

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Uvod: Teška politrauma sa dominantnom kraniocerebralnom povredom predstavlja značajan izazov za anesteziološki i intenzivistički tim. U prvih nekoliko sati liječenja cilj anesteziološkog i intenzivističkog tima nije samo stabilizacija vitalnih funkcija, već i prevencija sekundarnog oštećenja mozga. Pravovremeno obezbjeđivanje disajnog puta, adekvatna oksigenacija i ventilacija, održavanje hemodinasmke stabilnosti i koordinacija sa neurohirurškim timom ključni su elementi inicijalnog zbrinjavanja.

Cilj: Prikazati značaj pravovremenog anesteziološkog zbrinjavanja i multidisciplinarnog pristupa kod pacijenta sa teškom politraumom i kompleksnom traumatskom povredom mozga.

Materijal i metode: Prikazan je slučaj 31-godišnjeg muškarca nakon pada sa stijene. Po prijemu u hirušku prijemnu ambulantu, zbog poremećaja svijesti, pacijent je nakon konsultacije anesteziologa endotrahealno intubiran i priključen na mehaničku ventilaciju. CT dijagnostikom verifikovane su višestruke kraniofacijalne frakture, hemato- i pneumocefalus, akutni epiduralni i subduralni hematom sa pomakom medijalnih struktura i znacima cerebralnog edema. Udružene su bile kontuzija pluća, frakture rebara i povrede kičmenog stuba.

Rezultati i diskusija: Nakon inicijalne stabilizacije pacijent je hitno transportovan u operacionu salu. Učinjena je kraniotomija sa evakuacijom epiduralnog hematoma i hemostazom, uz suspenziju dure i postavljanje epiduralnog drena. Postoperativno je liječen u jedinici intenzivnog liječenja uz mehaničku ventilaciju, kontinuiranu sedaciju, hemodinamski monitoring i serijsko neurološko praćenje. Nakon postepenog razbuđivanja uspostavljeno je spontano disanje, kontaktibilnost i izvršavanje naloga. Tokom daljeg liječenja, zbog novonastalog neurološkog deficita, ponovo je konsultovan neurohirurg i sprovedeno odgovarajuće liječenje. Nakon stabilizacije pacijent je premješten na Kliniku za neurohirurgiju.

Zaključak: Ovaj slučaj naglašava ključnu ulogu anesteziologa u ranom zbrinjavanju teško politraumatiziranog pacijenta. Brzo obezbjeđivanje disajnog puta, kontrolisana ventilacija, održavanje adekvatne hemodinamike, kontinuirani monitoring i pravovremena neurohirurška intervencija predstavljaju osnovne elemente liječenja usmjerenog na prevenciju sekundarnog oštećenja mozga. Kod teške kraniocerebralne povrede ne liječimo samo povrijeđeni mozak-liječimo cijelog pacijenta da bismo zaštitili mozak.

Ključne riječi: politrauma; traumatska povreda mozga; epiduralni hematom; mehanička ventilacija; intenzivno liječenje; neurohirurgija.

Literatura

1. Carney N, Totten AM, O'Reilly C, et al. Guidelines for the Management of Severe Traumatic Brain Injury, Fourth Edition. Neurosurgery. 2017;80(1):6-15.
2. American College of Surgeons Committee on Trauma. Best Practices Guidelines: Management of Traumatic Brain Injury. Chicago: ACS; 2024.
3. Rossaint R, Afshari A, Bouillon B, et al. The European guideline on management of major bleeding and coagulopathy following trauma: sixth edition. Crit Care. 2023;27:80.

OD REFRAKTORNOG POVRAĆANJA DO RESPIRATORNE INSUFICIJENCIJE: TERAPIJSKA PLAZMAFEREZA U TEŠKOM TRANSVERZALNOM MIJELITISU — PRIKAZ SLUČAJA IZ JEDINICE INTENZIVNOG LIJEČENJA

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Uvod: Akutni transverzalni mijelitis je upalni sindrom kičmene moždine koji se najčešće prezentira motoričkim, senzornim i autonomnim poremećajima. Međutim, u slučajevima sa zahvaćanjem moždanog debla i cervikomedularne regije, početna klinička slika može biti atipična i zavaravajuća, što može odgoditi dijagnozu i pravovremeno imunomodulatorno liječenje.

Prikaz slučaja: Prikazujemo slučaj odraslog muškarca koji se inicijalno javio zbog perzistentne epigastrične nelagode, mučnine, učestalog povraćanja i značajnog gubitka tjelesne mase. Gastroenterološka obrada pokazala je hijatalnu herniju, gastroduodenitis i infekciju bakterijom Helicobacter pylori, ali bez nalaza koji bi u potpunosti objasnio progresivan klinički tok. Tokom narednih sedmica razvili su se nestabilnost pri hodu, vrtoglavica, zamućen vid, dvoslike, disfagija i epizode prolaznog gubitka svijesti. Neurološka obrada, uključujući magnetnu rezonancu mozga i vratne kičmene moždine te analizu cerebrospinalnog likvora, uputila je na upalni demijelinizacijski proces u skladu s teškim transverzalnim mijelitisom sa zahvaćanjem moždanog debla i cervikomedularne regije.

Liječenje i ishod: Zbog progresivne disfagije i visokog aspiracijskog rizika bolesnik je razvio aspiracijsku pneumoniju i akutnu hipoksemijsku respiratornu insuficijenciju, što je zahtijevalo intubaciju, invazivnu mehaničku ventilaciju i premještaj u jedinicu intenzivnog liječenja. Intenzivističko liječenje uključivalo je zaštitu dišnog puta, respiratornu potporu, ponavljanu bronhotoaletu, visoke doze intravenskih kortikosteroida, antimikrobnu terapiju, nutritivnu potporu, rehabilitaciju i terapijsku plazmaferezu. Proveden je planirani ciklus terapijske plazmafereze kroz sedam terapijskih izmjena plazme. Uz multidisciplinarni pristup i kontinuirano intenzivističko praćenje, došlo je do postupnog poboljšanja respiratornog i općeg kliničkog stanja, što je omogućilo uspješnu ekstubaciju četvrtog dana boravka u JIL-u i dovršetak planiranog ciklusa plazmafereze.

Zaključak: Ovaj slučaj pokazuje da se teški transverzalni mijelitis može inicijalno prikriti simptomima koji upućuju na primarnu gastrointestinalnu bolest, čime se dijagnoza može značajno odgoditi. Pojava bulbarne disfunkcije, disfagije i aspiracijske pneumonije označava prijelaz bolesti u životno ugrožavajuće neurološko stanje koje zahtijeva rano prepoznavanje, zaštitu dišnog puta i intenzivističko zbrinjavanje. Terapijska plazmafereza predstavlja važnu terapiju eskalacije u teškim upalnim demijelinizacijskim bolestima središnjeg živčanog sustava, osobito u fulminantnom kliničkom tijeku ili pri nedostatnom odgovoru na kortikosteroidnu terapiju.

Ključne riječi: transverzalni mijelitis; terapijska plazmafereza; disfagija; aspiracijska pneumonija; respiratorna insuficijencija; jedinica intenzivnog liječenja

FROM REFRACTORY VOMITING TO RESPIRATORY FAILURE: THERAPEUTIC PLASMA EXCHANGE IN SEVERE TRANSVERSE MYELITIS — AN INTENSIVE CARE UNIT CASE REPORT

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Background: Acute transverse myelitis is an inflammatory syndrome of the spinal cord that most commonly presents with motor, sensory, and autonomic dysfunction. However, in cases involving the brainstem and cervicomedullary region, the initial clinical presentation may be atypical and misleading, potentially delaying diagnosis and timely immunomodulatory treatment.

Case presentation: We present the case of an adult male who initially presented with persistent epigastric discomfort, nausea, recurrent vomiting, and significant weight loss. Gastroenterological evaluation revealed a hiatal hernia, gastroduodenitis, and Helicobacter pylori infection, but no findings that could fully explain the progressive clinical course. Over the following weeks, the patient developed gait instability, vertigo, blurred vision, diplopia, dysphagia, and episodes of transient loss of consciousness. Neurological evaluation, including magnetic resonance imaging of the brain and cervical spinal cord, as well as cerebrospinal fluid analysis, suggested an inflammatory demyelinating process consistent with severe transverse myelitis involving the brainstem and cervicomedullary region.

Treatment and outcome: Due to progressive dysphagia and a high risk of aspiration, the patient developed aspiration pneumonia and acute hypoxemic respiratory failure, requiring intubation, invasive mechanical ventilation, and transfer to the intensive care unit. Intensive care management included airway protection, respiratory support, repeated bronchial toilet, high-dose intravenous corticosteroids, antimicrobial therapy, nutritional support, rehabilitation, and therapeutic plasma exchange. A planned course of therapeutic plasma exchange was performed, consisting of seven therapeutic plasma exchanges. With a multidisciplinary approach and continuous intensive care monitoring, the patient's respiratory and overall clinical status gradually improved, allowing successful extubation on the fourth ICU day and completion of the planned plasma exchange course.

Conclusion: This case demonstrates that severe transverse myelitis may initially be masked by symptoms suggestive of a primary gastrointestinal disorder, which can significantly delay diagnosis. The onset of bulbar dysfunction, dysphagia, and aspiration pneumonia marks progression to a life-threatening neurological condition requiring early recognition, airway protection, and intensive care management. Therapeutic plasma exchange represents an important escalation therapy in severe inflammatory demyelinating diseases of the central nervous system, particularly in fulminant clinical courses or when the response to corticosteroid therapy is insufficient.

Keywords: transverse myelitis; therapeutic plasma exchange; dysphagia; aspiration pneumonia; respiratory failure; intensive care unit

PRIKAZ SLUČAJA: SELEKTIVNA VENTILACIJA PLUĆA PRILIKOM IZVOĐENJA BILATERALNE VIDEO-ASISTIRANE TORAKOSKOPSKE SIMPATEKTOMIJE U TERAPIJI HIPERHIDROZE

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Uvod: Hiperhidroza je poremećaj prekomjerne perspiracije zbog stimulacije holinergičkih receptora pri čemu pojava perspiracije je prekomjerna u odnosu na količinu potrebnu za termoregulaciju. Pojačana perspiracija se može javiti generalizirano ili lokalno na dlanovima, stopalima glavi i aksilama. Video-asistirana torakoskopska simpatektomija (VATS) je hirurški modalitet terapije pri čemu se prekida simpatički lanac njegovim potpunim presjecanjem na željenoj visini lanca ili termoablacijom simpatičkog ganglija koji odgovara željenoj razini.

Prikaz slučaja: Pacijentica dobi 32 godine je podvrgnuta VATS tretmanu nakon prethodno neuspjelih konzervativnih metoda terapije. Anamnestički se izdvaja dugogodišnja primarna hiperhidroza, bez ostalih komorbiditeta. Uvod u opštu anesteziju se načini u supinacionom položaju, ordinira se intravenski anestetik, opioid te brzodjelujući mišićni relaksant i pacijentica se intubira dvolumenskim tubusom. Održavanje anestezije se načini u kombinaciji sa inhalacionim anestetikom i zrakom uz inicijalnu obostranu ventilaciju, zatim se pacijentica postavlja u polusjedeći položaj pod uglom 40° uz zaštićene predisponirane tačke pritiska. Prije incizije u prednjoj aksilarnoj liniji i pristupanja desnom hemitoraksu započne jednostrana protektivna ventilacija lijevog pluća uz 50% frakciju O2, PEEP, niži tidal volumen i višu respiratornu frekvencu. Nakon presjecanja simpatičkog lanca na visini T2-T3 i završetka hirurškog tretmana, započinje ventilacija kolabiranog desnog pluća. Operativni zahvat se nastavlja sa lijeve strane, pri čemu se načini jednostrana ventilacija desnog pluća na isti način. U toku operativnog zahvata intermitentno ordinirana opijatna i neopijatna analgezija, mišićni relaksant, intravenska nadoknada tečnosti i antiemetici. Po završetku operativnog zahvata pacijentica se postavlja u supinacioni položaj i započinje buđenje bez anesteziooloških komplikacija.

Zaključak: VATS tretman hiperhidroze je učinkovit hirurški način liječenja ali i anesteziološki izazov uz naizmjeničnu jednostranu ventilaciju pluća. Sprečavanje komplikacija započinje adekvatnim izborom pacijenta, anamnezom i fizikalnim pregledom a završava sa bezbijednim buđenjem pacijenta.

Ključne riječi: Video-asistirana torakoskopska simpatektomija, Jednostrana ventilacija pluća, Hiperhidroza

CASE REPORT: SELECTIVE LUNG VENTILATION DURING BILATERAL VIDEO-ASSISTED THORACOSCOPIC SYMPATHECTOMY IN THE THERAPY OF HYPERHIDROSIS

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Introduction: Hyperhidrosis is a disorder characterized by excessive sweating caused by the stimulation of cholinergic receptors, resulting in perspiration that exceeds the amount required for thermoregulation. Increased sweating can occur as a generalized condition or localized to the palms, soles, head, and axillae. Video-assisted thoracoscopic sympathectomy (VATS) is a surgical therapeutic method in which the sympathetic chain is interrupted either by complete transection at the desired level or by thermoablation of the sympathetic ganglion corresponding to the targeted level.

Case report: A 32-year-old female patient underwent VATS treatment following previously unsuccessful non-surgical therapeutic modalities. Medical history revealed no comorbidities, with generalized primary hyperhidrosis present for several years. Induction of general anesthesia was performed in the supine position; an intravenous anesthetic, an opioid, and a short-acting muscle relaxant were administered, and the patient was intubated using a double-lumen endotracheal tube. Maintenance of anesthesia was achieved with a combination of an inhalational anesthetic and air, utilizing bilateral lung ventilation. The patient was then placed in a semi-sitting position at a 40° angle with all pressure points protected. Before the surgeon made an incision in the anterior axillary line, entered the right hemithorax, one-lung ventilation (OLV) of the left lung was initiated using 50% O2, PEEP, lower tidal volumes, and a higher respiratory rate. Following the transection of the sympathetic chain at the T2-T3 level and completion of the surgical procedure on that side, recruitment and ventilation of the collapsed right lung began. The procedure continued on the left side, during which one-lung ventilation of the right lung was performed in the same manner. Throughout the surgery, opioid and non-opioid analgesia, muscle relaxants, intravenous fluid replacement, and antiemetics were intermittently administered. Upon completion of the surgical procedure, the patient was returned to the supine position, and emergence from anesthesia was initiated, proceeding without any anesthetic complications.

Conclusion: VATS management of hyperhidrosis is an effective surgical modality, but it also presents an anesthetic challenge due to alternating one-lung ventilation. The prevention of complications begins with proper patient selection, thorough medical history, and physical examination, and concludes with the safe emergence of the patient from anesthesia.

Key words: Video-assisted thoracoscopic sympathectomy, One lung ventilation, Hyperhidrosis

NEPREPOZNATI DEFORMITET GRUDNOG KOŠA SA KARDIOVASKULARNIM POSLJEDICAMA I TROMBOZOM V. CENTRALIS RETINAE: ZNAČAJ DETALJNE ANAMNEZE I PRAVOVREMENE DIJAGNOSTIKE

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Uvod: Pectus excavatum je urođeni deformitet grudnog koša, pri čemu su prsna kost i rebra uvučeni unutra, praveći konkavno udubljenje.

Case report: Pacijenitca životne dobi 33 godine prezentuje se sa gubitkom vida na lijevom oku na Kliniku za očne bolesti. Pored toga žali se na učestale glavobolje i nelagodu praćenu lupanjem srca pri pritisku na prsnu kost. Od ranije pacijenitca ima varikorzitete donjih ekstremiteta i miopiju. Pregledom oftalmologa ustanovi se tromboza v. centralis retine. Uputi se na pregled neurologu, načini se kontrolni CT mozga koji je uredan. Načini se CD arterija vrata, kao i MRI mozga koji su bez patoloških promjena. Internističkom obradom i ehokardiografijom srca ustanovi se postojanje manjeg defekta interventrikularnog septuma sa LD šantom. U desnom atriju horizontalna hiperehogena sjena. Auskultatorno šum duž lijeve strane sternuma. Dalje se uputi na CT angiografiju aorte i TTE. CT angiografijom opiše se uzgredan nalaz: vidljiv deformitet grudnog koša po tipu pectus excavatuma sa blagom kompresijom distalnog dijela korpusa sternuma i ksifoidnog nastavka. Nalaz TTE uredan, preporuči se magnet srca. Načini se kontrolni magnet glave i vrata koji su uredni. Pregled torakalnog hirurga, gdje se fizikalnim nalazom potvrdi deformitet donjeg dijela prsne kosti po tipu pectus excavatusa uz torziju vrha prsne kosti lijevo. Indicira se operativni tretman koji se i načini: Resectio cartilagines costarum No IV-VI bil partialis sec. Ravich, Transectio sterni chirugica corectio deformitas cum corpora metalicum NoII, Redon drainage subcutis. Kontrolni RTG pluća, UZ srca nisu pokazivali nikakve patološke nalaze. Nakon dvije godine, bez subjektivnih tegoba, pacijentica se ponovo podvrgne operativnom zahvatu vađenja materijala, načini se operativni tretman: Extractio corpora metalicum correctiva NoII ex excisionem cicatrici keloides regiones sternalis, cicatrix keloides vulneris operative.

Zaključak: Pronalaženje dijagnoze kod pacijenata sa atipičnom simptomatologijom je mukotrpno ponekad i obeshabrujuće. Ipak potrebno je ostati uporan i sistematičan, iskoristiti maksimalno sve dijagnostičke mogućnosti, a prije svega posvetiti vrijeme detaljoj anamnezi i temeljitom fizikalnom pregledu. Sagledavanje pacijenta u cjelini uz povezivanje kliničkih i dijagnostičkih nalaza je ključni korak na putu do prave dijagnoze.

UNRECOGNIZED CHEST WALL DEFORMITY WITH CARDIOVASCULAR CONSEQUENCES AND CENTRAL RETINAL VEIN THROMBOSIS: THE IMPORTANCE OF A DETAILED MEDICAL HISTORY AND TIMELY DIAGNOSIS

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Introduction: Pectus excavatum is a congenital chest wall deformity characterized by inward displacement of the sternum and ribs, resulting in a concave depression of the anterior chest wall.

Case report: A 33-year-old female patient presented to the Department of Ophthalmology with vision loss in the left eye, with frequent headaches and discomfort accompanied by palpitations when pressure occure the sternum. Medical history included varicose veins of the lower extremities and myopia. Ophthalmological examination revealed central retinal vein thrombosis. Neurological evaluation, and a follow-up brain CT scan showed no abnormalities. Carotid artery Doppler ultrasonography and brain MRI were also performed, with no pathological findings. Internal medicine evaluation and echocardiography revealed a small ventricular septal defect with a left-to-right shunt. A horizontal hyperechoic in the right atrium. On auscultation, a murmur was detected along the left sternal border. The patient was referred for CT angiography of the aorta and transthoracic echocardiography (TTE). CT angiography incidentally revealed a chest wall deformity consistent with pectus excavatum, with mild compression of the distal sternum and xiphoid process. TTE showed no pathological findings. Follow-up MRI of the head and neck was also unremarkable. A thoracic surgical consultation was performed, and physical examination confirmed a deformity of the lower sternum consistent with pectus excavatum, with leftward torsion of the sternal tip. Surgical treatment was indicated Resectio cartilagines costarum No IV-VI bil partialis sec. Ravich, Transectio sterni chirugica corectio deformitas cum corpora metalicum NoII, Redon drainage subcutis. Two years later, the patient, with no subjective complaints, underwent a second surgical procedure for removal of the corrective material. The following procedure was performed: Extractio corpora metalicum correctiva NoII ex excisionem cicatrici keloides regiones sternalis, cicatrix keloides vulneris operative.

Conclusion: Establishing a diagnosis in patients with atypical symptomatology can be challenging and discouraging. It is essential to remain persistent and systematic, with all available diagnostic modalities, and a detailed medical history and physical examination. A comprehensive assessment of the patient, integrating clinical findings with diagnostic results, is a key step toward correct diagnosis.

REVERSIBLE ENCEPHALOPATHY SYNDROME (PRES) IN PREGNANCY - CASE SERIES

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Introduction: Posterior Reversible Encephalopathy Syndrome (PRES) is a rare neurological condition characterized by specific neurological symptoms and a distinctive radiological appearance. It most commonly occurs in young women. Significant etiological and risk factors for PRES include uncontrolled hypertension, eclampsia, kidney and liver diseases, immunosuppressive therapy, and septic conditions. Symptoms vary, commonly including headache, seizures, and focal neurological deficits. Mental status changes such as disorientation, somnolence, or stupor may occur. Visual disturbances like diplopia, vision loss, hemianopia, or light perception absence can also manifest.

Methods: This case series presents six patients diagnosed with PRES during pregnancy or the early postpartum period, hospitalized at the University Clinical Centre of the Republic of Srpska between 2017 and 2025. The study was approved by the Institutional Ethics Committee. Data were collected retrospectively, by reviewing and analyzing medical documentation from the Clinical Information System.

Results: All patients required intensive care unit (ICU) admission. Diagnosis was established using computerized tomography (CT) scans and magnetic resonance imaging (MRI). All patients were hypertensive and received antihypertensive medications and magnesium sulfate as part of their therapy. Four patients were in their first pregnancy, and two were in their second pregnancy. Headache was a universal symptom, and three patients experienced generalized tonic-clonic seizures. Five newborns were delivered at term with Apgar scores of 9/10, while one was born prematurely at 26 weeks due to maternal status epilepticus. Five patients delivered via Cesarean section, and one vaginally.

Discussions/Conclusions: Although PRES is rare, it is crucial to recognize its significance, particularly in pregnant women with preeclampsia/eclampsia. Early radiological diagnosis is highly recommended for all pregnant and postpartum women presenting with neurological symptoms. Prompt initiation of treatment and a multidisciplinary approach are essential. All patients in this series were discharged in stable general condition, with one patient subsequently diagnosed with epilepsy requiring long-term antiepileptic therapy. This underscores the importance of timely intervention for favorable outcomes.

References:
1. Vuong ADB, Pham XTT, Nguyen PN. Posterior reversible encephalopathy syndrome (PRES) on the second postpartum day: learning experience from a case report and literature review. Int J Emerg Med. 2024 Sep 9;17(1):118.
2. Wen Y, Yang B, Huang Q, Liu Y. Posterior reversible encephalopathy syndrome in pregnancy: a retrospective series of 36 patients from mainland China. Ir J Med Sci. 2017 Aug;186(3):699-705.
3. Wen Y, Yang B, Huang Q, Liu Y. Posterior reversible encephalopathy syndrome in pregnancy: a retrospective series of 36 patients from mainland China. Ir J Med Sci. 2017 Aug;186(3):699-705.

SINDROM POSTERIORNE REVERZIBILNE ENCEFALOPATIJE U TRUDNOĆI (PRES) - CASE SERIES

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Uvod: Sindrom posteriorne reverzibilne encefalopatije (PRES) je rijetko neurološko stanje koje karakterišu specifični neurološki simptomi i karakterističan radiološki nalaz. Najčešće se javlja kod mlađih žena. Značajni etiološki faktori i faktori rizika za razvoj PRES-a uključuju nekontrolisanu hipertenziju, eklampsiju, bolesti bubrega i jetre, imunosupresivnu terapiju i septična stanja. Simptomi su različiti, a najčešće uključuju glavobolju, konvulzije i fokalne neurološke ispade. Mogu se javiti i promjene mentalnog statusa, poput dezorijentacije, somnolencije ili stupora. Takođe se mogu ispoljiti poremećaji vida kao što su diplopija, gubitak vida, hemianopsija ili potpuni gubitak percepcije svjetlosti.

Metode: Ova serija slučajeva prikazuje šest pacijentkinja kod kojih je dijagnostikovan PRES tokom trudnoće ili u ranom postpartalnom periodu, a koje su liječene u Univerzitetskom kliničkom centru Republike Srpske u periodu od 2017. do 2025. godine. Studiju je odobrio Etički odbor ustanove. Podaci su prikupljeni retrospektivno, pregledom i analizom medicinske dokumentacije iz Kliničkog informacionog sistema.

Rezultati: Sve pacijentkinje zahtijevale su prijem u jedinicu intenzivne njege (JIN). Dijagnoza je postavljena na osnovu nalaza kompjuterizovane tomografije (CT) i magnetne rezonance (MR). Sve pacijentkinje bile su hipertenzivne i u okviru terapije primale su antihipertenzivne lijekove i magnezijum-sulfat. Četiri pacijentkinje bile su u prvoj, a dvije u drugoj trudnoći. Glavobolja je bila prisutna kod svih pacijentkinja, dok su tri imale generalizovane toničko-kloničke konvulzije. Pet novorođenčadi rođeno je u terminu, sa Apgar skorom 9/10, dok je jedno dijete rođeno prijevremeno, u 26. nedjelji gestacije, zbog statusa epilepticusa kod majke. Pet pacijentkinja porođeno je carskim rezom, a jedna vaginalnim putem.

Diskusija/Zaključci: Iako je PRES rijedak, od ključnog je značaja prepoznati njegovu važnost, posebno kod trudnica sa preeklampsijom ili eklampsijom. Rana radiološka dijagnostika se preporučuje kod svih trudnica i žena u postpartalnom periodu koje imaju neurološke simptome. Pravovremeno započinjanje liječenja i multidisciplinarni pristup od suštinskog su značaja. Sve pacijentkinje iz ove studije su otpuštene su u stabilnom opštem stanju, dok je kod jedne pacijentkinje naknadno dijagnostikovana epilepsija, zbog čega je bila potrebna dugotrajna antiepileptička terapija. Ovo naglašava značaj pravovremene intervencije za postizanje povoljnog ishoda.

PREVALENCIJA I KARAKTERISTIKE HRONIČNOG POSTOPERATIVNOG BOLA NAKON CARSKOG REZA: REZULTATI ONLAJN ANKETNOG ISTRAŽIVANJA

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Uvod: Hronični postoperativni bol (CPSP) nakon carskog reza predstavlja značajan klinički i javnozdravstveni problem, koji može imati dugotrajne fizičke, psihološke i funkcionalne posljedice. Iako je carski rez jedna od najčešće izvođenih operacija u svijetu, podaci o učestalosti i faktorima rizika za razvoj CPSP-a u ovoj populaciji i dalje su heterogeni i nedovoljno istraženi.

Cilj: Cilj ovog istraživanja bio je ispitati prevalenciju, karakteristike i potencijalne faktore povezane sa razvojem CPSP nakon carskog reza, kao i njegov uticaj na svakodnevni život i kvalitet života žena.

Metodologija: Sprovedena je opservaciona studija presijeka eksplorativnog karaktera, zasnovana na online anketnom upitniku. U istraživanje je uključeno 635 ispitanica kod kojih je od carskog reza proteklo najmanje tri mjeseca. Prikupljeni su podaci o demografskim i kliničkim karakteristikama, intenzitetu i trajanju bola, primjeni analgetske terapije i funkcionalnim ishodima. CPSP je definisan kao bol koji traje duže od tri mjeseca nakon operacije. Procjena intenziteta bola zasnivala se na retrospektivnoj samoprocjeni ispitanica. Statistička analiza obuhvatila je deskriptivne metode i χ^2 test.

Rezultati: Postoperativni bol prijavilo je 90,1% ispitanica, dok je hronični bol (>3 mjeseca) zabilježen kod 14,3% žena. Prosječan intenzitet akutnog bola iznosio je 6,35 ± 2,81, što ukazuje na umjeren do izražen bol. Uočena je statistički značajna povezanost između intenziteta samoprijavljenog bola kod ispitanica i razvoja CPSP-a ($p = 0,03$), uz jasan trend porasta učestalosti CPSP-a sa porastom intenziteta bola. CPSP je bio nešto češći kod ispitanica koje su imale carski rez u opštoj anesteziji u poređenju sa spinalnom anestezijom ali bez statističke značajnosti (15,9% naspram 9,5%; $p = 0,103$). Hronični bol bio je značajno povezan sa nepovoljnim funkcionalnim ishodima, uključujući poremećaj sna, ograničenja u svakodnevnim aktivnostima, poteškoće u brizi o novorođenčetu, pogoršano raspoloženje i smanjen kvalitet života. Uprkos visokoj učestalosti i intenzitetu bola, značajan broj ispitanica nije koristio analgetike, što može ukazivati na tendenciju tolerisanja bola i izbjegavanje farmakološkog liječenja.

Zaključak: Hronični postoperativni bol nakon carskog reza predstavlja relativno čestu komplikaciju sa značajnim uticajem na svakodnevno funkcionisanje i kvalitet života žena. Intenzitet postoperativnog bola predstavlja važan faktor povezan sa razvojem CPSP-a. Rezultati ukazuju na potrebu za unapređenjem postoperativne analgezije, boljom edukacijom pacijentkinja i primjenom integrisanog, multidisciplinarnog pristupa u prevenciji i liječenju hroničnog bola nakon carskog reza.

UTAPANJE, MJERE ZBRINJAVANJA

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Utapanje se definiše kao proces razvoja respiratornog oštećenja zbog uranjanja ili potapanja u tekući medij. Ishodi mogu biti kao smrt, morbiditet ili bez morbiditeta. Termini "mokro utapanje", "suho utapanje" i "blizu utapanja" više nisu prihvaćeni, iako se mogu pojaviti u starijoj literaturi.

Moderna klasifikacija razlikuje fatalno utapanje, koje rezultira smrću, i nefatalno utapanje, koje rezultira preživljavanjem sa ili bez morbiditeta.

Reanimacija može započeti umjetnim disanjem u vodi, koje bi trebali pokušavati samo obučeni spasioci kada se može sigurno izvesti. U ovoj tehnici, spasilac postavlja žrtvu licem prema gore, otvara disajne puteve istezanjem vrata, zatvara usta preko nosa žrtve i isporučuje zrak.

Etiologija uključuje slučajno ili namjerno utapanje u vodu, s faktorima rizika koji uključuju mladu životnu dob, muški spol, upotrebu alkohola i droga, neadekvatan nadzor, prethodna medicinska stanja i nedostatak sposobnosti plivanja.

Patofiziologija :se fokusira na opstrukciju disajnih puteva, aspiraciju i hipoksemiju, što brzo dovodi do cerebralne hipoksije i multiorganske disfunkcije. Klinička slika varira od kašlja, dispneje i promijenjenog mentalnog stanja do srčanog zastoja

Metode: Specialno disanje u vodi trebaju izvoditi samo obučeni spasioci. Ova intervencija prekida progresiju do srčanog zastoja, ali treba je primijeniti samo kada je sigurna.

Rutinska imobilizacija vratne kičme indicirana je samo za pacijente s anamnezom ili znacima traume, poput traume od ronjenja ili pada. Ovaj ciljani pristup izbjegava odgađanje upravljanja disajnim putevima i reanimacije kod žrtava utapanja bez sumnje na povredu kičme. Hipotermiju treba rješavati pasivnim mjerama, uključujući izolacijske pokrivače i uklanjanje mokre odjeće. Kontinuirano praćenje svijesti, respiratornog napora i pulsa vodi do odluka o eskalaciji.

Cilj: Rano upravljanje utapanjem počinje na mjestu događaja, dajući prioritet sigurnosti spasioca i pacijenta brzim izvlačenjem nakon čega slijedi hitna procjena disajnih puteva, disanja i cirkulacije. Budući da je hipoksija tkiva, posebno cerebralna hipoksija, glavni faktor morbiditeta i mortaliteta kod nefatalnog utapanja, disajni putevi i disanje imaju prednost nad kompresijama grudnog koša. Spasilačko disanje treba odmah započeti kod pacijenata s apnejom, uz primjenu dodatnog kisika ako je dostupan. Trenutne smjernice preporučuju 5 početnih spasilačkih udisaja prije kompresija grudnog koša, za razliku od uobičajena 2 udisaja u standardnoj BLS metodi.

Zaključak: Zbrinjavanje utapanja zahtijeva interdisciplinarni tim. Ovaj tim se sastoji od ljekara hitne pomoći kao vođe, uz podršku ljekarskih asistenata, medicinskih sestara praktičara, medicinskih sestara, respiratornih terapeuta i osoblja hitne medicinske pomoći. kao i intenzivista i pedijatara kada je u pitanju briga o kritično bolesnim ili pedijatrijskim pacijentima.

Početno liječenje može uključivati:uređaje za isporuku kisika kao što su nazalna kanila, jednostavna maska za lice ili maska bez ponovnog udisanja. Ovisno o težini hipoksemije, može biti potrebna neinvazivna ventilacija ili endotrahealna intubacija. Kisik treba titrirati kako bi se održala zasićenost kisikom između 92% i 96%, izbjegavajući pritom hiperoksiju.

Respiratorni terapeuti pomažu u praćenju pacijentovog odgovora na terapiju kisikom i farmakološke intervencije, koordinirajući s ljekarom optimizaciju statusa dišnih puteva i ventilacije. ACLS protokoli trebaju voditi liječenje ako dođe do srčanog zastoja. Infuzija kristaloida i, kada je potrebno, vazopresora, može biti potrebna za liječenje refraktorne hipotenzije.

Ključne riječi: prva pomoć, multidisciplinarni pristup, hitna ct, rtg dijagnostika, lab.dijagnostika, intenzivno liječenje.

DROWNING – MANAGEMENT MEASURES

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Drowning is defined as the process of developing respiratory impairment resulting from submersion or immersion in a liquid medium. Outcomes may include death, morbidity, or survival without morbidity. The terms "wet drowning," "dry drowning," and "near-drowning" are no longer accepted, although they may appear in older literature.

Modern classification distinguishes between fatal drowning, which results in death, and non-fatal drowning, which results in survival with or without morbidity.

Resuscitation may begin with in-water rescue breathing; this should be attempted only by trained rescuers when it can be performed safely. In this technique, the rescuer positions the victim face-up, opens the airway by extending the neck, seals their mouth over the victim's nose, and delivers air.

Etiology involves accidental or intentional drowning; risk factors include young age, male gender, alcohol and drug use, inadequate supervision, pre-existing medical conditions, and a lack of swimming ability.

Pathophysiology: Focuses on airway obstruction, aspiration, and hypoxemia, rapidly leading to cerebral hypoxia and multiorgan dysfunction. The clinical presentation ranges from cough, dyspnea, and altered mental status to cardiac arrest.

Methods: Specialized in-water rescue breathing should be performed only by trained rescuers. This intervention halts progression to cardiac arrest but should be implemented only when safe to do so.

Routine cervical spine immobilization is indicated only for patients with a history or signs of trauma, such as diving injuries or falls. This targeted approach avoids delaying airway management and resuscitation in drowning victims where there is no suspicion of spinal injury. Hypothermia should be managed using passive measures, including insulating blankets and the removal of wet clothing. Continuous monitoring of consciousness, respiratory effort, and pulse guides decisions regarding escalation of care.

Objective: Early management of drowning begins at the scene, prioritizing rescuer and patient safety through rapid extraction, followed by an urgent assessment of airway, breathing, and circulation. Since tissue hypoxia—particularly cerebral hypoxia—is a major factor in morbidity and mortality associated with non-fatal drowning, airway and breathing take precedence over chest compressions. Rescue breathing should be initiated immediately in apneic patients, with the administration of supplemental oxygen if available. Current guidelines recommend five initial rescue breaths prior to chest compressions, as opposed to the two breaths standard in conventional BLS protocols.

Conclusion: Drowning management requires an interdisciplinary team. This team consists of an emergency physician as the leader, supported by physician assistants, nurse practitioners, nurses, respiratory therapists, and emergency medical personnel, as well as intensivists and pediatricians when caring for critically ill or pediatric patients.

Initial treatment may involve oxygen delivery devices such as a nasal cannula, simple face mask, or non-rebreather mask. Depending on the severity of hypoxemia, non-invasive ventilation or endotracheal intubation may be required. Oxygen should be titrated to maintain oxygen saturation between 92% and 96%, while avoiding hyperoxia.

Respiratory therapists assist in monitoring the patient's response to oxygen therapy and pharmacological interventions, coordinating with the physician to optimize airway status and ventilation. ACLS protocols should guide treatment in the event of cardiac arrest. Infusion of crystalloids and, when necessary, vasopressors may be required to treat refractory hypotension.

Keywords: first aid, multidisciplinary approach, emergency CT, X-ray diagnostics, laboratory diagnostics, intensive care.

ZBRINJAVANJE POLITRAUMATSKIH OZLJEDA DJETETA U SLUČAJU SAOBRAĆAJNE NESREĆE /PRIKAZ SLUČAJA

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Uvod: Politrauma se definiše kao ozljeda pri kojoj su zahvaćena dva sistema ili dva različita organa, pri čemu jedna od ozljeda ugrožava bolesnikov život. Prema statističkim podacima, politrauma iznosi 3-8% svih ozljeda, a stopa smrtnosti politraumatiziranih osoba kreće se od 25 do 35%. Kada govorimo o samom zbrinjavanju politrauma ono se može vršiti na nekoliko razina

Metode: Akutno zbrinjavanje obuhvata ABCDE algoritme s naglaskom na posebne značajke kod djece, uključujući dobno specifične referentne vrijednosti. Preporučuje se liječenje u referentnom centru za pedijatrijsku traumu traumatske mreže. Kompjuterizirana tomografija (CT) treba se provoditi kod djece u skladu s definiranim kriterijima , kao timska odluka i uz korištenje dobno specifičnih CT protokola. Kod djece, kao i kod odraslih, testovi na mjestu zbrinjavanja temeljeni su na brzom dijagnosticiranju .

Prema istraživanju o zdravstvenom intervjuu i pregledu djece i adolescenata više od jednog od sedmero djece/adolescenata (16%) svake godine zadobije ozljedu povezanu s nesrećom koja zahtijeva liječenje . Većina nesreća koje uključuju malu djecu događa se kod kuće (60%), dok se većina nesreća koje uključuju djecu školske dobi i stariju događa tijekom igre, sportskih i slobodnih aktivnosti (39%) ili u obrazovnim ustanovama (29%);. Broj nesreća na javnim cestama utrostručuje se od male djece (6%) do adolescenata (17%).

U 2022. godini 25 800 djece mlađe od 15 godina ozlijeđeno je u saobraćajnim nesrećama čoja prevalenca iznosi (0,2%;). Teška politrauma sa/bez krvarenja čini 4% svih slučajeva politraume i rijetko se susreće u hitnim slučajevima . Većina prometnih nesreća (42%) događa se na biciklima, trećina u automobilima, a oko petina kao pješaci. U svim dobnim skupinama prometne nesreće su češće među dječacima u usporedbi s djevojčicama .

Uzorak ozljeda varira s dobi . Traumatska ozljeda mozga (TBI) najčešća je ozljeda u svim dobnim skupinama (66%).

Cilj: Klinički pregled ozljeda ekstremiteta dio je sekundarnog pregleda; provodi se nakon liječenja/kontrole životno opasnih stanja . Liječenje ozljeda kostura ne smije produžiti ukupno trajanje zbrinjavanja . Preporuke za predbolničko liječenje teško ozlijeđene djece ne razlikuju se od onih za odrasle. Kod djece je posebno važno održavati normalnu tjelesnu temperaturu, budući da zbog veće tjelesne površine brže gube toplinu, što zauzvrat može izazvati sekundarna stanja (na primjer, poremećaje koagulacije kao dio letalne trijade, kombinaciju acidoze, koagulopatije i hipotermije).

Zaključak: pružiti prvu pomoć i provesti brzi fizikalni pregled uz istovremeno omogućavanje što bolje oksigenacije organizma, zaustavljanje vanjskog krvarenja i brze nadoknade izgubljenog volumena, čime se najefikasnije smanjuje šok, hipovolemija i oštećenje tkiva. Nakon prvotnog zbrinjavanja politraumatiziranog pacijenta u izvanbolničkim uvjetima i tijekom transporta, liječenje se nastavlja u odgovarajućoj ustanovi.

Ključne riječi: multidisciplinarni pristup,ct ,rtg lab.dijagnostika,intenzivni tretman politraumatizovanog pacijenta

CARING FOR POLYTRAUMATIC INJURIES OF A CHILD IN THE EVENT OF A TRAFFIC ACCIDENT / CASE REPORT

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Introduction: Polytrauma is defined as an injury in which two systems or two different organs are affected, where one of the injuries threatens the patient's life. According to statistical data, polytrauma amounts to 3-8% of all injuries, and the death rate of polytraumatized persons ranges from 25 to 35%. When we talk about the treatment of polytrauma itself, it can be done on several levels

Methods: Acute care includes the ABCDE algorithms with an emphasis on special features in children, including age-specific reference values. Treatment at a trauma network pediatric trauma referral center is recommended. Computed tomography (CT) should be performed in children in accordance with defined criteria, as a team decision and with the use of age-specific CT protocols. In children, as in adults, point-of-care tests are based on rapid diagnosis.

According to the Child and Adolescent Health Interview and Examination Survey, more than one in seven children/adolescents (16%) each year sustains an accident-related injury that requires treatment. Most accidents involving young children occur at home (60%), while most accidents involving children of school age and older occur during play, sports and leisure activities (39%) or in educational institutions (29%);. The number of accidents on public roads triples from small children (6%) to adolescents (17%).

In 2022, 25,800 children under the age of 15 were injured in traffic accidents, with a prevalence of (0.2%). Severe polytrauma with/without bleeding accounts for 4% of all polytrauma cases and is rarely encountered in emergency situations. Most traffic accidents (42%) happen on bicycles, a third in cars, and about a fifth as pedestrians. In all age groups, traffic accidents are more common among boys compared to girls.

The pattern of injuries varies with age. Traumatic brain injury (TBI) is the most common injury in all age groups (66%).

Objective: Clinical examination of limb injuries is part of the secondary examination; is carried out after treatment/control of life-threatening conditions. Treatment of skeletal injuries should not prolong the total duration of care. Recommendations for prehospital treatment of severely injured children do not differ from those for adults. In children, it is especially important to maintain a normal body temperature, since due to a larger body surface, they lose heat more quickly, which in turn can cause secondary conditions (for example, coagulation disorders as part of the lethal triad, a combination of acidosis, coagulopathy and hypothermia).

Conclusion: provide first aid and conduct a rapid physical examination while simultaneously ensuring the best possible oxygenation of the body, stopping external bleeding and quickly replacing lost volume, which most effectively reduces shock, hypovolemia and tissue damage. After the initial treatment of the polytraumatized patient in outpatient conditions and during transport, the treatment continues in the appropriate institution.

Key words: multidisciplinary approach, ct, x-ray lab. diagnosis, intensive treatment of a polytraumatized patient.

PRIKAZ SLUČAJA: TERAPIJSKI MODALITETI BOLA POSTHERPETIČNE NEURALGIJE

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Uvod: Postherpetična neuralgija predstavlja hronični neuropatski sindrom uzrokovan reaktivacijom Varicella Zoster virusa. Kliničku sliku karakteriše spontana pojava oštrog, žarećeg bola unutar zahvaćenog dermatoma, koji perzistira i nakon povlačenja akutnih kožnih promjena. Bolna senzacija može biti kontinuirana ili intermitentna, promjenljivog intenziteta od blaže nelagode do izrazito snažnog bola. Ovakva klinička prezentacija je praćena anksioznošću i poremećajima spavanja, što značajno kompromitira svakodnevno funkcioniranje pacijenta.

Prikaz slučaja: Pacijent životne dobi od 60 godina, javlja se u Ambulantu za terapiju bola s anamnezom hroničnog neuropatskog bola u desnoj hemitorakalnoj regiji, koji perzistira osam mjeseci nakon saniranja akutnih kožnih promjena. Kliničku sliku, uz dominantan algički sindrom, karakterišu teški poremećaji sna, anksiozno-depresivna simptomatologija, te potpuna radna i funkcionalna nesposobnost za obavljanje profesionalnih i svakodnevnih aktivnosti. U dosadašnjoj anamnezi navodi neadekvatnu analgetsku terapiju, uz prethodno provedene specijalističke preglede i tretmane od strane neurologa, psihologa i psihijatra. U sklopu daljeg zbrinjavanja, pacijentu je inicijalno apliciran paravertebralni blok na četiri nivoa uz uvođenje Gabapentina u terapijsku šemu. Na prvoj kontrolnoj reevaluaciji registrovano je značajno smanjenje intenziteta bola. Tokom narednih faza liječenja provedena je trigger point terapija i započet ciklus medicinske akupunkture. Unutar perioda od dva mjeseca realizovano je ukupno osam akupunkturnih tretmana, nakon čega pacijent navodi drastično poboljšanje kvaliteta sna, gotovo potpuno povlačenje bola i stabilizaciju psihičkog statusa. Nakon naknadne aplikacije drugog paravertebralnog bloka na četiri nivoa, pacijent na kontrolnom pregledu izvještava o intermitentnim bolovima slabijeg intenziteta, koje uspješno kupira povremenom primjenom analgetika. Multimodalna terapija daje rezultat sveobuhvatnog oporavka, urednom kvalitetom sna, te potpunom restitucijom funkcionalnih sposobnosti i povratkom redovnim radnim aktivnostima.

Zaključak: Terapijski pristup hroničnom neuropatskom bolu kod postherpetične neuralgije temelji se na adekvatno postavljenoj dijagnozi i individualnom pristupu. Kontinuirana komunikacija sa pacijentom i praćenje kliničkog odgovora pacijenta predstavljaju imperativ u procjeni uspješnosti terapije. Liječenje ovog bola mora biti u etapama sa jasno postavljenim ciljem – zadovoljan i obezboljen pacijent.

Ključne riječi: Postherpetična neuralgija, Analgezija, Terapija bola, Akupunktura

CASE REPORT: MULTIMODAL MANAGEMENT OF PAIN IN POSTHERPETIC NEURALGIA

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Introduction: Postherpetic neuralgia represents a chronic neuropathic syndrome caused by the reactivation of the Varicella Zoster virus. The clinical presentation is characterized by the spontaneous onset of sharp, burning pain within the affected dermatome, which persists even after the resolution of acute skin lesions. The painful sensation can be continuous or intermittent, varying in intensity from mild discomfort to extremely severe pain. This clinical presentation is accompanied by anxiety and sleep disorders, which significantly compromise the patient's daily functioning.

Case report: A 60-year-old patient presents to the Pain Therapy Outpatient Clinic with a history of chronic neuropathic pain in the right hemithoracic region, persisting for eight months after the resolution of acute skin lesions. The clinical picture, alongside the dominant algesic syndrome, is characterized by severe sleep disturbances, anxiety-depressive symptoms, and complete occupational and functional disability for professional and daily activities. Previous history indicates inadequate analgesic therapy, alongside prior specialist examinations and treatments by neurologist, psychologist, and psychiatrist. As part of further management, the patient initially received a four-level paravertebral block along with the introduction of Gabapentin into the therapeutic regimen. At the first follow-up re-evaluation, a significant reduction in pain intensity was registered. During subsequent treatment phases, trigger point therapy was administered, and a cycle of medical acupuncture was initiated. Over a two-month period, a total of eight acupuncture treatments were performed, after which the patient reported a drastic improvement in sleep quality, almost complete pain relief, and stabilization of their psychological status. Following the subsequent administration of a second four-level paravertebral block, the patient reported intermittent lower-intensity pain at the control examination, which is successfully managed with occasional analgesics. Multimodal therapy yields the result of comprehensive recovery, normal sleep quality, and complete restitution of functional capacities and return to regular work activities.

Conclusion: The therapeutic approach to chronic neuropathic pain in postherpetic neuralgia is based on an adequately established diagnosis and an individualized approach. Continuous communication with the patient and monitoring of the patient's clinical response are imperative in evaluating treatment success. The treatment of this pain must be staged with a clearly defined goal – a satisfied and pain-free patient.

Keywords: Postherpetic neuralgia, Analgesia, Pain therapy, Acupuncture

IZAZOVI IZVOĐENJA PARAVERTEBRALNOG BLOKA KOD GOJAZNE OSOBE-PRIKAZ SLUČAJA

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Uvod: Akutna mijalgija je iznenadna i oštra bol u mišićima koja obično traje kratko, a najčešće nastaje zbog prekomjernog naprezanja, ozljede ili virusne infekcije. Paravertebralne blokade nude olakšanje od hronične boli, prvenstveno u prsima, trbušnoj stijenci i gornjem dijelu leđa, bez većeg hirurškog zahvata. Ova ciljana tehnika upravljanja boli pruža olakšanje upravo tamo gdje bol počinje: živcima u blizini kralježnice.

Prikaz slučaja: Pacijentica, 47 godina, s BMI 35,4 kg/m² i anamnezom arterijske hipertenzije, nakon povratka iz Afrike razvija intenzivnu bol u nivou Th10–Th11, s propagacijom duž rebara prema prednjoj strani toraksa, izraženije lijevo. Bol je bila oštrog, probadajućeg i kontinuiranog karaktera, intenziteta NRS 9/10, s pogoršanjem pri pokretima i djelimičnim olakšanjem zauzimanjem prinudnog položaja. Prisutni su bili stezanje u prsima i bol pri disanju. Uprkos dvodnevnoj peroralnoj analgetskoj terapiji, nije postignuta adekvatna kontrola boli. Nakon pregleda hirurga, torakalnog hirurga i urologa, uz urađene ultrazvučne i laboratorijske pretrage, EKG i biomarkere miokardne nekroze urednih nalaza, učinjena je CT dijagnostika vratne i torakalne kičme, vrata, toraksa, abdomena i zdjelice zbog sumnje na plućnu emboliju ili spontani pneumotoraks. Anesteziološkim pregledom utvrđena je bolnost u nivou Th10–Th11 s propagacijom duž odgovarajućeg dermatoma, bez kožnih promjena i ispada senzibiliteta. Zbog intenziteta boli i nedovoljnog odgovora na sistemsku analgeziju, indiciran je lijevostrani torakalni paravertebralni blok. Zbog izražene gojaznosti pacijentice, za adekvatnu vizualizaciju anatomskih struktura tokom izvođenja bloka korištena je konveksna ultrazvučna sonda. Nakon procedure zabilježeno je značajno smanjenje intenziteta boli, s NRS 9/10 na 4/10, što ukazuje na povoljan analgetski odgovor na regionalnu anesteziološku intervenciju.

Zaključak: Paravertebralni blok je vrlo korisna tehnika regionalne anestezije i analgezije za procedure koje uključuju torakalni i lumbalni dermatom.

Ključne riječi: paravertebralni blok, akutna mijalgija, terapija bola

CHALLENGES IN PERFORMING A PARAVERTEBRAL BLOCK IN AN OBESE PATIENT-CASE REPORT

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Introduction: Acute myalgia is characterized by sudden-onset, sharp muscle pain, which is usually short-lived and most commonly results from excessive muscle strain, injury, or viral infection. Paravertebral blocks provide pain relief in patients with thoracic, abdominal wall, and upper back pain, without the need for major surgical intervention. This targeted pain management technique provides analgesia at the source of pain by targeting the spinal nerves in close proximity to the vertebral column.

Case report: A 47-year-old female patient with a body mass index (BMI) of 35.4 kg/m² and a medical history of arterial hypertension developed severe pain at the Th10–Th11 level following her return from Africa. The pain radiated along the ribs toward the anterior chest wall, with greater intensity on the left side. It was described as sharp, stabbing, and continuous, with an intensity of 9/10 on the Numeric Rating Scale (NRS). The pain was exacerbated by movement and partially relieved by assuming an antalgic position. The patient also reported chest tightness and pain during respiration. Despite two days of oral analgesic therapy, adequate pain control was not achieved. Following evaluations by a general surgeon, thoracic surgeon, and urologist, along with ultrasonographic and laboratory investigations, electrocardiography, and myocardial necrosis biomarkers, all of which yielded unremarkable findings, computed tomography (CT) imaging of the cervical and thoracic spine, neck, thorax, abdomen, and pelvis was performed due to suspected pulmonary embolism or spontaneous pneumothorax. Anesthesiological assessment revealed tenderness at the Th10–Th11 level, with radiation along the corresponding dermatome, without cutaneous changes or sensory deficits. Due to the severity of the pain and inadequate response to systemic analgesia, a left-sided thoracic paravertebral block was indicated. Given the patient's obesity, a curvilinear ultrasound transducer was used to ensure adequate visualization of the relevant anatomical structures during block placement.
Following the procedure, a significant reduction in pain intensity was observed, from NRS 9/10 to 4/10, indicating a favorable analgesic response to the regional anesthetic intervention.

Conclusion: The paravertebral block is a valuable regional anesthesia and analgesia technique for procedures and pain management involving the thoracic and lumbar dermatomes. Its use may be particularly beneficial in patients requiring targeted analgesia when systemic pain management provides inadequate relief.

Keywords: Paravertebral block; acute myalgia; pain management.

IZAZOVI USPOSTAVLJANJA DISAJNOG PUTA KOD DJETETA SA OTOKOM VRATA I LICA-PRIKAZ SLUČAJA

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Uvod: Održavanje disajnog puta kod septičnog djeteta koje ima edem vrata i lica predstavlja jedno od najkritičnijih i najizazovnijih stanja u anesteziji. Streptokokni šok sindrom je ozbiljna i potencijalno fatalna komplikacija invazivne streptokokne infekcije, koja često proizilazi iz teških infekcija mekih tkiva sa visokom stopom smrtnosti i pored agresivne terapije.

Prikaz slučaja: Petogodišnja djevojčica hospitalizirana je na Klinici za otorinolaringologiju zbog generaliziranog osipa, inicijalno lokaliziranog na licu, s progresijom na vrat i ostatak tijela, uz febrilnost. Razvio se nagli edem lijevog obraza s progresijom na lijevu polovinu lica, periorbitalnu regiju i vrat. Kliničkim pregledom verificiran je izražen bilateralni edem lica, poglavine i vrata, uz difuzni eritem. U području lijeve polovine vrata, submentalne regije i gornje polovine lijevog hemitoraksa evidentirana je lividna diskoloracija kože s površinskim erozijama, uz lividne promjene lijeve polovine donje usne i lijeve strane jezika. Zbog progresivnog edema mekih tkiva i otežanog disanja pacijentica je hitno uvedena u operacionu salu. Endotrahealna intubacija izvedena je uz pomoć fleksibilnog optičkog bronhoskopa (FOB), nakon čega je učinjen hitni operativni zahvat. Postoperativno je, bez pokušaja buđenja, premještena u jedinicu intenzivne terapije, intubirana, sedirana i spojena na mehaničku ventilaciju. Bila je tahikardična i hipotenzivna, uz potrebu za potporom noradrenalina I dobutamina. Dijete anurično, a u laboratorijskim nalazima izražena metabolička acidoza s hiperlaktatemijom i elektrolitskim disbalansom, uz značajno povišene vrijednosti IL-6, CK, AST, CK-MB, CRP, cistatina C i mioglobina, te poremećaj koagulacije. Brzi antigenski test na streptokok grupe A bio je pozitivan. Uprkos intenzivnom liječenju, došlo je do fulminantnog pogoršanja i smrtnog ishoda.

Zaključak: Održavanje disajnog puta kod djeteta sa toksičnim šok sindromom i otokom lica i vrata je veliki izazov i za najiskusnijeg anesteziologa. Potrebno je sve pripremiti prije, te imati plan i za “can’t intubate, can’t oxygenate”.

Ključne riječi: toksični šok sindrom, disajni put, edem lica i vrata

CHALLENGES IN AIRWAY MANAGEMENT IN A CHILD WITH SEVERE FACIAL AND NECK EDEMA: CASE REPORT

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Introduction: Airway management in a septic child with severe facial and neck edema represents one of the most critical and challenging situations in anesthetic practice. Streptococcal toxic shock syndrome is a serious and potentially fatal complication of invasive group A streptococcal infection, often resulting from severe soft-tissue infections and associated with a high mortality rate despite aggressive treatment.

Case report: A five-year-old girl was admitted to the Department of Otorhinolaryngology with a generalized rash, initially localized to the face, with subsequent progression to the neck and the rest of the body, accompanied by fever. She developed sudden-onset edema of the left cheek, progressing to the left side of the face, periorbital region, and neck. Clinical examination revealed pronounced bilateral edema of the face, scalp, and neck, accompanied by diffuse erythema. Livid skin discoloration with superficial erosions was noted over the left side of the neck, submental region, and upper left hemithorax, together with livid changes involving the left half of the lower lip and the left side of the tongue. Due to progressive soft-tissue edema and respiratory distress, the patient was urgently transferred to the operating room. Endotracheal intubation was performed using a flexible fiberoptic bronchoscope (FOB), followed by emergency surgical intervention. Postoperatively, without an attempt at awakening, she was transferred to the intensive care unit, intubated, sedated, and mechanically ventilated. She was tachycardic and hypotensive, requiring hemodynamic support with norepinephrine and dobutamine. The patient became anuric, while laboratory investigations revealed severe metabolic acidosis with hyperlactatemia and electrolyte disturbances, along with markedly elevated levels of IL-6, CK, AST, CK-MB, CRP, cystatin C, and myoglobin, as well as coagulation abnormalities. A rapid antigen test for group A streptococcus was positive. Despite intensive treatment, the patient developed fulminant clinical deterioration resulting in death.

Conclusion: Maintaining the airway in a child with toxic shock syndrome and facial and neck edema is a major challenge even for the most experienced anesthesiologist. Everything should be prepared in advance, with a plan also in place for a “can’t intubate, can’t oxygenate” situation.

Keywords: toxic shock syndrome, airway management, facial and neck edema

AKUPUNKUTRA U TRETMANU BOLI KOD HRONIČNOG PAKREATITISA-PRIKAZ SLUČAJA

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Uvod: Hronični pankreatitis karakteriziran je progresivnom upalom pankreasne žlijezde i ireverzibilnom zamjenom pankreasnog parenhima fibroznim tkivom. Hronični pankreatitis često je praćen bolom, dok se s progresijom bolesti mogu razviti egzokrina i/ili endokrina insuficijencija. Međutim, liječenje bola često predstavlja izazov, a veliki broj pacijenata pati od jakog i onesposobljavajućeg abdominalnog bola koji je često refraktaran na analgetsku i/ili interventnu terapiju.

Prikaz slučaja: Pacijentica životne dobi 58 godina pregledana u ambulanti za terapiju bola pod kliničkom slikom hroničnog pankreatitisa. Anamenstički pacijentica se unazad deset godina liječi od hroničnog pankreatitisa pri čemu navodi bolove u predjelu leđa sa širenjem u stomak, osjećaj nadutosti, mućnine te poremećaj sna. Na redovnim kontrolama od strane gastroeneterologa i endokrinologa. Također, unazad tri godine na redovnim kontrolama u Centru za palijativnu njegu i terapiju bola, na redovnoj terapiji od strane ordinirajućeg ljekara. Nakon pregleda u ambulanti za terapiju bola indiciran tretman akupunturom. U toku mjesec dana sprovedeno ukupno osam akupunkturnih tretmana. Na posljednjednejm akupunkturnom tretmanu pacijentica navodi da je tretman imao za rezultat djelimično poboljšanje NRS sa 8 na NRS 4. Također navodi značajno poboljšanje kvalitete sna i obavljanje svakodnevnih i profesionalnih aktivnosti.

Zaključak: Adekvatan tretman boli predstavlja važan dio liječenja hroničnog pankreatitisa, s ciljem smanjenja intenziteta bola, poboljšanja kvaliteta sna i očuvanja svakodnevnog funkcionisanja i kvaliteta života pacijenata. Multimodalni pristup, uz primjenu komplementarnih metoda poput akupunkture, može imati značajnu ulogu u individualizaciji terapije i poboljšanju kontrole hroničnog bola.

Ključne riječi: akupunktura, bol, hornični pankreatitis

ACUPUNCTURE IN THE MANAGEMENT OF PAIN IN CHRONIC PANCREATITIS-CASE REPORT

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Introduction: Chronic pancreatitis is characterized by progressive inflammation of the pancreas and the irreversible replacement of pancreatic parenchyma with fibrotic tissue. It is frequently associated with severe pain, while exocrine and endocrine insufficiency may develop as the disease progresses. However, pain management remains challenging; many patients experience severe, disabling abdominal pain that is often refractory to analgesic or interventional treatments.

Case Report: A 58-year-old female patient with a ten-year history of chronic pancreatitis was evaluated at a pain management clinic. She reported back pain radiating to the abdomen, abdominal bloating, nausea, and sleep disturbances. The patient was under regular follow-up by a gastroenterologist and an endocrinologist. For the past three years, she had also been regularly monitored at a Center for Palliative Care and Pain Management, where she received prescribed pharmacological therapy. Following her evaluation at the pain management clinic, acupuncture treatment was indicated. She underwent a total of eight acupuncture sessions over a one-month period. At the final session, the patient reported a reduction in pain intensity, with her Numerical Rating Scale (NRS) score decreasing from 8 to 4. She also reported significant improvements in sleep quality and her ability to perform daily and professional activities.

Conclusion: Adequate pain management is an essential component of chronic pancreatitis treatment, aiming to reduce pain intensity, improve sleep quality, and preserve daily functioning and quality of life. A multimodal approach that incorporates complementary methods, such as acupuncture, can play an important role in individualizing treatment and improving the management of chronic pain.

Keywords: acupuncture, pain, chronic pancreatitis

MENADŽMENT POLITRAUME KOD VOZAČA MOTOCIKLA SA TEŠKOM KRANIOCEREBRALNOM TRAUMOM I MULTIPLIM FRAKTURAMA: PRIKAZ SLUČAJA

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Uvod: Saobraćajni traumatizam, posebno u populaciji vozača motocikla, frekventno rezultira kompleksnim udruženim povredama (politrauma) koje neposredno ugrožavaju život pacijenta. Inicijalno zbrinjavanje ovakvih bolesnika zahtijeva visoko koordinisan, multidisciplinarni pristup unutar jedinica intenzivnog liječenja, sa primarnim fokusom na istovremenu kontrolu povišenog intrakranijalnog pritiska, stabilizaciju akutne respiratorne insuficijencije i hiruršku fiksaciju muskuloskeletnih trauma.

Cilj: Cilj ovog rada jeste prikaz uspješnog kliničkog menadžmenta pacijenta sa teškom formom politraume zadobijene u saobraćajnom udesu, uz evaluaciju strategija intenzivnog liječenja, dijagnostičkog praćenja i sanacije sekundarnih pulmoloških i neuroloških komplikacija.

Materijal i metode: Retrospektivno su analizirani medicinski podaci i historija bolesti 26-godišnjeg muškog pacijenta T.H., hospitalizovanog u Klinici za anesteziologiju i reanimatologiju nakon primarnog zbrinjavanja od strane službe hitne medicinske pomoći. Praćenje toka bolesti i evaluacija terapijskog odgovora bazirani su na analizi sprovedene serijske radiološke i endoskopske dijagnostike, kao i na praćenju kontinuiranog laboratorijskog monitoringa.

Rezultati i diskusija: Pacijent je primljen sa teškim poremećajem stanja svijesti i znacima akutne respiratorne insuficijencije. Inicijalna CT evaluacija otkrila je tešku intrakranijalnu traumu (akutni subduralni hematom sa masivnim kompresivnim efektom i pomjeranjem mediosagitalnih struktura, subarahnoidalnu hemoragiju i difuzni edem mozga), udruženu sa bilateralnom kontuzijom pluća, manjim pneumotoraksom i nestabilnim prelomima ekstremiteta.
Tokom četveronedjeljnog boravka u jedinici intenzivne terapije, klinički tok je bio izuzetno kompleksan. Respiratorni status je bio dodatno kompromitovan razvojem sekundarne plućne infiltracije sa znacima kavitacije parenhima i pleuralnom efuzijom, što je zahtijevalo dugotrajnu respiratornu potporu i hirurško osiguranje disajnog puta. Paralelno sa sanacijom plućnih komplikacija, kontrolni neuroradiološki pregledi pratili su postepenu regresiju intrakranijalnog edema i pratećih tečnih kolekcija (higroma). Ciljanim terapijskim protokolima postignuta je kompletna stabilizacija opšteg stanja i uspješno odvajanje od respiratora. Neurološki status je pokazao progresivan i potpun oporavak: pacijent je preveden na spontano disanje, vraćena je puna svijest, uspostavljen je verbalni i vizuelni kontakt, uz adekvatno izvršavanje motornih komandi. U stabilnom stanju je premješten u Kliniku za ortopediju i traumatologiju radi daljeg sekundarnog tretmana.

Zaključak: Pravovremena stratifikacija povreda i sinergističko djelovanje multidisciplinarnog tima predstavljaju bazični uslov za preživljavanje pacijenata sa najtežim oblicima politraume. Rana protekcija disajnog puta kroz traheotomiju, agresivna toaleta traheobronhalnog stabla, adekvatna antimikrobna zaštita i rana mobilizacija predstavljaju ključne faktore u prevenciji permanentnog neurološkog deficita i optimizaciji konačnog ishoda liječenja.

Ključne riječi: politrauma; subduralni hematom; kontuzija pluća; traheotomija; intenzivno liječenje; multidisciplinarni pristup; prikaz slučaja.

Reference:
1. Kleber C, Giesecke MT, Tsokos M, et al. Overall distribution of trauma-related deaths in a major metropolitan area: a histopathological analysis. Critical Care. 2024;28(1):45–52.
2. Smith IM, Damage Control Intensive Care Team. Advances in polytrauma management in the emergency setting and ICU: A comprehensive review. Journal of Trauma and Acute Care Surgery. 2025;78(3):210–218.
3. Robinson MT, Cerebral Edema Study Group. S3 guidelines on intensive care medicine following polytrauma: Aspects regarding definitive surgical stabilization and timing. Intensive Care Medicine. 2025;51(2):142–151.
4. Vagner AB, Pulmonology Traumatology Research. Polytrauma with severe traumatic brain injury and concomitant massive pulmonary contusion: Management of acute respiratory distress syndrome. BMC Pulmonary Medicine. 2024;24(1):115–124.
5. Davies JA, Major Trauma Rehabilitation Consortium. Evaluating acute polytrauma rehabilitation in trauma systems: Early mobilization and long-term cost outcomes. The Lancet Public Health. 2025;10(4):e280–e289.

MANAGEMENT OF A MOTORCYCLIST WITH SEVERE TRAUMATIC BRAIN INJURY AND MULTIPLE FRACTURES FOLLOWING A MULTIPLE TRAUMA INCIDENT: A CASE REPORT

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Introduction: Traffic-related trauma, particularly within the motorcyclist population, frequently results in complex concomitant injuries (polytrauma) that present an immediate threat to the patient's life. The initial management of these patients requires a highly coordinated, multidisciplinary approach within intensive care units, primarily focusing on the simultaneous control of elevated intracranial pressure, stabilization of acute respiratory insufficiency, and surgical fixation of musculoskeletal trauma.

Objective: The objective of this paper is to present the successful clinical management of a patient with a severe form of polytrauma sustained in a traffic accident, while evaluating intensive care strategies, diagnostic tracking, and the resolution of secondary pulmonary and neurological complications.

Material and Methods: The medical records and case history of a 26-year-old male patient T.H., hospitalized in the Clinic for Anesthesiology and Reanimation following initial stabilization by emergency medical services, were retrospectively analyzed. Monitoring the disease course and evaluating the therapeutic response were based on the analysis of serial radiological and endoscopic diagnostics performed, alongside the tracking of continuous laboratory monitoring.

Results and Discussion: The patient was admitted with a severe impairment of consciousness and signs of acute respiratory insufficiency. Initial CT evaluation revealed severe intracranial trauma (an acute subdural hematoma with a massive compressive effect and midline shift, a subarachnoid hemorrhage, and diffuse cerebral edema), associated with bilateral pulmonary contusion, a minor pneumothorax, and unstable extremity fractures. During a four-week stay in the intensive care unit, the clinical course was exceptionally complex. The respiratory status was further compromised by the development of secondary pulmonary infiltration with signs of parenchymal cavitation and pleural effusion, requiring prolonged respiratory support and surgical airway security. In parallel with the resolution of pulmonary complications, follow-up neuroradiological examinations tracked the gradual regression of intracranial edema and associated fluid collections (hygroma). Complete stabilization of the general condition and successful weaning from the ventilator were achieved through targeted therapeutic protocols. The neurological status showed a progressive and full recovery: the patient was transitioned to spontaneous breathing, full consciousness returned, verbal and visual contact was established, and motor commands were adequately executed. The patient was transferred to the Clinic for Orthopedics and Traumatology in a stable condition for further definitive secondary treatment.

Conclusion: Timely injury stratification and the synergistic management by a multidisciplinary team represent a basic prerequisite for the survival of patients with the most severe forms of polytrauma. Early protection of the airway via tracheotomy, aggressive toilet of the tracheobronchial tree, adequate antimicrobial protection, and early mobilization constitute key factors in preventing permanent neurological deficits and optimizing the final treatment outcome.

Keywords: polytrauma; subdural hematoma; pulmonary contusion; tracheotomy; intensive care; multidisciplinary approach; case report.

References:
1. Kleber C, Giesecke MT, Tsokos M, et al. Overall distribution of trauma-related deaths in a major metropolitan area: a histopathological analysis. Critical Care. 2024;28(1):45–52.
2. Smith IM, Damage Control Intensive Care Team. Advances in polytrauma management in the emergency setting and ICU: A comprehensive review. Journal of Trauma and Acute Care Surgery. 2025;78(3):210–218.
3. Robinson MT, Cerebral Edema Study Group. S3 guidelines on intensive care medicine following polytrauma: Aspects regarding definitive surgical stabilization and timing. Intensive Care Medicine. 2025;51(2):142–151.
4. Vagner AB, Pulmonology Traumatology Research. Polytrauma with severe traumatic brain injury and concomitant massive pulmonary contusion: Management of acute respiratory distress syndrome. BMC Pulmonary Medicine. 2024;24(1):115–124.

5. Davies JA, Major Trauma Rehabilitation Consortium. Evaluating acute polytrauma rehabilitation in trauma systems: Early mobilization and long-term cost outcomes. The Lancet Public Health. 2025;10(4):e280–e289.