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Refining anesthesia practice – regional techniques, risk stratification, and evidence-based analgesia

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This issue of the *Croatian Medical Journal* presents a selection of original articles, essays, and a case report that reflect a progressive shift in anesthetic practice – away from rigid protocols toward patient-specific, physiology-informed decision-making. The common thread across these studies is a careful adaptation of anesthetic technique to surgical burden, comorbidity profile, and evolving evidence. These contributions collectively signal a growing emphasis on regional anesthesia, rational opioid use, and perioperative risk stratification in complex surgical patients. Here, we present several highlights of the issue content. Eljuga et al (1) describe an opioid-free protocol for mastectomy with immediate reconstruction using a combination of thoracic paravertebral (TPVB), pectoral (PECS I), and serratus anterior plane (SAP) blocks. Intraoperative opioid avoidance was successful; however, postoperative opioid use remained comparable to standard care. Despite this, pain scores remained low for up to 10 days postoperatively, which suggests that regional blockade provided durable analgesia. These results support multimodal regional strategies, though they also underscore that opioid-free intraoperative care does not guarantee complete postoperative opioid sparing. This observation is reinforced by the essay by Kukić et al (2), who discussed differences between TPVB, PECS II, and SAP blocks for breast-conserving surgery. The literature suggests that TPVB consistently provides superior analgesia and opioid reduction but is technically demanding. PECS II and SAP blocks offer safer, easier alternatives, but demonstrate variable efficacy, especially when used in isolation (3). The authors advocate tailoring block selection to surgical extent, anticipated pain intensity, and institutional experience, aligning with the emerging consensus that fascial plane blocks should be viewed as complements rather than substitutes for deeper paravertebral blockade (2). Gačo Rački et al (4) comment on the evidence base for neuraxial morphine and conclude that, when feasible, intrathecal administration offers superior analgesia with lower systemic exposure compared with epidural delivery (5-9). Concerns related to pain management are tackled by Milić et al (10), who retrospectively assessed analgesics use in a large cohort of patients treated at the Emergency Department of Krapina-Zagorje County. This single-center study shows there is still a lot of room for improvement when it comes to treating pain adequately by implementing up-to-date pain management protocols and ensuring continuous educational approaches.

All these observations contribute meaningfully to enhanced recovery after surgery protocols and advocate for evidence-based refinement of analgesic guide-

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lines. However, the known risks of delayed respiratory depression and unpredictable duration warrant caution and appropriate monitoring. Višković Filipčić et al (11) present a single-center retrospective study of major cardiovascular events during orthotopic liver transplantation. The incidence of perioperative events approached 9%, with older age, metabolic liver disease, donor hypertension, and prolonged cold ischemia identified as key risk factors. Given the increasing age and comorbidity of transplant candidates, the occurrence of severe adverse cardiovascular events was markedly higher than previously documented. The authors propose the use of scoring systems including known risk variables to identify patients at risk of adverse cardiovascular events; hence improving surveillance for early identification and intervention as supported by international transplant societies (12). A retrospective study by Krecak et al (13) on 1196 patients undergoing elective non-cardiac surgeries investigated whether preoperative polycythemia may be associated with inferior postoperative outcomes. The authors used the World Health Organization criteria to stratify patients into three categories according to their preoperative hemoglobin values: anemic, normal, and polycythemic. Their primary aim was to determine a 30-day postoperative composite outcome consisting of death, thrombosis, bleeding, and the need for postoperative red blood cell transfusion. Interestingly, the composite outcome was most frequent in patients with preoperative polycythemia, predominantly due to the highest frequency of postoperative bleeding events. Moreover, the association of polycythemia with the composite outcome was independent of patient sex, surgery risk, comorbidities, American Society of Anesthesiologists score, and the use of antithrombotic medications. Although anesthesiologists are usually more afraid of preoperative anemia, this interesting study suggests that patients presenting with preoperative polycythemia require careful perioperative surveillance. Župčić et al (14) describe the use of unilateral TPVB and remimazolam sedation for open cholecystectomy in a patient with severe cardiac disease and an implantable cardioverter defibrillator. Despite avoiding general anesthesia and neuraxial blockade, the team achieved adequate surgical anesthesia and maintained hemodynamic stability throughout the procedure. This case illustrates the flexibility and value of regional techniques in patients for whom standard approaches carry elevated risk. Tomulić Brusich et al (15) discuss the use of ultrasound-guided regional anesthesia (UGRA) in the intensive care setting. UGRA is associated with reduced opioid use, improved pain control, and fewer sedative complications in mechanically ventilated patients; yet it remains underutilized. The authors attribute this gap to limited clinician training and insufficient institutional protocols, joining growing calls for expanded UGRA capability in critical care environments. Tarčuković et al (16) explore the use of a honey-based oral carbohydrate solution as a natural alternative to commercial preparations in elective laparoscopic cholecystectomy. Their randomized study reveals promising benefits in terms of improved gastric motility and reduced postoperative symptoms such as thirst and pain. However, the honey solution was also associated with elevated cortisol and interleukin 6 levels, which suggests a stronger stress response. These findings highlight both the potential and the complexity of incorporating natural carbohydrate sources into preoperative protocols. As an extended interest in this issue, Miklić Bublić et al (17) reflect on transcutaneous vagal nerve stimulation as a new technique that may induce neuromodulation in brain trauma patients, thus alleviating the damage and enhancing recovery by reducing epileptic seizures and brain edema, as well as potentially improving brain tissue oxygenation and reperfusion of the penumbra.

Taken together, the studies published in this issue reflect a deliberate shift toward more precise, risk-adapted anesthetic care. Regional techniques are being re-evaluated not only as adjuncts but as primary anesthetic strategies in appropriately selected patients. Morphine administration is being refined to balance efficacy and safety. Meanwhile, perioperative risk factors such as cardiac vulnerability and erythrocytosis are gaining overdue attention. These contributions point toward a more patient-centered, evidence-based future in anesthesiology.

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