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Review

Anesthesia in Obese Patients Challenges and Updated Strategies: A Brief Article Review

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ABSTRACT

Obesity is a growing challenge for anesthetic practice because the excess adipose tissue profoundly alters drug pharmacokinetics and pharmacodynamics, compromises respiratory and cardiovascular function and increases peri-operative risk. Difficult airway management frequent in this population requires advanced devices, appropriate positioning and thorough pre-oxygenation. Safe care therefore hinges on meticulous pre-operative assessment and a multidisciplinary approach that combines multimodal analgesia, lung-protective ventilation and thrombo-embolic prophylaxis. Whenever feasible, regional techniques reduce opioid requirements and limit respiratory depression. Evidence-based protocols such as Enhanced Recovery After Surgery (ERAS) accelerate functional recovery and shorten hospital stay. Individualized plans, modern technology and multiprofessional follow-up are essential to improve outcomes in this group.

Keywords: Anesthesia; Obesity; Difficult airway; Pharmacokinetics; Peri-operative complications

Introduction

Obesity is a multifactorial, chronic condition that has reached epidemic proportions worldwide. It is strongly associated with hypertension, diabetes mellitus, obstructive sleep apnea (OSA) and cardiorespiratory dysfunction, all of which complicate anesthesia management[1-3]. Excess adipose tissue interferes with ventilation, oxygenation and surgical positioning. Difficult airway prevalent in obese patients is a primary concern. Ramped positioning and video laryngoscopy improve intubation success and reduce complications[4], yet limited mobility and the need for specialized equipment often complicate operating-table set-up. Obesity also modifies the pharmacokinetics and pharmacodynamics of an aesthetic drugs, demanding dose adjustments based on ideal, adjusted or total body weight. Continuous depth-of-anesthesia monitoring (e.g., BI spectral Index, BIS) helps optimize dosing and minimize under- or over-dosage of lipophilic agents with prolonged action[5,6]. Comprehensive pre-operative evaluation, strict intra-operative monitoring, tailored ventilatory strategies and multimodal analgesia are cornerstones of safe care. Interdisciplinary

collaboration among physiotherapists, nurses, nutritionists and surgeons, as well as patient counselling on weight loss, further reduce risk[7]. Understanding the specific physiological changes imposed by obesity is therefore critical to prevent complications and deliver patient-centered anesthesia[8].

Objectives

This review summarises the main challenges encountered during anaesthesia for obese individuals and discusses current strategies aimed at maximising safety, effectiveness and quality of peri-operative care.

Materials and Methods

A literature review was conducted using the PubMed, SciELO, Google Scholar and ScienceDirect databases.

Discussion

Anesthesia in obese patients presents a complexity that spans from pre-operative assessment through postoperative recovery. Anesthetic planning demands heightened attention to anatomy, physiology and pharmacology, as well as careful adaptation of conventional techniques[9]. Regarding airway management, obesity increases the difficulty of visualizing anatomical structures and raises the risk of failed mask ventilation. Studies have shown that videolaryngoscopes, fiber-optic bronchoscopy and supraglottic devices improve intubation success rates[10,11]. The ramped or head-elevated position optimizes ventilatory mechanics and pre-induction oxygenation. Mechanical ventilation in obese patients should follow lung-protective parameters: tidal volumes based on ideal body weight, appropriate PEEP levels and periodic alveolar recruitment maneuvers. These strategies minimize atelectasis and improve gas exchange, but must be balanced against the patient's hemodynamic stability.

The pharmacokinetics of anesthetic drugs are altered in obese individuals, particularly for lipophilic agents such as propofol, fentanyl and midazolam. Distribution, metabolism and elimination may be prolonged, requiring careful monitoring and knowledge of the most appropriate dosing scalars. Technologies such as BIS monitoring allow precise, safe titration of medications, reducing adverse events[12].

For analgesia, multimodal strategies that combine non-opioid analgesics, regional anesthesia and adjuvant drugs have proven effective in providing comfort, lowering opioid requirements and promoting early mobilization. Ultrasound-guided peripheral nerve blocks represent a safe and effective alternative[13]. Obesity is associated with an increased risk of thromboembolic events; therefore, prophylaxis with anticoagulants and pneumatic compression devices, along with early ambulation whenever possible, is recommended[14]. Glycemic control, blood-pressure management and adequate ventilatory support are also essential in the postoperative period. Implementing Enhanced Recovery After Surgery (ERAS) protocols integrates these measures to achieve early and safe recovery. Adherence to such protocols has yielded lower complication rates, reduced length of hospital stay and improved quality of life for patients[15].

Conclusions

Anaesthetizing obese patients remains one of the foremost challenges in modern practice. Profound physiological alterations demand advanced knowledge, refined technical skills and cohesive teamwork. Detailed pre-operative assessment focusing on comorbidities, pulmonary function and cardiovascular risk lays the foundation for safe care. Intra-operative management should employ personalized airway plans, lung-protective ventilation and vigilant monitoring. Rational drug selection and dosing, grounded in obesity-specific pharmacology, prevent complications and improve outcomes. Post-operatively, multimodal analgesia, respiratory physiotherapy and prompt mobilization are pivotal, while ERAS-based pathways further enhance recovery. Continuous education, technological investment and evidence-based guidelines are essential to safeguard obese surgical patients. Future advances in predictive tools, personalized monitoring and pharmacology promise even safer, more effective management.

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