



ANESTHESIA IN OBESE PATIENTS: MODERN PROTOCOLS

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Abstract: Obesity represents one of the most significant risk factors for perioperative complications due to profound alterations in respiratory, cardiovascular, and metabolic physiology. These changes complicate the administration of anesthesia and increase the likelihood of respiratory and hemodynamic adverse events. The implementation of modern protocols for the anesthetic management of obese patients—encompassing optimized preoperative preparation, advanced airway management technologies, evidence-based ventilation strategies, pharmacokinetically guided dosing of anesthetic drugs, and enhanced monitoring—has considerably improved patient safety. This review summarizes current recommendations for anesthetic care in obese individuals at all stages: preoperative, intraoperative, and postoperative.

Keywords: obesity, anesthesia, difficult airway, ventilation, respiratory complications, ERAS, ketamine, inhalation anesthesia, regional anesthesia.

Introduction. Obesity (BMI ≥ 30 kg/m²) has become a major global public health challenge, affecting over 650 million adults worldwide and contributing substantially to the global burden of chronic diseases. The prevalence of obesity continues to rise in both developed and developing countries, leading to an increasing number of obese patients undergoing surgical interventions. This trend poses significant challenges for anesthesiologists, as obesity is associated with multiple physiological and pathophysiological alterations that complicate perioperative management.

Surgical interventions in obese patients carry an increased risk of perioperative complications due to several interrelated factors. Respiratory system alterations include reduced functional residual capacity (FRC), decreased lung compliance, and increased airway resistance, which predispose patients to hypoventilation, atelectasis, and postoperative pulmonary complications. Excessive adipose tissue in the neck and thoracic region further complicates airway management, increasing the likelihood of difficult mask ventilation and endotracheal intubation. Cardiovascular changes, such as increased cardiac output, left ventricular hypertrophy, and systemic hypertension, elevate the risk of intraoperative hemodynamic instability. Metabolic abnormalities, including insulin resistance and dyslipidemia, contribute to impaired wound healing, increased infection rates, and greater susceptibility to thromboembolic events.

Pharmacokinetic and pharmacodynamic alterations in obese patients pose additional challenges. Lipophilic anesthetic agents often have increased volumes of distribution, while altered clearance rates can result in prolonged or unpredictable drug effects. Standard dosing regimens based on total body weight may lead to over- or under-dosing, necessitating individualized drug selection and careful monitoring. Moreover, the high prevalence of comorbidities such as diabetes mellitus, obstructive sleep apnea (OSA), gastroesophageal reflux disease (GERD), and



cardiovascular disease requires a comprehensive preoperative evaluation to optimize medical management and minimize perioperative risk.

Anesthetic management of obese patients therefore demands a multidisciplinary and evidence-based approach, integrating preoperative risk assessment, airway evaluation, intraoperative ventilatory strategies, and postoperative care protocols. In recent years, significant advances have been made in airway management algorithms, including the use of videolaryngoscopes and awake fiberoptic intubation techniques, optimized ventilation strategies with lung-protective protocols, enhanced recovery after surgery (ERAS-Obesity) pathways, and pharmacokinetically guided dosing of anesthetic agents. These innovations have markedly improved patient safety and perioperative outcomes.

Given the rising prevalence of obesity and its associated perioperative risks, the development and implementation of standardized, modern anesthetic protocols for obese patients are of critical importance. Understanding the unique physiological challenges, potential complications, and evidence-based management strategies allows anesthesiologists to minimize morbidity and mortality while improving recovery and overall surgical outcomes. The topic remains highly relevant for contemporary anesthetic practice and will continue to gain importance as the number of obese surgical patients grows worldwide.

Preoperative Assessment. The preoperative period is critical for optimizing outcomes in obese patients. A thorough assessment aims to identify risk factors that may complicate anesthesia, predict difficult airway management, and guide individualized planning.

Airway Evaluation. Obesity is a well-recognized predictor of difficult airway. Preoperative assessment should include:

1. Mallampati classification: Higher grades (III–IV) are associated with increased intubation difficulty.
2. Neck circumference: >40 cm correlates with higher risk of difficult ventilation and intubation.
3. Neck mobility and jaw protrusion: Limited cervical extension or reduced mandibular mobility increases airway challenges.
4. STOP-BANG screening: Identification of obstructive sleep apnea (OSA), which increases the risk of perioperative respiratory complications.

Recommendations: Anticipate difficult intubation and have advanced airway devices ready, including videolaryngoscopes and supraglottic airways. Position the patient in the “ramped position” (aligning external auditory canal with sternal notch) for optimal laryngoscopic view. Consider awake fiberoptic intubation in high-risk cases with severe OSA or prior difficult airway history.

Respiratory Optimization. Obese patients frequently present with restrictive ventilatory patterns and reduced functional residual capacity (FRC), increasing the risk of hypoxemia. Preoperative strategies include:

1. Preoxygenation for 3–5 minutes with 100% O₂ to prolong safe apnea time.



2. CPAP or NIV therapy in patients with severe OSA to improve oxygenation.
3. High-flow nasal oxygenation (HFNO) during induction to maintain oxygenation and reduce desaturation risk.

Comorbidity Evaluation and Optimization. Obesity often coexists with multiple comorbidities, including: hypertension and left ventricular hypertrophy; type 2 diabetes mellitus and insulin resistance; dyslipidemia; non-alcoholic fatty liver disease; gastroesophageal reflux disease (GERD); pulmonary hypertension.

Preoperative optimization involves controlling blood pressure and glycemia, evaluating cardiovascular function, and managing OSA. Multidisciplinary consultation (cardiology, pulmonology, endocrinology) is recommended for high-risk patients.

Intraoperative Management. Anesthesia in obese patients requires careful consideration of airway, ventilation, drug dosing, and hemodynamic management.

1. Airway Management. Difficult airway is common due to excess soft tissue, limited neck mobility, and OSA. Modern approaches include: videolaryngoscopy as the first-line intubation tool; use of bougies and stylets when visualization is limited; awake fiberoptic intubation for patients with history of difficult airway; apneic oxygenation via HFNO to prolong safe apnea time during intubation.

2. Choice of Anesthesia.

Inhalation Anesthesia:

- Sevoflurane and desflurane are preferred due to rapid titratability and faster emergence;
- Desflurane is advantageous in obese patients due to low blood-gas solubility and rapid recovery.

Total Intravenous Anesthesia (TIVA):

- Provides stable hemodynamics and reduced respiratory depression, especially in OSA.
- Propofol dosing: Induction — Ideal Body Weight (IBW); Maintenance — Lean Body Weight (LBW)
- Remifentanil dosing: LBW
- Succinylcholine — Total Body Weight (TBW)
- Non-depolarizing muscle relaxants — LBW

Regional Anesthesia

- Reduces respiratory complications and opioid requirement.
- Facilitates early mobilization (ERAS).
- Ultrasound guidance is recommended due to increased tissue depth in obese patients.



3. Ventilation Strategies. Obese patients are at high risk of perioperative atelectasis and hypoxemia. Recommendations:

- Tidal volume: 6–8 mL/kg IBW
- PEEP: 12–16 cm H₂O
- Recruitment maneuvers every 30–45 minutes
- FiO₂ titration to avoid absorption atelectasis
- Pressure-controlled ventilation may improve compliance and oxygenation

4. Hemodynamic Management

- Obese patients often exhibit altered preload, increased cardiac output, and hypertension.
- Invasive monitoring (arterial line, central venous pressure) may be indicated for high-risk surgeries.
- Goal-directed fluid therapy using dynamic preload indices (SVV, PPV) is recommended.

Postoperative Management. Obese patients are prone to respiratory complications, hemodynamic instability, thromboembolism, and prolonged recovery. Careful postoperative monitoring is essential.

1. Respiratory Care: Early application of CPAP or NIV for patients with OSA; Continuous pulse oximetry and capnography when indicated; Positioning in semi-upright or ramped posture to optimize FRC.
2. Analgesia: Prefer multimodal analgesia and regional blocks to minimize opioids; Opioid-sparing strategies reduce postoperative respiratory depression.
3. Thromboprophylaxis: Obese patients have higher risk of venous thromboembolism; Use of pharmacologic (LMWH) and mechanical (compression devices) prophylaxis is recommended.
4. Early Mobilization and ERAS: Early ambulation, incentive spirometry, and physiotherapy are crucial to reduce complications; ERAS-Obesity protocols optimize fluid therapy, nutrition, and analgesia to accelerate recovery.

Pharmacological Considerations

- Lipophilic drugs have increased volume of distribution
- Adjust dosing based on IBW, LBW, and TBW
- Propofol: induction by IBW, maintenance by LBW
- Remifentanyl: LBW
- Succinylcholine: TBW



- Non-depolarizing agents: LBW
- Minimize opioids; prefer short-acting agents

ERAS Protocols for Obese Patients

- Minimized fasting and preoperative carbohydrate loading
- Restricted perioperative fluids
- Multimodal analgesia
- Early mobilization

Conclusion. Anesthesia in obese patients requires a structured, evidence-based, and individualized approach. Modern protocols emphasize advanced airway management, safe ventilation strategies, optimized drug dosing, and comprehensive postoperative monitoring. Integration of ERAS pathways and regional anesthesia significantly enhances safety and reduces postoperative complications. Continued development of personalized protocols is essential to meet the increasing surgical needs of the obese population.

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