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Perioperative Anesthesia Risk in Patients with Class III Obesity Undergoing Oocyte Retrieval: Evidence-Based Rationale for a Structured 48-Hour Preoperative Protocol and Enhanced NPO Guidelines

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Observational Analysis — Multicenter Outpatient Setting
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ABSTRACT

Background: Patients with body mass index (BMI) ≥40 kg/m² undergoing oocyte retrieval represent a high-risk anesthetic population. Class III obesity is associated with compromised respiratory reserve, difficult airway anatomy, hemodynamic instability, altered pharmacokinetics, and delayed gastric emptying—risks compounded by the rising prevalence of GLP-1 receptor agonist use. Standard nil per os (NPO) guidelines were developed for healthy patients and may be inadequate for this population.

Objective: To synthesize current evidence supporting enhanced preoperative fasting and dietary modification protocols for patients with BMI ≥40 undergoing office-based procedural anesthesia for egg retrieval.

Methods: Narrative review of peer-reviewed literature, ASA practice guidelines (2017, 2023), and multisociety consensus statements addressing obesity, office-based anesthesia, fasting, and GLP-1 receptor agonist perioperative management.

Conclusions: Class III obesity significantly elevates perioperative anesthetic risk through multiple physiologic mechanisms. Standard NPO guidelines explicitly exclude obese patients from their healthy-patient framework. A structured 48-hour protocol—including low-fat dietary modification, optimized hydration, GLP-1 agonist management, and enhanced fasting timelines—is supported by the existing evidence base and represents a clinically sound strategy to mitigate aspiration, hemodynamic instability, and PONV in this population.

1. Introduction

The rising prevalence of obesity among reproductive-age patients has introduced profound challenges for anesthetic management in outpatient settings. Patients with Class III obesity (BMI ≥40 kg/m²) represent a uniquely high-risk subset for procedural anesthesia, particularly in the context of oocyte retrieval performed in office-based or ambulatory fertility centers. Unlike hospital-based surgical environments, office-based anesthetic settings may have more limited resources for managing perioperative emergencies, placing a greater premium on thorough preoperative risk mitigation.

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The American Society of Anesthesiologists (ASA) classifies severe obesity as a 'severe systemic disease with substantive functional limitations' (ASA Physical Status III), recognizing its pervasive impact on nearly every organ system relevant to anesthesia.[1] The physiologic derangements associated with Class III obesity—including reduced functional residual capacity (FRC), increased aspiration risk, hemodynamic vulnerability, altered pharmacokinetics, and difficult vascular access—are well-documented in the peer-reviewed literature and demand a structured preoperative approach that goes beyond standard protocols designed for healthy patients.[2]

Compounding these baseline risks is the exponentially increasing use of glucagon-like peptide-1 receptor agonists (GLP-1 RAs) such as semaglutide (Ozempic®, Wegovy®) and tirzepatide (Mounjaro®, Zepbound®), which are now widely prescribed for obesity and type 2 diabetes. These medications are known to delay gastric emptying, generating meaningful concern for pulmonary aspiration even in patients who appear to have adhered to standard fasting instructions.[3]

Standard ASA preoperative fasting guidelines—recommending 2 hours for clear liquids and 6–8 hours for solid foods—were explicitly developed for healthy patients without significant comorbidities. The 2023 ASA update specifically identifies obesity as a condition that warrants clinical modification of these guidelines, stating that physicians should recognize that obesity 'can increase the likelihood of regurgitation and pulmonary aspiration' and should adjust fasting protocols accordingly.[4]

This paper reviews the peer-reviewed evidence base for each key domain of perioperative risk in Class III obese patients undergoing outpatient egg retrieval, and presents the rationale for a structured 48-hour preoperative protocol that addresses these risks through dietary modification, hydration optimization, GLP-1 agonist management, and enhanced NPO guidelines.

2. Anesthetic Risks Associated with Class III Obesity

2.1 Respiratory Compromise and Airway Difficulty

The pulmonary consequences of Class III obesity are among the most clinically significant challenges for anesthesia providers. Excess adipose tissue surrounding the thorax, abdomen, and upper airway reduces lung compliance, FRC, and expiratory reserve volume—dramatically increasing the speed of oxygen desaturation during apnea. Patients with morbid obesity are particularly prone to perioperative hypoventilation, atelectasis, and postoperative respiratory failure.[5]

A large retrospective single-center trial involving 45,447 patients demonstrated a substantially greater probability of difficult mask ventilation in morbidly obese patients (OR 3.785; 95% CI: 3.188–4.493; P <0.001).[6] A Danish registry-based study confirmed a significant association between morbid obesity and difficult or failed conventional intubation (OR 1.34; 95% CI: 1.19–1.51; P <0.0001).[6] The UK National Audit Project (NAP4) found twice the rate of major airway adverse events in obese patients compared to the general population, particularly when supraglottic airway devices were used—with caution strongly advised when BMI exceeds 40 kg/m².[7]

Obstructive sleep apnea (OSA), which co-occurs in up to 77% of patients with morbid obesity undergoing bariatric surgery, further amplifies these risks by predisposing patients to airway

obstruction during sedation, unplanned tracheal reintubation, and postoperative cardiopulmonary complications.[8] In the outpatient setting, where intubation resources and post-anesthesia monitoring may be more limited, these risks demand proactive preparation.

2.2 Aspiration Risk and Gastric Physiology

Pulmonary aspiration of gastric contents is a rare but potentially life-threatening complication of anesthesia. Standard fasting guidelines aim to minimize gastric volume and acidity to reduce this risk. However, the 2023 ASA Practice Guidelines for Preoperative Fasting explicitly exclude obese patients from the healthy-patient population to which standard 2-hour clear liquid and 6–8-hour solid food fasting rules apply.[4] Obesity is listed alongside diabetes, gastroparesis, pregnancy, and esophageal disorders as conditions that increase the likelihood of regurgitation and aspiration, requiring clinical modification of fasting protocols.[4]

Obese patients have elevated intra-abdominal pressure and are more likely to have gastroesophageal reflux disease, both of which contribute to higher aspiration risk. Moreover, gastrointestinal motility may be independently impaired by obesity itself, even in patients not on GLP-1 medications. The clinical implications are clear: applying standard fasting durations to patients with Class III obesity may leave them at unacceptably elevated aspiration risk at the time of anesthetic induction.

2.3 Cardiovascular and Hemodynamic Vulnerability

Cardiovascular disease is among the most consequential comorbidities of obesity. Excess adipose tissue increases resting cardiac output by 20–30 mL per kilogram of excess body fat, leading to left ventricular dilation, increased stroke volume, LV hypertrophy, diastolic dysfunction, and elevated left ventricular end-diastolic pressure.[1] A meta-analysis of over 300,000 patients found that each five-unit increase in BMI was associated with a 29% increased risk of coronary heart disease; even after adjustment for blood pressure and cholesterol, a 16% residual increased risk persisted.[1]

In the perioperative context, these cardiovascular changes translate to reduced hemodynamic reserve and greater susceptibility to intraoperative hypotension. Hypovolemia from inadequate preoperative hydration compounds this vulnerability. Obese patients are also more likely to present with hypertension, dyslipidemia, and insulin resistance, further narrowing their hemodynamic tolerance during anesthetic induction and maintenance.[2]

2.4 Vascular Access Challenges

Peripheral intravenous access in patients with Class III obesity is frequently problematic due to subcutaneous adipose tissue obscuring venous anatomy and reducing venous wall visibility and palpability. Dehydration from fasting further collapses superficial veins and increases access failure rates. Failed or delayed IV access in the outpatient setting may require escalation to central or ultrasound-guided access, consuming significant time and clinical resources, and may destabilize case scheduling.

Optimization of preoperative hydration through continuous intake of clear fluids—as detailed in the structured protocol—has been shown to improve peripheral vein distension and first-attempt IV

access success rates, reducing the need for advanced access techniques and improving procedural efficiency.[2]

2.5 Pharmacokinetic Alterations

Obesity profoundly affects drug distribution and elimination. Increased adipose tissue expands the volume of distribution for lipophilic agents such as propofol, benzodiazepines, and opioids, potentially prolonging their pharmacologic effects and recovery times. Anesthesia providers must account for these alterations using weight-adjusted dosing strategies—typically ideal body weight (IBW) or adjusted body weight (ajBW = IBW + 0.4[TBW – IBW]) for most agents, while using total body weight for neuromuscular blocking drugs and their reversal agents.[9]

Delayed drug clearance in patients with Class III obesity increases the risk of postoperative sedation, respiratory depression, and prolonged PACU stays. Total intravenous anesthesia (TIVA) with propofol, combined with multimodal analgesia and aggressive PONV prophylaxis, is supported by evidence as the preferred approach to minimize these risks in outpatient bariatric and high-BMI contexts.[9]

2.6 Postoperative Nausea and Vomiting (PONV)

PONV represents a significant source of morbidity, patient dissatisfaction, and extended recovery time in the outpatient setting. Obesity, female sex, non-smoking status, and the use of volatile anesthetics and opioids are among the established risk factors for PONV identified in the Fourth Consensus Guidelines for PONV Management.[10] Fertility patients undergoing egg retrieval are almost universally female, often non-smokers, and frequently receive opioid-containing anesthetic regimens, placing them in a high-PONV-risk category even before obesity is factored in.

Preoperative dietary modification—particularly the transition to low-fat, low-residue foods in the 48 hours preceding the procedure—reduces gastric solid content and may attenuate post-anesthetic nausea. Enhanced hydration also supports hemodynamic stability, which in turn reduces the emetogenic stimulus of hypotension during recovery.

3. GLP-1 Receptor Agonists: A Compounding Perioperative Risk

The widespread adoption of GLP-1 receptor agonists for weight management and glycemic control has introduced a new and clinically significant variable in perioperative anesthetic risk. Agents including semaglutide, liraglutide, dulaglutide, and tirzepatide slow gastric emptying through their activity at GLP-1 receptors in the enteric nervous system, creating the physiologic equivalent of gastroparesis.[3]

The ASA issued consensus guidance in June 2023 acknowledging that delayed gastric emptying from GLP-1 agonists can increase the risk of regurgitation and pulmonary aspiration of gastric contents during general anesthesia and deep sedation, even in patients who report adherence to fasting instructions.[11] Published case reports have documented retained gastric solids in patients who had fasted for 18 hours or more while taking semaglutide, necessitating suctioning prior to intubation and reflecting the inadequacy of standard NPO protocols for this population.[3,12]

The FDA subsequently updated the package inserts for multiple GLP-1 agonists—including Ozempic®, Wegovy®, Victoza®, Byetta®, and Mounjaro®—to include rare but serious postmarketing reports of pulmonary aspiration in patients undergoing general anesthesia or deep sedation despite preoperative fasting.[13] Semaglutide has a pharmacologic half-life of approximately seven days, requiring approximately 23 days for plasma levels to fall below 10% of the initial concentration, meaning that standard washout periods may provide insufficient protection.[3]

Current multisociety clinical practice guidance (ASA, American Gastroenterological Association, ASMBS, and others) recognizes that safe perioperative use of GLP-1 RAs should include efforts to minimize aspiration risk through preoperative diet modification—specifically a liquid-only diet for at least 24 hours before the procedure in patients with concern for delayed gastric emptying.[14] Point-of-care gastric ultrasound is also endorsed as a tool for direct assessment of residual gastric content on the day of the procedure.[14]

Given that a substantial proportion of fertility patients with Class III obesity are likely to be active GLP-1 agonist users, this evidence strongly supports enhanced fasting protocols as a core element of preoperative care in this population.

4. The Office-Based Anesthesia Context

Office-based anesthesia settings present unique challenges not encountered in hospital operating rooms. The AAOMS Office-Based Anesthesia White Paper recognizes that patients with Class III obesity (BMI ≥40) fall into a high-risk category due to the potential for loss of airway, reduced FRC, and difficulty with airway establishment or intubation.[15] Practitioners delivering deep sedation or monitored anesthesia care (MAC) in outpatient fertility centers must account for these risks with limited access to a full complement of airway rescue resources, critical care support, or surgical back-up.

Clinical practice guidelines from the AAOMS for outpatient anesthesia specify that moderate sedation in patients with obesity can result in airway obstruction, oxygen desaturation, hypercarbia, and cardiac arrhythmias, and that in this patient population, deeper levels of anesthesia require providers experienced in airway management, including endotracheal intubation, LMA placement, and surgical airway procedures.[16] The anesthesia provider must plan for the worst while working in an environment optimized for efficiency.

In this context, the value of proactive preoperative risk reduction cannot be overstated. Every intraoperative complication avoided—every aspiration event, every failed IV access, every hemodynamic crisis requiring intervention—preserves both patient safety and the operational efficiency of the fertility center. A structured preoperative protocol shifts the risk management burden from the procedure room to the days before, where intervention is less time-pressured and more amenable to patient cooperation.

5. Evidence-Based Protocol: Structured 48-Hour Preoperative Preparation

The following protocol synthesizes recommendations from peer-reviewed literature, ASA guidelines, and multisociety consensus statements to address the full spectrum of perioperative risks in patients with BMI ≥40 undergoing oocyte retrieval under office-based anesthesia.

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Timeframe	Intervention	Rationale
≥2 weeks prior	Discontinue GLP-1 receptor agonists	Attenuate delayed gastric emptying; reduce aspiration risk in high-risk obesity subgroup
48 hours prior	Transition to low-fat, low-fiber, soft diet	Reduce gastric residue volume; improve gastric pH; decrease aspiration risk
48 hours prior	Initiate continuous clear fluid hydration	Optimize intravascular volume; improve IV access; reduce hemodynamic instability
Day before (if on GLP-1)	Clear liquids only after 6:00 PM	Extended fasting for patients at highest gastroparesis risk
Day before (standard)	Low-residue diet until 6:00 PM, then NPO	Minimize gastric solids prior to midnight cutoff
After midnight	Strict NPO (all solids and non-clear liquids)	ASA-aligned mandatory fasting for aspiration prevention
Day of procedure	Gastric ultrasound if indicated	Point-of-care confirmation of gastric emptying in high-risk patients

5.1 GLP-1 Receptor Agonist Management

Patients on GLP-1 receptor agonists should discontinue their medication at least two weeks prior to the procedure. While multisociety guidance was updated in late 2024 to allow most patients to continue GLP-1 RAs perioperatively, this guidance applies primarily to patients without additional delayed gastric emptying risk factors.[14] Patients with Class III obesity who are in the dose-escalation phase of GLP-1 therapy, who have experienced recent GI symptoms such as nausea or bloating, or who have additional gastroparesis risk factors should be considered for earlier cessation in consultation with their prescribing clinician.

If GLP-1 discontinuation is not feasible—due to glycemic control concerns in patients with Type 2 diabetes—the procedure day fasting protocol should be extended to treat the patient as 'full stomach' with appropriate anesthetic modifications, including consideration of rapid sequence induction.[11]

5.2 Dietary Modification

Beginning 48 hours before the planned procedure, patients should transition to a low-fat, low-fiber, soft diet. This dietary modification reduces the volume and viscosity of gastric contents and shortens the gastric emptying time for solid material. Multisociety guidance for GLP-1 RA patients explicitly endorses a preoperative liquid diet for at least 24 hours as a means to minimize aspiration risk in patients with concern for delayed gastric emptying.[14]

For patients on standard care (without GLP-1 medication), the protocol calls for continuation of the low-residue diet through the evening before the procedure, with transition to NPO after midnight. For patients on GLP-1 medications, clear liquids only are recommended beginning at 6:00 PM the day prior, reflecting the heightened aspiration risk in this subgroup.

5.3 Hydration Optimization

Continuous intake of clear fluids during the 48-hour preoperative period is strongly encouraged. Adequate hydration expands intravascular volume, supporting hemodynamic stability during anesthetic induction and reducing susceptibility to intraoperative hypotension. Critically, well-hydrated patients demonstrate improved peripheral venous distension, substantially increasing first-attempt IV access success rates—particularly important given the vascular access challenges inherent to this population.[2]

The 2023 ASA fasting update supports clear liquid intake up to 2 hours prior to the procedure for low-risk patients, a policy designed in part to prevent the hemodynamic consequences of prolonged fasting.[4] For high-BMI patients, the benefits of ongoing hydration are magnified, and protocol adherence should be actively reinforced by the clinical team during preoperative counseling.

5.4 Mandatory Nil Per Os After Midnight

Strict NPO status for all solids and non-clear liquids after midnight on the evening before the procedure is non-negotiable for this patient population. While standard ASA guidelines permit solid food intake up to 6 hours prior for light meals and 8 hours for fried or fatty foods, these intervals were designed for healthy individuals without the gastric motility impairments common in obese and GLP-1-medicated patients.[4]

The physiologic rationale for midnight NPO in this population is clear: prolonged solid food elimination time, elevated intra-abdominal pressure, and potential gastroparesis from GLP-1 therapy all conspire to leave patients with Class III obesity at materially higher aspiration risk than the standard 6–8-hour fasting window accounts for. The midnight cutoff provides a conservative and clinically defensible buffer that aligns with the precautionary framework recommended by expert guidelines.

5.5 Day-of-Procedure Assessment

On the day of the procedure, clinical assessment should include direct inquiry about GI symptoms suggestive of retained gastric contents—nausea, vomiting, bloating, or early satiety. In patients with high clinical suspicion, point-of-care gastric ultrasound (POCUS) can be used to directly assess gastric volume and content. Published evidence supports the utility of gastric POCUS in identifying patients at high or low aspiration risk, enabling individualized perioperative management.[3]

If the stomach is found to be full or if POCUS is inconclusive and clinical concern is high, the case should be delayed or the patient should be managed as 'full stomach' with appropriate anesthetic modifications. This decision should be made transparently with the patient and fertility team, as patient safety must supersede scheduling considerations.

6. Clinical Outcomes and Operational Implications

Implementation of this protocol in multicenter outpatient fertility settings has been associated with clinically meaningful improvements across several perioperative domains. No aspiration events

were observed during the study period. Clinical observations were consistent with reduced regurgitation risk, improved IV access on first attempt (attributable to enhanced hydration), fewer intraoperative hypotensive episodes, and lower rates of PONV with shorter recovery times.

These outcomes translate directly into operational efficiency. Reliable IV access reduces procedure delays. Hemodynamic stability reduces the need for intraoperative rescue interventions. Lower PONV rates accelerate discharge readiness and reduce PACU occupancy. Together, these improvements support safer, more predictable case flow—an important consideration for high-volume outpatient fertility programs managing complex patient populations.

7. Limitations

This analysis is subject to the following limitations:

- Observational design without a randomized control group limits causal inference.
- Protocol implementation occurred across a limited number of outpatient fertility centers, which may reduce generalizability.
- Quantitative outcome reporting was not standardized across all sites, limiting formal statistical comparisons.
- Variability in anesthesia provider technique and case complexity may confound outcome interpretation.
- The rapidly evolving guidance on GLP-1 receptor agonist management means that recommendations in this area may require periodic reassessment as prospective data mature.

Prospective, randomized studies are warranted to validate these findings and provide higher-quality evidence for protocol standardization.

8. Conclusions

Patients with BMI ≥40 undergoing oocyte retrieval under office-based anesthesia represent a high-risk population in whom standard preoperative protocols designed for healthy patients are insufficient. Class III obesity imposes a broad spectrum of anesthetic hazards—respiratory compromise, aspiration risk, hemodynamic vulnerability, difficult vascular access, pharmacokinetic disturbance, and elevated PONV risk—all of which are compounded in patients receiving GLP-1 receptor agonists.

A structured 48-hour preoperative protocol addressing GLP-1 medication management, dietary modification, hydration optimization, and enhanced NPO fasting timelines is well-supported by the existing peer-reviewed evidence base and current multisociety guidelines. Adoption of such protocols across outpatient fertility anesthesia practices has the potential to substantially improve patient safety while enhancing operational predictability and efficiency.

Anesthesia providers practicing in this setting bear a professional obligation to move beyond one-size-fits-all fasting guidelines and to implement individualized, evidence-based preoperative care plans for their highest-risk patients.

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