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AMBULATORY ANESTHESIA (G JOSHI, SECTION EDITOR)

Preoperative Considerations for Ambulatory Surgery: What Is New, What Is Controversial

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Abstract

Purpose of Review Ambulatory anesthesia has experienced a rapid expansion in procedural breadth and patient complexity. Proper patient selection via preoperative evaluation and testing is imperative to ensure the safety of patients with major comorbidities and advanced age who undergo procedures in ambulatory surgical settings.

Recent Findings New developments and controversies have arisen in the preoperative considerations for ambulatory surgical patients with class III obesity, obstructive sleep apnea, pulmonary hypertension, cardiomyopathy, heart failure, and other severe diseases. The value of preoperative laboratory testing is also debated.

Summary There are controversies and new developments with important implications for current and future practice in ambulatory anesthesia. With careful preoperative evaluation, testing, and patient selection process, patients with severe diseases may safely undergo ambulatory surgery. Individualized evaluations should dictate which patients are appropriate for ambulatory surgery.

Keywords Ambulatory surgery criteria · Anemia · Diabetes · Frailty · Obesity · Preoperative evaluation · Sleep apnea

Introduction

Ambulatory anesthesia continues to expand rapidly. Healthcare analysts project that 85% of all procedures will be performed in ambulatory settings by 2028 [1, 2]. An increasing number of patients with major comorbidities and advanced age are undergoing more complex procedures in institutional outpatient settings, free-standing ambulatory surgery centers (ASCs), and office-based practices. Ambulatory anesthesia offers many benefits, including quick emergence from anesthesia, same-day discharge with minimal residual effects, and earlier resumptions of daily activities. Its safety and success rely on appropriate patient selection via preoperative evaluation as ambulatory surgical patients continue their postoperative recovery in the comfort of their own homes. With an emphasis on patient selection, this review article critically assesses current controversies on preoperative considerations for ambulatory surgery.

Search Strategy

The literature search included the PubMed database between 2013 and 2023. The key words listed in Box 1 were used to identify articles related to ambulatory anesthesia. Included articles were published guidelines, systematic reviews, randomized controlled trials, and observational trials. Case reports, editorial letters, conference proceedings, animal studies, and non-English articles were excluded. For all articles, except for the pregnancy key word search, pediatric patient population (age < 18 years) was excluded. A total of 905 articles were found after removing 86 duplicates. Upon title and abstract review, 522 articles were included for full-text review. The authors included peer-reviewed articles that they deemed relevant to current practice. The clinical utility of their contents and the overall subjective quality

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of the studies were considered. The reference lists of each selected article were also reviewed for additional sources of information.

Box 1 Literature search key words

Ambulatory surgery criteria	Perioperative medication management
Anemia	Postoperative admission
Atrial fibrillation	Postoperative pulmonary complications
Cardiac devices	Pregnancy
Cardiomyopathy	Preoperative evaluation
Diabetes	Preoperative risk assessment
Difficult intubation	Preoperative testing
Frailty	Pulmonary hypertension
Glucagon-like peptide-1 receptor agonist	Readmission
Heart failure	Respiratory failure
Implanted devices	Sleep apnea
Major adverse cardiac events	Transcatheter aortic valve replacement
Obesity	

Preoperative Considerations for Patients With Severe Diseases

Class III Obesity

The Centers for Diseases Control and Prevention (CDC) now categorize all adults with body mass index (BMI) of 40 kg/m^2 or higher as class III or "severe" obesity [3]. In 2020, the prevalence of class III obesity was estimated to be 9.2% in the USA [4]. With the prevalence continuing to rise, more surgical patients now present with obesity and obesity-related comorbidities, and the long-standing controversies on the BMI cutoff for ambulatory surgical patients continue. Previously, patients with class III obesity were often excluded from surgery in ASCs as they were categorized as American Society of Anesthesiologists (ASA) physical status III with "severe systemic disease" [5, 6]. Obese patients have increased risk of hypertension, hyperlipidemia, coronary artery disease, type 2 diabetes mellitus (DM), stroke, obstructive sleep apnea, asthma, and many other obesity-related comorbidities, costing the USA an estimated $170 billion annually on healthcare and medical expenditures [4].

The controversy of BMI cutoff remains. Some studies reported the association between obesity and increased risk of postoperative complications and unplanned hospital admissions, but the data combined all patients with BMI ≥ 30 kg/m^2 without providing well-defined BMI numerical ranges for risk stratification and preoperative patient selection criteria [7, 8]. Other studies found that BMI alone was not associated with delayed discharge and unplanned admission after ambulatory surgery [9, 10]. More recently, Gabriel et al. found that BMI ≥ 50 kg/m^2 was associated with increased odds for same-day hospital admission even after patients underwent preoperative optimization of their comorbidities before ambulatory joint arthroscopy, suggesting that additional cautions may be needed for patient selection [11•]. BMI ≥ 50 kg/m^2 was also listed as one of the risk factors in the calculation of Obesity Surgery Mortality Risk Score, developed from a single-institution experience for the sole purpose of risk stratification in patients scheduled for bariatric surgery [12•, 13•]. While BMI alone should not be the sole preoperative consideration, patients with BMI ≥ 50 kg/m^2 should be selected with caution for ambulatory surgical setting, focusing on obesity associated co-morbid conditions [14]. Bariatric surgery also has been an ambulatory surgical option [15]. Studies have shown that ambulatory laparoscopic sleeve gastrectomy and Roux-en-Y gastric bypass procedures have comparable morbidity to inpatient settings for selected patients [16–18].

To add a new layer of complexity in preoperative evaluation for obese patients, a new generation of weight loss medications, glucagon-like peptide-1 (GLP-1) receptor agonists, has stirred up controversies. Originally designed as a medication to manage type 2 DM, GLP-1 receptor agonists (GLP-1RAs), especially semaglutide, have become strikingly popular in recent years for weight loss in patients with or without DM [19, 20]. The FDA also recently approved tirzepatide injection, previously approved for the treatment of type 2 DM, for chronic weight management [21]. Due to the associations between GLP-1RAs and delayed gastric emptying [22–24], controversies on the timing of preoperative GLP-1RA discontinuation, the current fasting guidelines, the utilization of gastric ultrasound, and the need of secured airway to mitigate increased pulmonary aspiration risk of regurgitated gastric contents have all recently arose. The ASA consensus-based guidance on preoperative management of patients on GLP-1RAs recommends holding the daily dose of GLP-1RA on the day of the procedure and the weekly dose a week prior to the procedure [25••]. However, for semaglutide with a long half-life of approximately 1 week, it has been argued that discontinuing the medication for at least three half-lives prior to the procedure is necessary to achieve approximately 88% clearance of the GLP-1RA [26]. On the other hand, long-acting GLP-1RAs were reported to have less pronounced effect on delaying gastric emptying than short-acting GLP-1RAs [27, 28]. The effect on gastric emptying also depends on the medication dosage, the duration of usage, and dosing schedule [27]. Some may suggest prolonging preoperative fasting periods, but currently there is no clear evidence to suggest the exact length.

Point-of-care gastric ultrasound has been utilized to assess gastric volume and contents [29]. Although gastric ultrasound results may not be always accurate due to native or surgical anatomical variations in patients,

it may provide information to aid risk stratification and guide perioperative airway management [30, 31]. Still, ultrasound systems with curvilinear array transducers may not be readily available in all anesthesia practices, and not all anesthesiologists are experienced with gastric ultrasound examinations. Before more high-quality evidence emerges to further guide the best preoperative management in patients on GLP-1RAs, it may not be financially feasible for ambulatory anesthesia practices to purchase ultrasound systems and provide trainings. Current evidence suggests that if gastric ultrasound shows patient with full stomach or if gastric ultrasound is inconclusive or not possible, precautions should be taken to manage the anesthesia care as the patient is with "full stomach," especially for patients without discontinuation of GLP-1RAs prior to procedure [27]. As we wait for more high-quality evidence, patient safety should be the priority while the topic remains controversial.

Obstructive Sleep Apnea

Obstructive sleep apnea (OSA) is a highly prevalent, often undiagnosed, condition. OSA is associated with cardiovascular diseases, including refractory hypertension, myocardial ischemia, atrial fibrillation, and pulmonary hypertension [32]. With its anesthetic implications and its associated comorbidities, the safety of patients with severe OSA to proceed with an anesthetic in an ambulatory environment has been debated. However, surgical interventions designed to treat anatomic causes of OSA, such as sleep endoscopies, pharyngoplasties, palatoplasties, nasal surgeries, and stimulator implants, are now being offered in the ambulatory setting [15, 33].

It is important to ensure that patients with diagnosed or suspected OSA are evaluated in advance of surgery to ensure proper planning. Patients who are compliant with positive airway pressure (PAP) therapies, able to continue PAP therapies after surgery, and with postoperative pain able to be adequately managed by opioid minimized strategies may proceed in the ambulatory setting [34••]. Regional anesthesia and non-sedating multimodal pain therapy should be utilized whenever possible. Policy should ensure that patients bring their own PAP equipment, as ASCs may have limited device availability [35]. OSA patients should receive care earlier in the day when qualified personnel are available for unplanned difficult airway management. Additionally, there must be access for rescue airway equipment as there is an association with unplanned difficult airway in OSA patients [36].

Very stringent criteria should be devised for patients presenting for procedures where PAP therapy may be contraindicated or unavailable postoperatively. Postoperative supplemental oxygen in these patients may be considered with caution as a secondary plan. Oxygen therapy postoperatively in lieu of PAP has been found to be associated with improved apnea–hypopnea index and less desaturation that persisted through postoperative day (POD) 3 [37]. However, there is also a trend towards increased partial pressure of carbon dioxide in arterial blood in these patients through POD 3, suggesting hypoventilation in the setting of adequate oxygenation. Therefore, admission instead of postoperative short-term home supplemental oxygen should be weighed cautiously [37].

Pulmonary Hypertension

Pulmonary hypertension (PH) is associated with an increased risk of morbidity and mortality. The risk of death increases up to 26% with surgery and anesthesia [38•, 39, 40]. While it rises with worsening severity of PH and worsening right heart function, mortality is also affected by the location where the procedure is performed [38•]. Centers with expertise in PH have better postoperative outcomes than those without. PH patients presenting for elective surgery require advanced evaluation and planning for all phases of the perioperative period. Ambulatory surgical centers without access to resources for immediate escalation in care including arterial lines, echocardiography, selective pulmonary vasodilators, extracorporeal membrane oxygenation, a knowledgeable anesthesia team, and an equipped intensive care unit may want to avoid caring for patients with PH [40].

There is a total of 5 group classifications for PH [41•]. Most studies in the perioperative population focus on group 1 PH, known as pulmonary arterial hypertension (PAH) [38•]. The etiology of group 3 PH is chronic hypoxia. Affecting between 12 and 34% of obese patients, group 3 PH is thought to be related to chronic hypoventilation and/or severe, untreated OSA [42•]. Obesity is highly associated with PH. In a cohort study evaluating 8490 patients undergoing in-hospital right heart catheterizations, obesity was found to be independently associated with greater odds of PH, and the odds increased with incremental rises in BMI [43]. Interestingly, while this study showed the association between PH and increased risk of death, it also found survival benefit in patients with obesity and PH over their matched non-obese patients with PH [43].

Diligence should be taken to screen for clinical signs of comorbid PH when obtaining the history and performing the preoperative physical exam. Chest pain, presyncope, and dyspnea are concerning in any patient, and care should be taken to pause and evaluate before pursuing elective surgery and anesthesia, especially in an ambulatory center or in a center with lacking resources for escalation of care. Following the current American College of Cardiology and American Heart AssociationACC/AHA guidelines, echocardiography and potentially right heart catheterization should

be considered if concern for underlying PH exists during preoperative evaluation [38•].

Cardiomyopathy and Heart Failure

Studies evaluating the risk of proceeding with low-risk ambulatory surgery in patients with heart failure are sparse. Only one large database cohort study evaluating 355,121 veterans presenting for ambulatory, elective, non-cardiac surgery was undertaken in 2019. After adjusting for patient and surgical characteristics of the 19,353 veterans, the authors found an increased 90-day mortality risk (odds ratio (OR) of 1.95) in patients with heart failure. This extended to patients with heart failure but with preserved ejection fraction (EF) (adjusted OR 1.80) [44]. An increased morality risk was seen for all classifications of heart failure, peaking for patients with EF less than 30% (adjusted OR 2.46) [44].

The American, Canadian, and European Cardiovascular Society guidelines ubiquitously recommend against the use of routine screening echocardiography for preoperative evaluation [38•, 39, 45] but recommend the consideration of echocardiography results within 1 year of the surgery for patients with known ventricular dysfunction [38•]. Resting or stress echocardiography in patients with known cardiomyopathy and worsening symptoms is supported by the American guidelines, whereas preferential evaluation of biomarkers such as N-terminal pro-brain natriuretic peptide are supported by Canadian and European guidelines [38•, 39, 45].

For patients with end-stage left ventricular failure, left ventricular assist devices (LVADs) have historically been used as a bridge to heart transplant. Now, LVADs are also being implanted as destination therapy in non-transplant candidates. Patients with LVADs are living longer and often present for non-cardiac, ambulatory surgery [46]. Advanced and multidisciplinary preoperative planning is mandatory for perioperative anticoagulation management, and trained personnel must be present in the operating room for the duration of the surgery and in the recovery room for device management [46, 47]. The majority of LVADs implanted today deliver continuous blood flow, as opposed to pulsatile flow. Depending on the intrinsic function of the native ventricle and the degree of the LVAD support, a reliable pulse may not be found in patients with LVADs [46]. Pulse oximetry and non-invasive blood pressure (NIBP) monitoring equipment both require a pulse to provide measurements. Although cerebral oximetry may be a surrogate for pulse oximetry and an arterial blood gas analysis may obtain an actual partial pressure of oxygen for these patients [46], these resources may not be readily available for all ASCs. NIBP should be attempted because a pressure reading can often be generated even in patients with a poor pulse; a NIBP may reflect a pressure close to the mean arterial blood pressure (MAP). Alternatively, a manual cuff and Doppler can be considered to measure MAP. An arterial line can also be considered for MAP monitoring [46], but placement may be challenging in patients without a pulse, requiring ultrasound guidance.

There is no robust evidence to demonstrate the safety of ambulatory surgery in the LVAD patients. While an LVAD patient can be considered for ambulatory settings, these patients require additional monitoring resources and must be monitored closely throughout the entire perioperative period to ensure adequate pump flows and hemodynamic stability. If there is any concern for dehydration, bleeding, infection, uncontrolled pain, or arrythmia, ambulatory anesthesia may not be the best practice for this particular patient population.

Frailty

Surgery in geriatric patients continues to increase in the aging US population. Advanced age was found to be associated with increased risks of morbidity and mortality during ambulatory surgery, and controversies arose on the maximum age to safely undergo ambulatory anesthesia [48–51]. However, studies had not been able to identify the exact age for risk stratification. This was most likely due to the differences between a patient's chronologic and physiologic age [52]. A patient's physiological age and health status may be better quantified by the degree of frailty. Frailty is a multidimensional syndrome with a state of reduced physiological reserve and an inability to cope with stressors such as surgery [53]. While frailty is independent of the chronological age of a patient, it is predominantly found in the geriatric population [54]. The prevalence of frailty in the geriatric surgical population is estimated to be between 10 and 37% [55]. Perhaps the controversies on age limit for ambulatory anesthesia can be resolved with preoperative identification of frailty for patient selection. Indeed, frailty may be better in predicting perioperative morbidity and mortality than individual disease processes [55–57]. Frail patients have higher unplanned admission rate after ambulatory surgery and a higher chance to be discharged to a skilled care facility rather than to home [56, 58, 59•].

There is an abundance of frailty screening stools with debates on their interchangeability across contexts to predict perioperative outcomes for ambulatory anesthesia [60•]. Many tools require a relatively large amount of time, space, and equipment, posting limitations on their utility in ambulatory anesthesia setting. When comparing different questionnaire screening tools, the Cardiovascular Health Study (CHS) Frail Scale or the Simple Frail Questionnaire each only consists of five items with simple yes or no answers [61–64]. Conversely, Time Up and Go (TUG) [65] is a quick physical screening tool evaluating a patient's walk speed for 10 feet with good correlation with the more time consuming CHS Frailty Phenotype [66] and Short Physical

Performance Battery (SPPB) scores in geriatric population [67, 68]. However, space for the walk and the need of a timer may post some limitations. Frailty rather than chronological age should be the focus of preoperative evaluation for the geriatric patients. The key is for the ambulatory anesthesiologists to find an accurate screening tool that can be easily and efficiently used in their practice settings. Once identified, proper preoperative optimization, patient selection, patient and caretaker education, and tailored perioperative anesthetic care may all be used to mitigate perioperative risks associated with frailty.

Preoperative Testing

Preoperative testing protocols should take into consideration the added value each test will provide within the clinical context. A diagnostic test is only valuable if (1) The information is used for decision-making and (2) the decision-making results in improved outcomes [69, 70]. Key factors in a cost–benefit analysis include the cost of the test, the safety of performing it (including exposure to false positive results and the cascade of follow-up testing), and the feasibility of performing both the test and the intervention [70]. Studies in ambulatory surgery populations have demonstrated an increased cost associated with routine preoperative laboratory tests without a difference in outcomes compared to patients without testing [71, 72].

Most procedures performed at ASCs carry a low to moderate cardiac risk [73]. Thus, preoperative testing is only likely to be valuable in detecting critical abnormalities that would disqualify the patient from undergoing the procedure (e.g., extreme hyperglycemia, anemia). Yet, when compared to prior decades, increases in both patient-related and procedural complexity of cases performed in the ambulatory surgery arena brought controversies on the need of preoperative testing.

Hemoglobin

Anemia has been established as a risk multiplier in the perioperative period [74], and it is often caused by correctable conditions, such as iron deficiency [75]. Early detection may allow treatments before proceeding to surgery. For surgery of intermediate or major risk category, preoperative hemoglobin testing is warranted when the presence of anemia would disqualify the patient from undergoing the procedure at a free-standing ambulatory surgery center without access to a blood bank. A preoperative hemoglobin level < 10 g/dL is defined as moderate anemia and has been associated with an increased risk of perioperative blood transfusion in total knee replacement patients [76]. Although a non-invasive assessment of hemoglobin level would be an attractive alternative to preoperative blood testing, non-invasive hemoglobin measurements are not suitable for detecting preoperative anemia due to low sensitivity in patients of all genders [77]. By contrast, minor procedures, such as cataract surgery or other surgeries expecting minimal to no blood loss, can be successfully performed in patients with anemia. There is no requirement for this population to be screened preoperatively [78].

Serum Glucose and Hemoglobin A1c

Exposure to hyperglycemia in the immediate perioperative period is associated with an increased prevalence of perioperative infection, acute kidney injury, pulmonary complications, longer lengths of hospitalization, and death [79, 80]. In patients with a history of hyperglycemia or predisposing factors such as a current infection, inflammation, or reported non-adherence to medical therapy, a serum glucose level is warranted in the immediate preoperative period. Extreme hyperglycemia may represent a medical emergency such as diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar state that requires urgent intervention. In diabetic patients with adequate glycemic control, glucose levels should target ≤ 200 mg/dL on the day of surgery to reduce the risk of postoperative adverse events [81]. By contrast, patients with chronic hyperglycemia should not have their serum glucose lowered aggressively before ambulatory surgery due to the risk of triggering an increased oxidative stress response and increased perioperative morbidity and mortality [82]. Glucose testing in the immediate preoperative period is also indicated for patients with a history of hypoglycemia due to the sequelae (seizure, brain damage, autonomic failure, and death) or with an altered mental status that reduces the ability to detect symptoms. In patients who did not stop their sodium-glucose cotransporter 2 inhibitors 3–4 days preoperatively, there is an increased risk of euglycemic DKA, and a preoperative basic metabolic panel or other testing may be necessary to screen for elevated anion gap, decreased serum bicarbonate, elevated serum beta-hydroxybutyrate, or low serum pH [83].

Controversies exist on the need of testing hemoglobin A1c (HbA1c) in diabetic patients and the need to delay elective surgery when HbA1c reaches a certain level. Bock et al. suggested that preoperative serum glucose and HbA1c testing are not required in non-DM patients. Yet, the authors also recommended testing for patients scheduled for vascular and orthopedic surgery due to their elevated risks [84]. Generally, HbA1c above 8.0–8.5% has been set to be the threshold for recommending additional glycemic control interventions prior to proceeding with non-time-sensitive moderate to high-risk surgery [85–87]. HbA1c of 8.5% is reflective of an average serum glucose level of 200 mg/dL, suggesting high likelihood of significant hyperglycemia on the day of surgery and

Table 1 Pregnancy Reasonably Excluded Guide (PREG) for pregnancy assessment [95]

□ I am pregnant.	**D**
□ I am 14-17 years old. □ I need an interpreter or other help completing this form. □ I think I may be pregnant or would like a pregnancy test.	**C**
□ I have had my fallopian tubes tied or removed (tubal ligation or salpingectomy). □ I have had my uterus removed (hysterectomy) OR □ I have had both ovaries removed (bilateral oophorectomy). □ I am in menopause (no menses for the past year) AND more than 45 years old. □ I have an intrauterine device for birth control AND it is not due to be changed. □ I have a birth control implant AND it is not due to be changed.	**A**
□ I started bleeding from a normal menstrual period within the last seven days. □ I use birth control AND have not missed it or been late taking it. Examples of methods: • Birth control pills • Shots or injections • Patch • Ring □ I have not had sex with a man since the start of my last normal menstrual period. □ My partner(s) has had a vasectomy AND he has had a negative semen test.	**B**
None of the above in sections A–B apply.	**C**

Interpretation Guide

D. Patient known to be pregnant.

Action: The surgical listing should already acknowledge that she is pregnant. If not, notify the service.

A. Women with a positive response in this category are reasonably not pregnant and are unlikely to become pregnant soon.

Action: No pregnancy test needed today unless the patient requests one.

B. Women with a positive response in this category are reasonably not pregnant today but will require evaluation again prior to future exposures of concern.

Action: No pregnancy test needed today unless the patient requests one.

C. Women with a positive response in this category require pregnancy testing today prior to the procedure, unless a lab resulted pregnancy test from the last 36 hours.

Action:

1. Positive pregnancy test — notify the service now. Depending on the exposure of concern:
   a. She is not a candidate for the procedure.
   b. She is a candidate with peri-procedure modifications.
   c. She is a candidate with no modifications required.
   Service will arrange for evaluation for pregnancy or other reasons for elevated hCG.
2. Negative pregnancy test.
   a. Urine pregnancy test is negative and any Group A (other than pregnancy) or Group B statement: She is reasonably not pregnant.
   b. Urine pregnancy test is negative and no Group A (other than pregnancy) or Group B statement: She is reasonably not pregnant, but depending on menstrual and coital history, she may have conceived up to 14 days ago.
3. If patient is unable to read, understand, and accurately respond to statements, pregnancy testing can be safely omitted if she has had a hysterectomy, bilateral oophorectomy or bilateral tubal ligation and collaborating history is available in the medical record.

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potential DM-associated end organ damage, including kidney and cardiovascular disease, warranting additional screening and evaluation [82, 85]. With more than one in five adults in the USA being undiagnosed for DM, some argue the need of preoperative HbA1c testing when preoperative serum glucose is higher than 200 mg/dL regardless of a history of DM [79]. However, patients having cataract surgery or other surgery with minimal risk should not undergo any preoperative testing unless they exhibit clinical signs [88].

Pregnancy Test

The incidence of previously unrecognized pregnancy identified via routine preoperative screening has been reported to range between 0.1 and 2.2% in asymptomatic menstruating patients [89–92]. Urine human chorionic gonadotropin (hCG) testing is the most commonly used test in the perioperative period due to a > 99% sensitivity and specificity at 14 days post-conception and the relatively low cost associated with the testing process [93]. Pregnancy testing may be an example of a high-value test when applied in circumstances in which the patient's pregnancy status will change perioperative management. However, universal preoperative urine hCG testing is often done unnecessarily and may pose medicolegal risk to anesthesiologists due to proceeding to provide anesthesia with failure to check the results. The Mayo Clinic had developed the Pregnancy Reasonably Excluded Guide (PREG) for pregnancy assessment to determine if the patient may not require hCG testing on the day of a procedure (Table 1.). Ultimately, patient autonomy must be upheld; informed consent of the risks, benefits, and alternatives to preoperative pregnancy testing should be obtained, including the possibility of both false positive and false negative results. Patients should not be denied medically necessary surgery in any trimester of pregnancy or for declining a pregnancy test. Patients who lack decision-making capability and patients who are unable to express their wishes require special consideration. Institutional variation exists regarding preprocedure pregnancy testing in vulnerable patient populations [92]. Informed consent should also include counseling patients on the potential failure of oral contraception due to exposure to medications such as sugammadex [94].

Conclusion

There is an exponential growth in procedures performed in the ambulatory setting and outside the operating room. An increasing number of patients with major comorbidities and advanced age are undergoing more complex procedures in the ambulatory surgical setting. This places challenges for anesthesiologists to provide safe, high quality, efficient, and cost-effective care. Delivery of patient-centered care will require modification of the current approach to preoperative evaluation. As this paper addresses the common conundrums for physicians in preoperative considerations, it covers key topics and new developments that have important implications for current and future practice in the ambulatory anesthesia. With careful preoperative evaluation, proper testing, and standardized patient selection process, patients with severe diseases may safely undergo ambulatory surgery. Individualized evaluations considering patient, surgery, and anesthesia-related risk factors should dictate which patients are appropriate for ambulatory surgery.

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Data availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The authors declare no competing interests.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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