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Anesthesia: A Weighty Issue

Commentary by **Ashish C. Sinha, MD, PhD**

The Case

A 77-year-old woman was evaluated preoperatively in anticipation of an elective left hip arthroplasty. She reported having a history of hypertension that was reasonably well controlled on procardia, atenolol, and lisinopril. The patient reported no history of bleeding disorders, tobacco use, anesthetic complications, or other significant comorbidities. Her calculated body mass index was 34. She was medically cleared for surgery.

The following week, the patient underwent an uneventful left hip arthroplasty with general anesthesia via a laryngeal mask airway. She had stable vital signs throughout. She was breathing spontaneously following the procedure and was safely extubated and transferred to the recovery unit. The patient continued to receive doses of morphine sulfate for procedure-related pain, which became complicated by increasing somnolence. She was also noted to have oxygen desaturations and, as these persisted, an arterial blood gas was drawn that demonstrated an acidosis with a markedly elevated partial pressure of carbon dioxide (PaCO₂) of 81 mm Hg. Attempts at noninvasive ventilation failed and the patient was reintubated for hypercarbic respiratory failure. After better pain control and airway assessment, the patient was extubated the following day and had an uneventful hospital course to discharge. Providers suggested in the discharge summary that the patient likely had obstructive sleep apnea (OSA) and would benefit from formal outpatient testing. Given the reintubation in the recovery unit, the case was reviewed by the hospital quality committee and questions were raised whether obese patients undergoing anesthesia should receive formal preoperative screening for OSA.

The Commentary

by **Ashish C. Sinha, MD, PhD**

In the United States, where two-thirds of the population is overweight, many overweight, obese, and morbidly obese patients require anesthetic care. In addition to the comorbidities of obesity, such as hypertension, diabetes, dyslipidemia, and obstructive sleep apnea (OSA), the presence of obesity itself puts patients at risk for slower wound healing, increased infection rates, longer hospital stays, deep vein thrombosis (DVT), and pulmonary embolism (PE) in the surgical (or anesthetic) setting.

Challenges in caring for obese patients in the perioperative setting can begin with obtaining routine intravenous (IV) access and continue through safe airway management. For the latter, difficult mask ventilation and intubation can make managing a patient's cardiopulmonary status, intraoperative ventilation, and safe extubation even more complex. Furthermore, when comorbidities like OSA are not adequately identified preoperatively ([Table](#)), the stage is set for the clinical scenario presented in this case.

Preoperative screening of obese patients should take into account the unique concerns of cardiopulmonary status (including pulmonary hypertension and tricuspid regurgitation) and airway challenges. OSA is a common sleep

disorder: 28% of women and 38% of men are at high risk.(1) The standard test for OSA and its severity is polysomnography (2), which is expensive and requires an overnight stay. In the general population, prevalence rates of moderate OSA (apnea–hypopnea index [AHI] > 15) are about 5% in women to 11% in men.(1) The association increases with age, with odds ratio rising 1.8 per decade. OSA is more common in all surgical populations. In morbidly obese patients (body mass index [BMI] > 40 kg/m²) with AHI greater than 15, the prevalence of OSA for men is between 42% to 55%, and between 16% and 24% in women.(1)

Screening for OSA should occur as part of every patient's preoperative evaluation. One of the commonly used validated screening tools is STOP BANG, which stands for **S**noring, daytime **T**iredness, **O**bserved apnea, high blood **P**ressure, high **B**Mi, advanced **A**ge, **N**eck circumference, and male **G**ender.(3,4) Three or more "positives" indicate a positive screen, which should prompt the provider to manage these patients closely by minimizing the use of narcotics. If avoidance of narcotics is not possible, clinicians should use non-narcotic options like nonsteroidal anti-inflammatory agents, local anesthetics, or IV acetaminophen for postoperative pain. The other considerations hinge on observing patients in a monitored setting (e.g., a post-anesthesia care unit [PACU]) for 3 hours after last narcotic dose to evaluate for potential sedation, and finally, overnight admission in a monitored situation if necessary.

In this case, an obese patient with a positive STOP BANG screen (one point each for high blood pressure, high BMI, and advanced age, for a total of three points) should have been handled a bit differently, particularly with multiple risk factors for over-sedation and respiratory depression. She likely had OSA (at least a high index of suspicion, even in the absence of a formal sleep study), was elderly (which gave her a fivefold higher risk from age alone), and was opioid naive. Given her BMI and the lateral position required for the procedure, a laryngeal mask airway (LMA) may have been a suboptimal choice of airway management. (It might have been a consideration if combined with a successful regional technique.) In the absence of a local anesthetic component, the amount of narcotics a spontaneously breathing patient can receive is limited and true preemptive narcotic analgesia is a challenge.

When volatile agents were discontinued at the end of surgery, this patient's pain was treated with morphine, which caused somnolence and hypercarbic respiratory failure. For postoperative pain, we would have favored a regional block. If the patient could not receive a block for technical reasons, patient preference, or contraindications, multimodal analgesia (without or with minimal narcotics) would have been ideal. Even if the patient had a contraindication to nonsteroidal anti-inflammatory agents, IV acetaminophen can be effective. One gram IV acetaminophen, every 6 hours for 24 hours, provides rapid and effective analgesia, especially when used as part of a multimodal analgesic program and results in good patient satisfaction and decreased patient-controlled analgesia narcotics use.(5) Finally, a patient in this BMI range may also have been better managed by endotracheal tube placement and controlled mechanical ventilation. Obese patients are more prone to atelectasis and frequent recruitment maneuvers are necessary to counteract this atelectasis. Increasing fraction of inspired oxygen (FiO₂) has minimal impact on this atelectasis-related desaturation. An LMA turns out to be a poor choice for a recruitment maneuver.

As this discussion suggests, managing anesthesia in obese patients requires careful attention and understanding of respiratory and cardiac physiology, including its specific derangements in the setting of obesity. Given the current prevalence of obesity, most anesthesia trainees have had ample opportunities to care for obese patients and learn the requisite skills before entering practice. Their training should also include how to have deliberate engagement and counseling with obese patients in a sensitive and open manner. Empathy and establishing rapport are critical in helping them understand the added risks to what may seem like routine procedures. Obese patients can and should receive safe and high-quality care, but attention to obesity-related risks is important to assure desired outcomes.

Take-Home Points

- While providing anesthesia for obese and overweight patients, whenever possible consider multimodal analgesia and minimize the use of narcotics.
- Patients with a diagnosis of OSA should be monitored carefully prior to considering discharge to home.
- Keep a high index of suspicion for inappropriate ventilation in the post-operative period; obese patients have a

low functional residual capacity along with a high metabolic demand for oxygen.

- For short, supine procedures, spontaneous ventilation intraoperatively may be considered in patients who have no other contraindication like reflux.

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Table

Table. Characteristics of patients at higher risk of over sedation and respiratory depression.

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| Sleep apnea |
| Opioid naïve, opioid habituation, or increased opioid requirement |
| Elderly: Age in the 60s, risk almost 3-fold higher; 70s, 5-fold higher; 80s, approximately 9-fold higher |
| Snoring |
| Morbid obesity |
| Upper abdominal or thoracic surgery |
| Long length of surgery (and anesthesia) |
| Concurrent sedatives |
| Pulmonary or cardiac impairment preoperatively |
| Chest incisions that impair breathing |
| Smoking |

