Sedation Challenges
Obesity and Sleep Apnea

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KEYWORDS

• Bariatric endoscopy • Sedation • Obesity • Anesthesia • Endoscopy
• Colonoscopy • Gastric bypass

KEY POINTS

- There is little evidence regarding endoscopic sedation in obesity and obstructive sleep apnea.
- Moderate sedation is likely safe for diagnostic and simple therapeutic procedures in the general obese and bariatric populations.
- Anesthesia support should be considered for more complicated therapeutic procedures and in the superobese.

Obesity has become an epidemic health problem worldwide. Defined as a body mass index (BMI) of greater than or equal to 30 kg/m^2, obesity is divided into class I (BMI 30–34.9 kg/m^2), class II or severe obesity (BMI 35–39.9 kg/m^2), and class III or morbid obesity (BMI >40 kg/m^2). Some surgical literature further breaks down class III obesity into superobese, which represents those with BMI of greater than or equal to 45 or 50 kg/m^2.[1,2] In 2014, the World Health Organization (WHO) reported that 33% of adults ages 18 years and older were overweight (BMI >25 kg/m^2), and 13% were obese (BMI >30 kg/m^2).[1] In the United States, this problem has become even more severe with more than half of adults ages 20 years and older being overweight and 34.9% being obese as of 2012.[3] To date, multiple conditions have been shown to be associated with obesity, including hypertension, hyperlipidemia, diabetes, stroke, osteoarthritis, and sleep apnea.[4,5] Additionally, multiple gastrointestinal diseases, including gallbladder disease, esophageal cancer, and colon cancer, have been demonstrated to be more prevalent in patients with a higher BMI.[6,7] As a result, all gastroenterologists will inevitably encounter an increase in the number of obese patients in their practice who are undergoing endoscopy.

Sedation is an integral component of every endoscopic examination. Defined as a drug-induced state in which the level of consciousness is depressed, sedation

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provides a relief in patients' discomfort and anxiety, and allows proceduralists to focus on the endoscopic work.[8,9] Four stages of sedation have been described: minimal, moderate, deep, and general anesthesia (Table 1). Generally, most diagnostic and uncomplicated therapeutic upper endoscopy and colonoscopy can be successfully performed under moderate sedation, formerly known as conscious sedation. During moderate sedation, patients respond purposefully to verbal commands or tactile stimulation. For longer and more complex procedures, however, deeper levels of sedation may be required. These include deep sedation in which patients cannot be easily aroused but may respond purposefully to painful or repeated simulation and general anesthesia in which patients are unarousable to painful stimuli. To appropriately choose the level of sedation for each procedure, multiple factors need to be taken into an account. These include patient's age, comorbidities, concurrent medications, pain tolerance, and the type of endoscopic procedure being performed. This article explores the medical literature on the effect of obesity and obstructive sleep apnea (OSA) on endoscopic sedation.

OBESITY AND SEDATION

Traditionally, a higher BMI was thought to be associated with an increased risk during procedural sedation. This may be due to sleep apnea, pulmonary hypertension, and restrictive lung disease, which are more common in patients with obesity. Additionally, airway management in obese patients may prove to be more difficult due to rapid oxygen desaturation, challenges with mask ventilation and intubation, and increased susceptibility to the respiratory depressant effects of sedatives.[10] As a result, many institutions require an anesthesia consultation on all patients with a BMI of 40 and higher before any endoscopic procedures to plan out the safest and most efficacious method of sedation.

Nonbariatric Obese Population

Although anecdotally obese patients are believed to be at higher risk for procedural sedation, this perception is not extensively backed up by the medical literature. In fact, the concept of BMI being a risk factor for sedation-related adverse events (SRAEs) has only recently gained an interest among gastroenterologists. In large national studies using the Clinical Outcomes Research Initiative National Endoscopic

Table 1
Four stages of sedation

	Responsiveness	Airway	Spontaneous Ventilation	Cardiovascular Function
Minimal sedation	Normal response to verbal stimulation	Unaffected	Unaffected	Unaffected
Moderate sedation	Purposeful response to verbal or tactile stimulation	No intervention required	Adequate	Usually maintained
Deep sedation	Purposeful response after repeated or painful stimulation	Intervention may be required	May be inadequate	Usually maintained
General anesthesia	Unarousable even with painful stimuli	Intervention often required	Frequently inadequate	May be impaired

Data from Gross JB, Bailey PL, Connis RT, et al. Practice guidelines for sedation and analgesia by nonanesthesiologists. Anesthesiology 2002;96:1004–17.