

# Conscious Sedation/Local Anesthesia in the Office-Based Surgical and Procedural Facility

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## KEYWORDS

- Balanced anesthesia • Conscious sedation • Propofol • Constant infusion • Titration infusion
- Twilight sleep

## KEY POINTS

- Conscious sedation/local anesthesia is a challenging technique requiring cooperation of the patient, surgeon, and anesthesia provider.
- The anesthesia provider keeps the patient sedated, whereas the surgeon provides the anesthesia (local).
- In the authors' experience, the defining factor of "conscious sedation" is the ability of the patient to maintain spontaneous respirations and the ability (reflexes) to protect the airway throughout the procedure.
- The properties of propofol, especially the rapid onset and short duration of action, make it an ideal agent for conscious sedation.
- Because the level of sedation can deepen unexpectedly with propofol, an anesthesia provider should administer and monitor the patient.
- Low-dose propofol conscious sedation with local anesthesia is a safe and effective anesthetic for a wide spectrum of surgical procedures.
- It is the dose of the drug, not the route of administration, which determines depth of sedation.
- PONV is infrequent with this technique.

With the increasing number of office-based surgical (OBS), medical, and diagnostic procedures done each year, there has been resurgence in the use of intravenous sedation. The American Association for the Accreditation of Ambulatory Surgical Facilities (AAAASF), which provides accreditation for most OBS and office-based medical facilities in the United States, has demonstrated the safety of OBS from peer review data involving more than 1 million procedures.<sup>1</sup> Several independent

reports have confirmed the safety of ambulatory surgery.<sup>2-5</sup>

Current anesthetic methods, improved monitoring technology, and newer drugs have improved the safety of general anesthesia and that of intravenous sedation. The importance of OBS facility accreditation and appropriate physician credentialing for patient safety cannot be overemphasized and are integral to the conclusions of this article. In fact, when propofol is used, AAAASF requires a

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credentialed anesthesia provider to administer the anesthetic and that the facility be equipped comparably with one approved for general anesthesia.

Intravenous sedation encompasses a broad continuum of levels of consciousness, from a low-dose tranquilizer reducing anxiety in an awake patient, to deep sedation requiring supplemental oxygen and airway management. Measurable outcomes of conscious sedation (midazolam/fentanyl) and deep (propofol) sedation have been found to be effective and safe in a series reported by Hansen and coworkers.<sup>6</sup> This article presents the authors' extensive experience with conscious sedation/local anesthesia as a safe, comfortable, and effective but constantly evolving technique. Because conscious sedation requires teamwork, the discussion includes the perspective of the various members of the operating room (OR) team.

### CONSCIOUS SEDATION DEFINED

According to the American Society of Anesthesia, "Conscious sedation is a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained."<sup>7</sup> This is in contrast to deep sedation, in which the patient is unconscious and requires assistance with airway management, with potential impairment of cardiovascular function. Many surgeons prefer deep sedation because it requires less time and concern for patient comfort than conscious sedation. However, deep sedation increases the risk of airway compromise, incidence of postoperative nausea and vomiting (PONV), and recovery time. It could be argued that deep sedation is merely a "light general anesthetic" and should be treated as such with mechanical control of the airway. Conscious sedation, properly administered, is safer, has a lower incidence of PONV, and provides a shorter recovery.

In the authors' experience, the defining factor of conscious sedation is the ability of the patient to maintain spontaneous respirations and the ability (reflex) to protect the airway. Although the authors' patients are generally responsive to verbal and physical stimuli most of the time, they are maintained at a deeper level during the initial injection of the local anesthesia and occasionally and briefly at intervals of more intense stimulation. Occasionally, it is necessary to lift the jaw to temporarily maintain the airway, but the need to use a mask for positive pressure assistance was uncommon in the authors' series. In their

experience, supplemental oxygen, which is potentially dangerous because of fire hazard, is not required, because no patient has exhibited hypoxia requiring the use of intubation.<sup>8</sup> Intraoral and intranasal airways are not routinely used. Of interest, Stemp has suggested that supplemental oxygen can actually be detrimental because it can mask and delay the diagnosis of hypoventilation.<sup>9</sup>

Conscious sedation/local anesthesia is a challenging technique requiring cooperation between the surgeon and anesthesia provider. The non-threatening office environment, with limited anesthesia equipment, recovery space, and personnel requirements, together with the reduced incidence of PONV and shorter recovery time, make this technique ideal for OSB procedures. Significantly, certain risks of general anesthesia can be reduced or avoided with the use of conscious sedation, including deep vein thrombosis, pulmonary complications, OR fires, and pressure injuries. The cost effectiveness of OBS and conscious sedation is crucial as hospital costs increase, despite shrinking health care resources. In cosmetic surgery, the use of conscious sedation and OBS can provide a valuable marketing advantage to the surgeon, including safety, cost, and patient satisfaction.<sup>10</sup> Empirically, the risk of deep venous thrombosis in a sedated patient should be negligible compared with general anesthesia. However, it is the authors' practice and an AAAASF requirement to use a sequential compression device on all cases lasting longer than an hour.

In some practices, oral sedation is used for OBS to avoid the necessity of accreditation, which is mandated in many states for facilities using intravenous sedation. However, most oral drugs have relatively long onset and duration, making the control of level of consciousness unpredictable. Furthermore, the occurrence of an overdose is difficult to manage without trained personnel and the availability of adequate resuscitation drugs and equipment. AAAASF requires the continual monitoring of vital signs, oxygenation, and continuous monitoring of electrocardiogram by a qualified physician when using sedation. It is important to understand that the depth of sedation is related to dose, not route of administration of the sedating drug.

### CLINICAL EXPERIENCE

Fifteen years experience of 1400 consecutive cases done by a nurse anesthetist in a single practice Class B AAAASF OBS facility were retrospectively reviewed for incidence of anesthetic complications, fatalities, and unanticipated hospital admissions. Drugs used, doses given, and order

of administration varied; however, the technique described here has evolved over the past 15 years and has proved effective and safe. **Table 1** shows the low incidence of complications of conscious sedation with local anesthesia. Several series have been published that mirror these data and conclusions.<sup>1,3,4,10,11</sup> Our data show that the routine use of supplemental oxygen for patients under conscious sedation is unnecessary. However, if the anesthesia provider prefers the use of supplemental oxygen, recent studies suggest a nasopharyngeal catheter may be safer than other delivery methods.<sup>12</sup>

No oral premedication was used in this technique because the authors and others have found oral medication can prolong recovery time and PONV. The authors' current conscious sedation technique uses low-dose propofol titration in combination with several other drugs, with effective sedation and short recovery period. Yoon and coworkers<sup>11</sup> describe propofol as the ideal sedative drug for local anesthesia in the ambulatory setting because it provides sedation, anxiolysis, and amnesia with rapid onset and recovery and few side effects. With low-dose propofol, careful titration and continual observation are necessary to achieve the desired level of consciousness, maintenance of airway, and respiratory drive. A constant infusion pump can be used with the benefit of more even levels of altered consciousness, but often results in deeper sedation.<sup>4,13,14</sup> Because of the potential for a rapid and unexpected deepening of sedation, only an anesthesia professional should administer propofol. It is important to advise patients that they may have some vague memories after conscious sedation,

rarely unpleasant, and usually from late in the procedure.

## CONSCIOUS SEDATION TECHNIQUE

The technique described has been successfully used balancing doses of propofol, midazolam, fentanyl, and other adjuvants to achieve a safe level of sedation. The success of this technique has been a product of the continuous communication and cooperation between the surgeon, patient, and anesthesia provider. On the continuum of conscious to deep sedation, the technique described keeps the patient predominately in a conscious state with deeper sedation only at appropriate times and for short intervals.

The patient is contacted the day before surgery to discuss the proposed anesthetic management, to allay any concerns, and to explain the sedation experience. Referring to the anesthetic technique as "twilight sleep" is a term best understood by patients. The morning of surgery is an opportune time for the anesthesia provider to reassure the patient that they will not feel pain or experience anxiety during the procedure and likely will have no memory of the procedure. An explanation of a forthcoming maneuver, especially if it is uncomfortable, is key to avoiding surprises that might undermine any previously established confidence. Patient comfort, in and of itself, is reassuring, so appropriate room temperature, positioning, and assistance in transfer to the OR table should be a part of the preoperative management (**Fig. 1**).

After an intravenous line is established, medications are administered with an initial dose of midazolam, 0.025 mg/kg, and droperidol, 0.625 mg. This is followed by an initial dose of propofol, 0.5 mg/kg, and titration is continued until the patient no longer responds to verbal stimuli. Close observation of the patient response is key in

**Table 1**  
**Complications**

Unanticipated hospital admissions	0
Deep venous thrombosis	0
Mortality	0
Acute urinary retention	1
Orthostatic hypotension, treated with fluids	7
Orthostatic hypotension, treated with fluids and vasoconstrictor	3
Airway management	
Oral airway	0
Nasal airway	1
Endotracheal tube/LMA	0
Face mask with oxygen/positive pressure ventilation	7
PONV	5

Abbreviation: LMA, Laryngeal Mask Airway.



**Fig. 1.** Anesthesia provider directly observing patient for comfort level and airway, with electronic monitor, drugs, and anesthesia machine readily available.

determining future propofol doses. During this time, the patient also receives fentanyl, 0.5 µg/kg, and ketamine, 0.25 mg/kg, to provide a brief and mild dissociative state during the infiltration of the local anesthetic (Table 2, for dosages). The goal of this measured use of agents is to provide adequate sedation while maintaining spontaneous respirations and adequate oxygenation, without assistance or supplemental oxygen. A mixture (1:1) of lidocaine HCl 1% with epinephrine and bupivacaine HCl 0.25% with epinephrine local infiltration is used to provide rapid onset and long duration of the local anesthetic effect.

Painful stimuli that result in a patient response, including movement, verbal complaints, or a subtle change in breathing pattern, should be managed by infiltration of additional local anesthetic by the surgeon. A small amount of propofol may be given to relax the patient. However, when patient movement seems independent of painful stimuli, it may be positional discomfort, restlessness, or undisclosed claustrophobia. Whereas additional propofol may diminish this movement, it may also result in apnea. In the authors' experience, restlessness is best controlled with a bolus of diazepam, 5 mg, which does not result in apnea or significantly delay discharge.

PONV is a debilitating consequence of anesthesia, which leads to patient dissatisfaction and prolonged time at the surgical facility. Approaches to preventing PONV have been studied extensively with rates of nausea from 4% to 38.5% in those who were treated prophylactically and 10% to 79% without prophylaxis.<sup>15–17</sup> In their experience, the authors have found PONV to be uncommon, and they attribute this to decreased narcotic requirement because pain is well controlled by the long-acting local anesthetic. Chemoprophylaxis begins with the initial use of droperidol, 0.625 mg, along with midazolam, and single dose of dexamethasone, 8 to 10 mg after the first dose of propofol. The propofol should be given before the steroid to mitigate acute urethral irritation, frequently caused by dexamethasone. Ondansetron, 4 mg,

is administered intravenously within the last hour of surgery. Additionally, adequate hydration is important for PONV prevention and hemodynamic stability. A single dose of ketorolac, 30 mg, is given at the end of the procedure to provide extended pain relief (Table 3).

With conscious sedation, most patients meet discharge criteria when they arrive in the recovery area. However, the patient should be observed

Table 2 Conscious sedation dosing regimen		
	Initial Dose	Follow-Up Dose
Midazolam	0.025 mg/kg	0.025–0.04 mg/kg
Propofol	0.4–0.7 mg/kg	0.3–0.5 mg/kg
Fentanyl	0.4–0.7 µg/kg	0.6–1 µg/kg
Ketamine	0.15–0.3 mg/kg	0.15–0.3 mg/kg
Diazepam	NA	0.05–0.07 mg/kg

Table 3 Medications listed by actions	
Midazolam	Anxiolysis, some contemporaneous amnesia, <sup>18,20</sup> short duration of action
Propofol	Hypnotic, some antiemetic effects, short duration of action <sup>18</sup>
Fentanyl	Narcotic, blunts pain response to local injections, decreases propofol dosing needs, provides some postoperative pain control <sup>18</sup>
Ketamine	Dissociative, no respiratory depression at recommended doses, may decrease fentanyl and propofol requirements <sup>19,20</sup>
Diazepam	Skeletal muscle relaxant, antispasmodic, anxiolytic
Ketorolac	Nonnarcotic postoperative pain control
Dexamethasone	Sense of well-being postoperatively, antiemetic action, <sup>18,22</sup> late effect on PONV, seems to have synergistic effects when given with ondansetron <sup>18,21</sup>
Droperidol	Antiemetic action in CTZ and area postrema, does not alter cardiac refractory period or produce extrapyramidal effects in low dose <sup>18,20,22</sup> Always give with or after benzodiazepine to avoid anxiety sometimes associated with this drug <sup>22</sup>
Ondansetron	5-HT <sub>3</sub> receptor antagonist, acts peripherally on vagus nerve terminals and centrally in CTZ <sup>18,22</sup>

Abbreviation: CTZ, Chemoreceptor Trigger Zone in the area postrema.

and monitored until vital signs and level of consciousness are appropriate for discharge. Because the surgical area is anesthetized locally to permit surgery, early postoperative pain management is simplified, reducing the use of narcotics or other analgesics that prolong recovery and increase the risk of PONV.

## **DISCUSSION ON CONSCIOUS SEDATION FROM VARIOUS PERSPECTIVES**

### ***Patient Selection***

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Patient selection is essential to the success of this technique. The patient should be healthy, ASA I or II, relatively mature, and emotionally stable. However, children typically respond well to conscious sedation. Any patient who has anxiety tendencies, claustrophobia, or a previous unsatisfactory experience with a procedure done under sedation should be counseled thoroughly before offered this approach. In the authors' experience, males may be more difficult patients because they may show agitation with conscious sedation.

The patient should be thoroughly informed about the method and goals of this type of anesthesia, as contrasted with a general anesthesia. The authors have found that a well-motivated, adequately prepared patient requires no premedication and can even walk from the preoperative area to the office OR. Most of the authors' patients meet or nearly meet discharge criteria at the end of the procedure and are comfortably transported to the postoperative (recovery) area in a wheelchair. The average patient is discharged from the post-surgical observation area within 20 to 30 minutes.

In the authors' experience, a wide range of cases have been successfully done in an OBS setting using local anesthesia and conscious sedation, including aesthetic facial and breast surgery and bodying contouring, including liposuction and abdominoplasty. Multiple procedures have been successfully performed under conscious sedation, but longer and more extensive combined procedures may be more appropriately done under a general anesthetic.

### ***The Surgeon***

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Success with conscious sedation requires a commitment by the surgeon to exercise patience, use gentle surgical technique, and to be willing to communicate with the patient and anesthesia provider during the procedure. A surgeon experienced in the use of local anesthesia/conscious sedation develops a level of comfort by being constantly aware of the status of the patient's comfort. The surgeon must be adept at the use of local anesthesia and anesthetic wetting solutions to provide

profound, effective anesthesia. Sufficient time should be allowed after the administration of the local anesthetic to provide maximum anesthesia and vasoconstriction. Should the patient experience pain during the procedure, the surgeon must pause and add additional local anesthetic, in coordination with the anesthesia provider. It is imperative that the surgeon and anesthesia provider understand that the anesthesia provider's goal is to sedate the patient, whereas the surgeon's responsibility is to provide analgesia.

### ***The OR Nursing Staff***

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Although the professional activities and responsibilities of the nursing staff are independent of the type of anesthesia, conscious sedation requires certain additional considerations. All aspects of patient comfort must be considered in the "awake" patient with a prompt response to any verbal request. The entire team should avoid using alarming terminology, such as pain, knife, blood, needle, and so forth, and instead substitute such terms as discomfort, #15 (scalpel blade), drainage, and attachment (needles are attached to suture). In general in the OR, but especially with the "awake" patient, inappropriate and unnecessary conversation should be avoided. OR music should not be loud or distracting, but should be background music, of a genre selected with consideration of the patient and OR staff.

### ***The Anesthesia Provider***

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In many ways, conscious sedation is more demanding of the anesthesia provider than general anesthesia, in comparable patients and surgical procedures. Because the level of sedation with propofol may unexpectedly deepen, requiring emergent airway management, the anesthesia provider must be vigilant and responsive. The administration of conscious sedation requires the anesthesia provider's constant and undivided attention, clinical expertise, and a great deal of patience.

## **SUMMARY**

Conscious sedation is almost as much an art as it is a science, and requires the commitment of the entire OR team. It is not the easiest approach, but has several significant advantages, including safety, shorter recovery period, less nausea and vomiting, and generally a better patient experience. Also, it lends itself to OBS because it requires less space, equipment, and personnel. Low-dose propofol, along with other drugs, is the ideal agent because it provides sedation,



anxiolysis, and amnesia, with rapid onset and a short duration of action. The technique described in this article includes the use of low-dose propofol with midazolam and often small doses of fentanyl, without supplemental oxygen or airway devices, or endotracheal intubation. A total of 1400 cases were reported with negligible complications, and no hospitalizations or fatalities.

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