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# Shades of

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# sedation

## Learning about moderate sedation and analgesia

**Find out about the newest drugs, nurse-administered sedation, and more.**

INCREASINGLY POPULAR for both hospital and outpatient procedures, moderate sedation (also called procedural sedation) can be used for a range of treatments and diagnostic tests. With its wider use comes a host of new responsibilities for nurses who care for patients undergoing moderate sedation and analgesia. For example, besides knowing how to monitor a patient's condition and assess for complications, you need to learn about the various drugs used to induce moderate sedation and analgesia. You should also inform yourself about nurse-administered propofol sedation (NAPS), a controversial new practice. In this article, I'll discuss what you need to know to care for your patient.

### **What is moderate sedation and analgesia?**

According to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and the American Society of Anesthesiologists (ASA), *moderate sedation and analgesia* is a drug-induced depression of consciousness. Under moderate sedation and analgesia, a patient can respond purposefully to verbal commands (alone or accompanied by light tactile stimulation), maintain a patent airway, and breathe on his own. In contrast, *minimal sedation* (also called anxiolysis) is a lighter state of sedation in which the patient can respond normally to verbal commands.

On the other end of the scale, two stages of sedation are deeper than moderate sedation:

- *deep sedation/analgesia*. The patient may need help maintaining a patent airway and may need assisted ventilation. He can't be easily aroused, but he responds purposefully to repeated or painful stimulation.
- *general anesthesia*. The patient isn't arousable, even to painful stimulation; probably needs help maintaining a patent airway; and may require positive-pressure ventilation.

### **Propofol gains popularity**

In recent years, propofol, an intravenous (I.V.) sedative-

hypnotic, has been gaining popularity over midazolam and fentanyl as the drug of choice for moderate sedation and analgesia. One reason is that patients spend less time sleeping after the procedure than if they were given benzodiazepines or opioids. Propofol also has replaced thiopental sodium as a rapid-acting nonbarbiturate induction and maintenance agent for anesthesia or sedation during surgery. Depending on the dose given, propofol can be used for moderate or deep sedation or for general anesthesia. For more details, see *Drugs used for moderate sedation and analgesia*.

### First things first

Before administering moderate sedation and analgesia, take a thorough history of the patient's allergies (patients allergic to eggs or soybeans shouldn't receive

propofol), medical problems with special attention to respiratory and cardiac problems, tobacco and alcohol use, and drug abuse. Question him about previous adverse experiences with sedation or analgesia and perform medication reconciliation.

Next, determine the patient's ASA physical status class:

- P1—a normal, healthy patient
- P2—a patient with mild systemic disease that doesn't limit activities, such as controlled hypertension
- P3—a patient with severe systemic disease that limits activities, such as stable angina
- P4—a patient with severe systemic disease that's a constant threat to life, such as end-stage renal disease
- P5—a patient who's not expected to survive without surgery or other intervention
- P6—a patient declared brain-

dead whose organs are being removed for donation.

Patients in ASA classes P1 and P2 are candidates for moderate sedation and analgesia; consult the anesthesiology department about patients who are in classes P3 to P6.

### Before the procedure

When the patient arrives in the procedure area, confirm his N.P.O. status, obtain baseline vital signs, auscultate his heart and lungs, and evaluate his airway. Make sure a signed consent form is in his chart. Before administering supplemental oxygen via nasal cannula, use pulse oximetry to document his oxygen saturation on room air. Record his blood pressure (BP), heart rate and rhythm, respiratory rate, and oxygen saturation by pulse oximetry (SpO<sub>2</sub>) every 5 minutes during moderate sedation. Assess the

## Drugs used for moderate sedation and analgesia

Administer small doses and assess the patient's response before giving another dose. Body mass and other factors can affect the patient's reaction.

	Onset	Peak	Duration	Usual dosage
<b>Nonbarbiturate</b>				
<b>Propofol</b>	30-60 sec	1 min	5-20 min	see prescribing information
<b>Benzodiazepines</b>				
<b>Diazepam</b>	1-5 min	4-8 min	15-60 min	2-5 mg I.V. over 2 min; may repeat 0.5 mg every 5 min to max 10 mg total
<b>Midazolam</b>	1-5 min	2-5 min	15-90 min	0.5-2 mg I.V. over 2 min; may repeat 0.5 mg every 5 min to 5 mg total
<b>Opioids</b>				
<b>Fentanyl</b>	<30 sec	3-7 min	30-60 min	25-50 mcg I.V. over 2 min; may repeat 25 mcg every 5 min to max 500 mcg in 4 hr
<b>Morphine</b>	<1 min	20 min	2-7 hr	2-5 mg I.V. over 5 min; may repeat 2-5 mg every 5 min
<b>Reversal agents</b>				
<b>Flumazenil</b>	1-2 min	6-10 min	40-90 min	0.2 mg I.V. over 15 sec; may repeat every 1 min to max 1 mg
<b>Naloxone</b>	1-2 min	5-15 min	1-4 hr	0.02-0.04 mg over 30 sec; may repeat at 1-min intervals to max 10 mg. (Dilute 0.4 mg in 10 ml of 0.9% sodium chloride solution to make 0.04 mg/ml.)

adequacy of his I.V. access and check the results of preprocedural lab and diagnostic testing.

If your patient will receive propofol for moderate sedation, make sure he has a large-bore I.V. device in place (typically 16- or 18-gauge in the metacarpal, basilic, or cephalic vein) because propofol can be irritating to veins.

Patients who abuse drugs or alcohol and those who are opioid-tolerant may need more medica-

• 6—Patient doesn't respond to stimuli.

### **Monitoring and handling complications**

To be prepared for complications, make sure the procedure room has appropriate equipment to continuously monitor cardiac rate and rhythm, SpO<sub>2</sub>, and noninvasive BP. Other equipment needed in the room includes supplemental oxygen and various delivery devices

the monitor's nasal tubing. The monitor shows the patient's carbon dioxide level and sounds an alarm if the readings go beyond predetermined ranges. Monitoring is discontinued when the patient has recovered sufficiently from sedation, according to your facility's policy.

During moderate sedation and analgesia, if your patient develops respiratory depression or is difficult to wake, protect his airway. As

## **Although controversial, nurse-administered propofol sedation is becoming popular for procedures such as endoscopies and liver biopsies.**

tion to achieve the desired level of sedation and analgesia. Patients taking methadone for drug rehabilitation should take their daily methadone dose on the day of the procedure. For the patients taking methadone and those in an alcohol rehabilitation program, document the sedatives and analgesics used and give the patient a copy of this documentation on discharge; he'll need to give it to his counselor.

The drug used in moderate sedation and analgesia is titrated to keep the patient at 2 to 3 on the Ramsay sedation scoring system:

- 1—Patient is anxious, restless, agitated, or all three.
- 2—Patient is cooperative, oriented, and tranquil.
- 3—Patient is easily arousable and responds appropriately to stimuli.
- 4—Patient is asleep but has brisk response to light glabellar tap or loud auditory stimulus.
- 5—Patient is asleep and has sluggish response to glabellar tap or auditory stimulus; responds to painful stimuli.

(including nasal cannula, non-rebreather mask with reservoir, and bag-mask), a suction source and suctioning apparatus, and advanced airway management equipment such as laryngoscope handles and blades and endotracheal tubes and stylets. Also have on hand reversal agents for opioids and benzodiazepines, I.V. equipment, and a crash cart with emergency drugs and a defibrillator. (Propofol has no pharmacologic antidote, but effects typically wear off after 20 minutes.)

Capnography is being used in some facilities to monitor patients during moderate sedation. This device monitors exhaled carbon dioxide and produces a numeric value and a waveform that can alert you to hypoventilation, respiratory depression, hypermetabolism, and hypoperfusion.

The patient wears a nasal cannula (similar to one for supplemental oxygen administration) attached to the capnography monitor; he may also wear an SpO<sub>2</sub> sensor. Supplemental oxygen can flow through

ordered or per facility policy, give flumazenil as an antidote if he was sedated with a benzodiazepine, or naloxone as an antidote to sedation with an opioid.

Because flumazenil is a benzodiazepine receptor antagonist, use it cautiously in patients who use benzodiazepines chronically or who have a history of epilepsy; flumazenil can cause seizures in these patients.

In opioid-tolerant patients, the opioid antagonist naloxone can cause acute withdrawal syndrome. In any patient, naloxone can cause tachycardia, hypertension, agitation, nausea, vomiting, diaphoresis, seizures, and pulmonary edema if given too quickly or in too large a dose. Monitor the patient closely for opioid-related respiratory depression, which can occur if the opioid's duration of action is longer than that of naloxone.

### **Postprocedure care**

After the procedure, monitor the patient's vital signs every 15 minutes for the first hour or until he's

## Assessing recovery from anesthesia

A score of 9 or greater on this modified Aldrete scale means that your patient has recovered from anesthesia.

	0	1	2
<b>Activity</b>	Unable to move extremities voluntarily or on command	Able to move two extremities voluntarily or on command	Able to move all extremities voluntarily or on command
<b>Respiration</b>	Apneic	Dyspnea or limited breathing	Able to breathe deeply and cough freely
<b>Circulation</b>	BP +/- 50 mm Hg of preanesthesia level	BP +/- 20-49 mm Hg of preanesthesia level	BP +/- 20 mm Hg of preanesthesia level
<b>Consciousness</b>	Unresponsive	Arousable with verbal stimuli	Fully awake
<b>Spo<sub>2</sub></b>	<90% with supplemental oxygen	Needs supplemental oxygen to maintain >90%	>92% on room air

sufficiently awake and recovered to go home. (See *Assessing recovery from anesthesia*.) A patient shouldn't be discharged if he's nauseated, vomiting, or dizzy or if he has excessive bleeding or drainage. If he has abnormal vital signs, altered mental status, or impaired respiratory effort, he'll need a longer stay in the recovery area or, if necessary, inpatient admission.

If the patient needs opioids for postprocedural pain, titrate doses carefully because propofol can potentiate an opioid's hypotensive effects.

### Can you administer propofol?

Nurse-administered propofol sedation is becoming popular in some facilities for procedures such as endoscopies (particularly colonoscopy) and liver biopsies. Check your nurse practice act to determine if this is within the scope of nursing practice in your state.

Various medical and nursing organizations support NAPS, but their criteria vary. The American College of Gastroenterology, the American Gastroenterological Association, and the American Society for Gastrointestinal Endos-

copy support NAPS except in the case of high-risk patients, who may need an anesthesiologist or nurse-anesthetist. The American Association of Nurse Anesthetists and ASA recommend that only those practitioners trained to administer general anesthesia administer propofol for moderate sedation because sedation level can change abruptly. The American Society of

PeriAnesthesia Nurses states that patient safety is most important, and perianesthesia nurses should have proper training and follow facility protocols for administering moderate sedation, if allowed by their state's nurse practice act.

When nurses in Florida took the NAPS issue to the Florida State Board of Nursing, the board ruled that NAPS is beyond the scope of practice for nurses who aren't certified registered nurse-anesthetists. Eleven other states (Alabama, Arizona, Connecticut, Kentucky, Louisiana, Mississippi, Missouri, South Carolina, Tennessee, Texas, and Wyoming) have established similar limitations.

If you can administer NAPS, you still need to meet competency requirements, which should be spelled out in your facility's policies and procedures. For example, the nurse (and procedural physician) must be trained in basic and advanced cardiac life support. Other key elements of a NAPS training program include the following.

- The nurse studies written materials that cover pharmacology, patient inclusion and exclusion criteria for NAPS, and management of potential complications. (See *Who*

### Who shouldn't get NAPS?

Patient contraindications to nurse-administered propofol sedation (NAPS) include:

- American Society of Anesthesiologists (ASA) class P3 or higher, unless based on liver or kidney disease alone. All patients ASA class P4 or higher are excluded.
- difficult airways due to obstructive sleep apnea, marked obesity (especially involving the neck and facial structures), inability to open mouth widely, or short neck with limited neck extension
- increased risk of aspiration from upper gastrointestinal bleeding, known gastric outlet obstruction, or known delayed gastric emptying
- allergy to propofol or its components.

shouldn't get NAPS?)

- The nurse passes a written exam given by the facility.
- The nurse observes propofol sedation by trained peers, then moves on to proctored NAPS.
- The nurse administers NAPS independently.

Follow the JCAHO's patient-safety goals when administering moderate sedation and use two forms of patient ID before administering medications. Use a preprocedure verification process to ensure you're giving the right amount of the right drug by the right route at the right time to the right patient, review the patient's allergy history and ASA status, and involve the patient in decisions before any medications are given. Be sure also to use an infusion pump that has

free-flow protection.

The NAPS program should be monitored for trends of oversedation or undersedation, and problems should be addressed as part of an ongoing quality-improvement program.

### Staying safe

By understanding moderate sedation and analgesia and your role in administering it, you can help keep your patient safe, comfortable, and complication-free. <>

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American Association of Nurse Anesthetists. Considerations for Policy Guidelines for RNs Engaged in Administration of Sedation and Analgesia. <http://www.aana.com/practice/conscious.asp>.

American Society for Gastrointestinal Endoscopy, Society of Gastroenterology Nurses and Associates, Inc. Role of GI Registered Nurses in the Management of Patients Under-

going Sedated Procedures. August 2004. <http://www.sgna.org/resources/statements/jointstatement.cfm>.

O'Donnell J, et al. Procedural sedation: Safely navigating the twilight zone. *Nursing2003*. 33(4):35-44, April 2003.

Society of Gastroenterology Nurses and Associates, Inc. Statement on the Use of Sedation and Analgesia in the Gastrointestinal Endoscopy Setting. <http://www.sgna.org/Resources/statements/statement2.cfm>. Accessed May 12, 2004.

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The author has disclosed that she has no significant relationship with or financial interest in any commercial companies that pertain to this educational activity.



#### SELECTED WEB SITES

American Association of Nurse Anesthetists  
<http://www.aana.com>

American Society of PeriAnesthesia Nurses  
<http://www.aspan.org>

Association of periOperative Nurses  
<http://www.aorn.org>

Society of Gastroenterology Nurses and Associates  
<http://www.sgna.org>

Last accessed on March 1, 2006.

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#### Shades of sedation

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## Shades of sedation

**GENERAL PURPOSE** To provide nurses with an overview of moderate sedation and analgesia. **LEARNING OBJECTIVES** After reading the preceding article and taking this test, you should be able to: **1.** Describe patient criteria for moderate sedation and analgesia. **2.** Identify monitoring required for patients receiving moderate sedation and analgesia. **3.** Discuss potential complications associated with moderate sedation and analgesia.

### 1. A patient under moderate sedation and analgesia

- a. maintains a patent airway and breathes on his own.
- b. needs help maintaining a patent airway.
- c. needs assisted ventilation.
- d. requires positive-pressure ventilation.

### 2. One reason propofol is becoming the drug of choice for moderate sedation and analgesia is that

- a. the patient sleeps longer after the procedure.
- b. the patient sleeps less after the procedure.
- c. the patient is unresponsive during the procedure.
- d. it has a longer duration of action than diazepam and midazolam.

### 3. Propofol is contraindicated for patients with an allergy to

- a. shellfish.
- b. peanuts.
- c. soybeans.
- d. milk.

### 4. According to the ASA physical status classification, which patient would be an appropriate candidate for moderate sedation and analgesia?

- a. a patient with end-stage liver disease
- b. a patient requiring hemodialysis
- c. a patient with controlled hypertension
- d. a patient with unstable angina

### 5. During moderate sedation and analgesia, monitor and document your patient's vital signs and Spo<sub>2</sub>

- a. every 5 minutes.
- b. every 10 minutes.
- c. every 20 minutes.
- d. every 30 minutes.

### 6. Patients who abuse drugs or alcohol or who are opioid-tolerant

- a. can't be sedated.
- b. may need a lower dosage of sedative.
- c. may need a higher dosage of sedative.
- d. don't need a dosage adjustment for sedatives.

### 7. A patient with a Ramsay sedation score of 2 is

- a. cooperative and tranquil.
- b. asleep but responsive to painful stimuli.
- c. restless and agitated.
- d. unresponsive to stimuli.

### 8. Which drug has no pharmacologic antidote?

- a. diazepam
- b. fentanyl
- c. morphine
- d. propofol

### 9. The effects of propofol typically wear off after

- a. 5 minutes.
- b. 10 minutes.
- c. 15 minutes.
- d. 20 minutes.

### 10. Capnography is used during moderate sedation to monitor

- a. oxygen saturation.
- b. exhaled carbon dioxide.
- c. blood pressure.
- d. cardiac rate and rhythm.

### 11. Which medication is a reversal agent for benzodiazepines?

- a. flumazenil
- b. disulfiram
- c. naloxone
- d. naltrexone

### 12. Symptoms of acute opioid withdrawal after a large dose of naloxone include

- a. hypotension and tachycardia.
- b. agitation and bradycardia.
- c. seizures and hypotension.
- d. tachycardia and seizures.

### 13. Which complication will most likely occur in a patient who had moderate sedation and analgesia with propofol and opioids for postprocedural pain?

- a. nausea
- b. hypotension
- c. vomiting
- d. hypertension

### 14. Preparation for NAPS must include all of the following *except*

- a. checking your state's nurse practice act.
- b. completing basic and advanced cardiac life support training.
- c. completing a moderate sedation and analgesia training program.
- d. obtaining ASA certification.

### 15. Question deleted.

### 16. Which *isn't* appropriate for NAPS quality improvement monitoring?

- a. Monitor for oversedation or undersedation trends.
- b. Ensure use of two patient identifiers before drug administration.
- c. Ensure that nurses provide propofol only to patients in ASA classes P4 to P6.
- d. Use infusion pumps that protect against free flow.



## ENROLLMENT FORM *Nursing2006, April, Shades of sedation*

### A. Registration Information:

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| 16. <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

### C. Course Evaluation\*

- 1. Did this CE activity's learning objectives relate to its general purpose?  Yes  No
- 2. Was the journal home study format an effective way to present the material?  Yes  No
- 3. Was the content relevant to your nursing practice?  Yes  No
- 4. How long did it take you to complete this CE activity? \_\_\_\_\_ hours \_\_\_\_\_ minutes
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