Moderate (Conscious) Sedation

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INTRODUCTION

Medical procedures that can cause pain and anxiety are performed with various forms of patient sedation to reduce discomfort, apprehension, and potentially unpleasant memories associated with these procedures.

Patient sedation ranges from minimal sedation to general anesthesia. Within this continuum is moderate (conscious) sedation.

Moderate sedation involves the use of short-acting analgesic and sedative medications to enable clinicians to perform certain procedures effectively.

PURPOSE/OVERALL GOAL

This module outlines what healthcare providers need to know about the administration of moderate (conscious) sedation, and how to care for patients undergoing this type of sedation.

The goal of this module is to ensure you are prepared to deliver safe and effective care to patients before, during, and after the administration of moderate sedation.

COURSE OBJECTIVES

After completing this module, the learner should be able to:

1. Define different types of sedation used for medical procedures
2. Demonstrate how to assess patients prior to receiving moderate sedation
3. Demonstrate how to monitor patients who receive moderate sedation
4. Describe adverse events associated with moderate sedation
5. Describe post-procedure patient care and discharge
SEDATION AND ANESTHESIA

Sedation and anesthesia options for patients undergoing medical procedures include:

- **Minimal sedation**, in which patients are aware of the activity around them and can respond to questions, but they are in a relaxed state with impaired cognition and physical coordination. Interventions are not normally required to maintain airway and cardiovascular function.

- **Moderate (conscious) sedation**, in which patients’ consciousness is depressed but they are able to respond to questions and to tactile stimulation. The sedation level can vary from minimal to deep. Interventions are not normally required to maintain airway and cardiovascular function.

- **Deep sedation/analgesia**, in which consciousness is depressed and arousal is not easy, but patients can respond to repeated or painful stimuli. Cardiovascular status is typically unaltered, but patients may require interventions to maintain airway function.

- **General anesthesia**, in which patients are not arousable and do not respond to repeated or painful stimuli. Cardiovascular status can be impaired, and patients require interventions to maintain airway function.

Moderate (conscious) sedation is considered safer than general anesthesia and typically allows for a quicker recovery. It is administered with sedatives, opioids, and/or hypnotic agents and other medications, usually via intravenous (IV) route.
ABOUT MODERATE SEDATION

Moderate sedation is also referred to as conscious sedation or procedural sedation. In this medication-induced state:

- Patients respond purposefully to verbal commands
- No interventions are required to maintain the airway
- Cardiovascular function is usually maintained

Moderate (conscious) sedation is used for minor surgery and diagnostic procedures, such as:

- Minor bone fracture repair
- Reduction of a dislocated large joint, such as a shoulder
- Endoscopy
- Cystoscopy
- Colonoscopy
- Breast biopsy
PRE-PROCEDURE PATIENT CARE

Patient care prior to the administration of moderate (conscious) sedation involves a history and physical that includes an evaluation of:

- Any major organ system abnormalities
- History of adverse events with sedation, analgesia, or regional or general anesthesia
- Drug allergies
- Current medications or herbal supplements
- Last oral intake (in most cases, patients should be fasting)
- Tobacco, alcohol, or substance abuse issues, which may affect the dosages of medications needed for sedation
- Vital signs
- Pregnancy status
- Cardiopulmonary assessment
- Airway evaluation

Consent should be obtained from the patient or family member that includes:

- The reason for sedation
- Risks and benefits of moderate sedation
- Alternatives for sedation, and the risks and benefits of those
- Risks and benefits of not undergoing sedation

As a caregiver, you should:

- Give patients the opportunity to ask questions.
- Address any concerns that patients and family members may have.
- Ensure that patients understand the sedation procedure so they can make an informed decision.
- Counsel patients on the risks of hypotension, hypoxia, bradycardia, cardiac dysrhythmias, respiratory depression, the need for assisted ventilation, intubation, allergic reaction, or achieving deeper sedation than intended.
- Reassure patients that many of the side effects are minor and can resolve spontaneously or with the use of reversal agents.
EQUIPMENT AND SUPPLIES

For patients undergoing moderate (conscious) sedation, the necessary equipment and supplies may include:

- Nonsterile gloves
- Additional personal protective equipment (PPE) such as a mask, gown, or eye protection, depending on the patient’s condition, the facility’s protocol, and the anticipated risk for exposure to body fluids
- Vital signs monitoring equipment, such as an automatic blood pressure cuff and pulse oximeter
- Supplemental oxygen supplies
- Suction catheter of appropriate size, suction tubing, and wall or portable suction source
- Supplies for IV access and delivery of fluids and medication
- EKG monitor
- Stand-by emergency cart (“crash cart”) with emergency medications, airway supplies, a defibrillator, and supplies for IV access and delivery of fluids and medication
- Positive pressure breathing device (bag-valve-mask device)
- Clinical evaluation tool, such as the Modified Aldrete Scale, if used by the facility to monitor patient status during moderate sedation and recovery
- Medication administration record (MAR)
- Facility-specific documentation required for monitoring the patient’s status during administration of moderate sedation
- Medications required before and during the procedure, which can include sedatives and reversal agents

Before moderate sedation is administered:

- Check the post-sedation and procedure areas to ensure that resuscitation supplies, operational emergency rescue equipment, and reversal drugs agents are available.
- Confirm that personal are available who are proficient in emergency airway management, intubation, and advanced cardiopulmonary resuscitation.
- Conduct a “time out” to confirm that:
  - The correct patient, site, and procedure is identified
  - All required documents are complete
  - Equipment is available and ready for use
  - Any team concerns have been addressed
PHARMACOLOGICAL OPTIONS

Various drugs are available to provide moderate (conscious) sedation.

- A short-acting benzodiazepine (such as midazolam), either alone or in combination with an opioid analgesic (such as fentanyl or morphine), is commonly used.
- Administering a benzodiazepine and an opiate together may be preferable for longer procedures but increases the risk of oxygen desaturation and cardiopulmonary complications.
- Specific reversal agents for opiates (such as naloxone [Narcan]) and benzodiazepines (such as flumazenil [Mazicon]) must be readily available during the procedure.
- Other drugs for moderate sedation include ketamine, propofol, etomidate, and dexmedetomidine.

Benzodiazepines

The beneficial properties of benzodiazepines for moderate sedation include:

- Amnesia
- Anticonvulsant
- Anxiolysis (inhibits anxiety)
- Sedation

Benzodiazepines used for mild to moderate sedation include:

- Midazolam (Versed), which produces a fast onset of sedation, more complete amnesia, less pain on injection, and improved awakening when compared with diazepam
- Lorazepam (Ativan), which has a slower onset of action but roughly double the potency of midazolam and is typically used for long-term sedation, such as in an ICU setting

It is important to note that when combined with alcohol or opioids, the sedative and respiratory-depressant effects of benzodiazepines, as well as the risk for cardiovascular depression, are greatly increased.

Opiates

Opiates provide analgesia and sedation during painful procedures. Fentanyl is the most common because of its prompt onset and short duration of action.

- Unlike morphine, fentanyl has minimal cardiovascular depressive effects, and hypotension rarely occurs.
- Fentanyl increases pain threshold, alters pain perception reception, and inhibits ascending pain pathways.

Ketamine

Ketamine (Ketalar) is usually not recommended for adults because it may cause emergent delirium such as vivid imagery, hallucinations, confusion, excitement, and irrational behavior. But is it often used in children, where this effect is not typically observed.

Ketamine elicits profound dissociative and amnestic actions, allowing for a consistent state of sedation and patient comfort. In doses typically used for moderate sedation, it does not affect airway function. This drug is particularly useful for emergency procedures when fasting is not assured.
Propofol
Propofol (Diprivan):
- Provides potent, extremely short-acting sedation and anesthesia
- Results in rapid deepening of a sedation level to that of general anesthesia; because of this, an anesthesiologist or sedation team often administers it
- Is increasingly used in the emergency department for patients with severe or excruciating pain
- Is known to cause injection site burning, stinging, and pain

Etomidate
Etomidate (Amidate):
- Is an extremely short-acting nonbarbiturate hypnotic
- Produces rapid induction without histamine release and with minimal cardiovascular and respiratory effects

Dexmedetomidine
Dexmedetomidine (Precedex):
- Is used for procedural sedation in adults and children
- Has a relatively rapid onset of action
- Provides little to no respiratory depression
- Allows patients to be able to follow commands and respond to verbal and tactile stimulus but fall quickly asleep when not stimulated
- Provides some pain relief, but not to the degree of ketamine, so other analgesics are necessary for the more painful procedures
PATIENT MONITORING

Patients receiving procedural sedation are continuously monitored for:

- Level of sedation
- Blood pressure
- Heart rate
- Heart rhythm
- When applicable, ST segment analysis using the EKG
- End-tidal carbon dioxide
- Oxygenation using pulse oximetry

Patient care measures should include:

- Continuously evaluating patient responsiveness to verbal and tactile stimuli
- Ensuring supplemental oxygen is available during the sedation as well as the post-procedure period
- Having an emergency cart immediately accessible
- Having a positive pressure breathing device, oxygen, and suction placed in the room
ADVERSE EVENTS

Although it is safer than general anesthesia, moderate (conscious) sedation carries risks. Adverse events associated with moderate sedation include:
- Respiratory depression, such as reduced breathing rate and/or depth
- Cardiovascular complications, such as chest pain, arrhythmia, and myocardial infarction
- Reduced protective reflexes, such as a gag reflex or cough, which can increase the risk for aspiration
- Allergic reaction to one or more medications, which can range from mild (such as urticaria, commonly referred to as hives) to severe (such as anaphylaxis)

It is not always possible to predict how an individual patient will respond to moderate sedation. Caregivers must ensure that procedures are in place to rescue patients whose level of sedation becomes deeper than initially intended.

Rescue from a deeper level of sedation than intended requires an intervention by a provider with expertise in airway management and advanced life support.
REVERSAL AGENTS

Drug dosages for moderate sedation vary significantly, and other factors such as concurrent medications, medical conditions, and age contribute to this variability.

It is critical that resuscitative drugs, equipment, and healthcare personnel experienced with the use of these drugs are available. Reversal agents for opioids (such as naloxone) and benzodiazepines (such as flumazenil) also must be available.

- Naloxone has an onset of action of 1 to 3 minutes for IV administration and 10 to 15 minutes for intramuscular administration. Rebound sedation may occur. If used in patients with chronic opioid use, it can precipitate acute withdrawal and abrupt sympathetic discharge, possibly leading to acute pulmonary edema.

- With flumazenil, rebound sedation may occur. If used in patients with chronic benzodiazepines use, it can precipitate acute withdrawal, possibly leading to seizures unresponsive to benzodiazepines.
POST-PROCEDURE AND DISCHARGE

Your facility will specify the specific criteria for assessing, evaluating, and monitoring patients, and for documentation during the recovery period. A qualified professional capable of managing complications should remain in the facility until the patient is stable.

Caregivers should note each patient’s:
- Recovery status
- Level of consciousness
- Ability to ambulate

Upon discharge from your facility, patients must be accompanied by a responsible adult who will take them home. Patients should receive detailed verbal and written instructions regarding:
- Diet
- Medications
- Activities
- Effective self-care to facilitate their recovery
- Potential complications and how to manage them
- What to do for an emergency, including a phone number to call
- Keeping follow-up appointments with their healthcare provider
EMERGING TECHNOLOGY

A computer-assisted personalized sedation (CAPS) system may be used for moderate (conscious) sedation. The CAPS system integrates the physician and nurse sedation team with physiologic monitoring and drug delivery through a computer interface. It facilitates drug titration personalized to the needs of each patient while providing safeguards.

The CAPS system:

- Incorporates cardiovascular and respiratory monitoring, including electrocardiogram, pulse oximeter, end-tidal carbon dioxide, respiratory rate, heart rate, and blood pressure
- Uses drug delivery algorithms that calculate and deliver appropriate amounts of drug based on the patient’s physiological measurements and response to tactile and voice stimulation
- Increases oxygen delivery based on the patient’s peripheral oxygen saturation
- Detects signs associated with over-sedation and will automatically modify or stop the drug infusion

CAPS is not intended for administration of deep sedation or for general anesthesia or sedation of high-risk patients, such as the morbidly obese, those with a difficult airway, or those undergoing complex procedures.
CONCLUSION

As a healthcare worker, your goal in caring for patients receiving moderate (conscious) sedation is for the procedure to be completely safe, efficient, and cause minimal or no complications or discomfort for patients.

With more diagnostic, therapeutic, and invasive procedures taking place both inside and outside the operating room, caregivers administering moderate sedation must be prepared, competent, and skilled to achieve optimal patient outcomes and satisfaction.

REFERENCES: