In today’s managed care environment, anesthesia providers are no longer the only practitioners administering sedation in operating and procedure rooms. The number of cases performed with moderate (conscious) sedation/analgesia administered by registered nurses (RNs) has increased dramatically. Today, RNs in operating rooms, emergency room, endoscopy suites and even critical care units, administer sedative, opioid and hypnotic agents to assist patients through diagnostic and therapeutic procedures. This module has been designed for RNs and provides the basic knowledge and skills necessary for the safe and effective administration of pharmacologic agents for moderate sedation/analgesia.
Moderate Sedation/Analgesia

Competency Assessment Module

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Overview and Objectives

Overview

Currently, more than half of the state boards of nursing (28 of 50) define the administration and monitoring of moderate sedation/analgesia as within the scope of practice of nonanesthesia registered nurse (RN) providers. Consequently, anesthesia providers are no longer the only practitioners administering sedation/analgesia for operative and invasive procedures. The number of procedures performed comfortably and safely with sedation/analgesia (i.e., conscious sedation) administered by RNs has risen dramatically with the increase in ambulatory procedures and the advantages of rapid acting pharmacologic agents with shorter recovery periods. Today, RNs in operating rooms, endoscopy suites, emergency rooms, various ambulatory areas, as well as inpatient units function in this expanded role of providing moderate sedation/analgesia and monitoring patients during operative, diagnostic, and other invasive procedures.¹

This competency assessment module has been designed to provide perioperative RN's with the basic knowledge necessary for the safe and effective management of the adult patient receiving moderate sedation. An overview of pharmacologic agents used for moderate sedation and analgesia, monitoring parameters, and equipment necessary for patient safety is provided. Key considerations in recognizing and managing complications, as well as regulatory, accrediting, and medico-legal aspects, are discussed. Throughout the module, the role of the professional RN is discussed in detail, stressing safety considerations and outlining documentation guidelines.

Objectives

Upon completion of this module, the participant should be able to:

1. Discuss the goals of moderate sedation/analgesia.
2. Identify key patient assessment factors.
3. Discuss the pharmacology of various agents used during administration of moderate sedation/analgesia.
4. List the equipment necessary to safely monitor patient parameters during moderate sedation/analgesia.
5. Describe the management of identified complications.
6. Apply the principles of moderate sedation/analgesia to specific case studies.
Unit 1:  

Introduction to  

Moderate Sedation/Analgesia

History

Moderate sedation was first described as a technique in the dental and oral surgery literature. The American Dental Association was one of the first professional associations to define conscious sedation in 1984. Then as now, the hallmark was the patient’s ability to independently and continuously maintain his/her airway and respond appropriately to physical and verbal stimulation. This technique was described as a combination of sedative, analgesic, and local anesthetics to the affected area.

In the past, the term IV conscious sedation referred to the administration of sedatives and analgesics to establish a drug-induced state whereby the patient could tolerate invasive procedures without pain, while at the same time experiencing amnesic and anxiolytic states. The hallmark for this type of anesthesia was that the patient did not lose consciousness, hence the term conscious sedation. The current terminology for this method of sedation and analgesia is moderate sedation/analgesia.

The use of intravenous (IV) pharmacologic agents to provide patients with moderate sedation and analgesia allows patients to comfortably tolerate diagnostic, therapeutic, and invasive procedures. Approximately 200,000,000 cases are performed each year in the United States. This widespread use of moderate sedation/analgesia by non-anesthesia providers has stimulated a proliferation of endorsements, position statements, and practice guidelines by more than 25 professional organizations. Perhaps the most authoritative, evidenced-based guidelines are those developed in 2001 by the American Society of Anesthesiologists (ASA) Task Force on Sedation and Analgesia by Non-Anesthesiologists. These statements provided the basis for other specialties to develop guidelines related to the administration of moderate sedation/analgesia. The intent of this publication was to establish appropriate and safe standards for administering moderate sedation/analgesia agents and monitoring patients by the non-anesthesia RN provider.

Definition

The term moderate sedation/analgesia is both a definition and an objective. Moderate sedation is a drug-induced depression of consciousness achieved through the administration of a combination of sedatives (e.g., amnesic and anxiolytics) and analgesic medications to achieve a state whereby the patient retains consciousness, yet experiences reduced or no anxiety and pain. Protective reflexes are maintained, and no interventions are needed to maintain a patent airway, spontaneous respirations, baseline heart rate and rhythm, and blood pressure.

The number of patients receiving IV administration of moderate sedation/analgesia by non-anesthesia providers has increased dramatically because of several key changes in health care. One change is the increasing number and variety of operative and diagnostic procedures that were once performed using general or regional anesthesia that can now be performed safely using moderate sedation/analgesia agents. See Table 1 for examples of procedures that may be performed utilizing moderate sedation/analgesia.

Table 1: Procedures appropriate for moderate sedation/analgesia. (Note: this is not an all-inclusive list)

<table>
<thead>
<tr>
<th>Angiography</th>
<th>Extracorporeal shockwave (i.e. lithotripsy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchoscopy</td>
<td>Selected cosmetic/reconstructive procedures</td>
</tr>
<tr>
<td>Cardiac catheterization</td>
<td>Hand surgery</td>
</tr>
<tr>
<td>Chest tube insertion</td>
<td>Hernia repair</td>
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<tr>
<td>Closed reduction of fractures</td>
<td>Superficial biopsies</td>
</tr>
<tr>
<td>Cystoscopy</td>
<td>Thrombectomy</td>
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<tr>
<td>Dental/oral surgery</td>
<td>Vasectomy</td>
</tr>
<tr>
<td>Gastroenterological endoscopy</td>
<td>Vascular access</td>
</tr>
<tr>
<td>Excision of masses/skin lesions</td>
<td></td>
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Unit 2: Patient Assessment Factors

Presedation Interview

Moderate sedation/analgesia is not appropriate for all patients; it should not be administered to high-risk patients by a non-anesthesia care provider. In these cases, monitored anesthesia care (MAC) by an anesthesia care provider may be in the best interest of and safest for the patient.

There are several objectives of the preoperative assessment, including appropriate patient selection and determining the patient’s physiological and psychological status. The presedation assessment typically involves a more in-depth review of systems than that conducted by an RN circulator. This assessment should be performed in conjunction with eliciting the patient’s attitudes and expectations concerning the procedure and anesthesia options. The information obtained provides the RN with baseline data and identifies the patient’s individual risk factors before concluding that he/she is an appropriate candidate for moderate sedation/analgesia.

In addition, the RN provides education to both the patient and family to help reduce preoperative anxiety and ultimately to ensure that the patient is in the best possible physical and mental state for the procedure. The assessment and education components should be documented in the patient record, and pertinent findings reported to the rest of the health care team.

The RN who will administer moderate sedation/analgesia agents and monitor the patient conducts the assessment and review of data from numerous sources (e.g., history and physical, medical record, nursing physical assessment and interview, consultation with other clinicians). The presedation assessment may include, but is not limited to:

- physical and functional status;
- level of consciousness;
- airway assessment;
- history of sleep apnea;
- mental and emotional status;
- perception and understanding of the procedure, sedation, and analgesia;
- laboratory values;
- current medications, treatment, and/or other integrated therapies;
- allergies and sensitivities;
- current comorbidities;
- surgical and anesthesia history;
Unit 3: Pharmacologic Techniques and Agents

Administration of moderate sedation has two main objectives:

1. provision of an anxiolytic and amnesic effect through the use of benzodiazepines, and

2. alleviation of pain through the use of opioids.

Various agents are administered to produce sedation, amnesia, and/or analgesia. Sedative/amnesic medications include the benzodiazepines (e.g., midazolam, diazepam); analgesics include the opioids (e.g., morphine, meperidine, fentanyl) and local anesthetics include lidocaine and bupivacaine. This unit’s discussion will be limited to agents that are most often used intravenously by a non-anesthesia care provider.

Pharmacodynamics of moderate sedation agents

The ideal pharmacologic agent administered to achieve moderate sedation/analgesia would have a short duration of action, no cumulative effects, rapid recovery, few adverse side effects, be compatible with a large number of other drugs, and possess a residual analgesic effect. No one drug possesses all these characteristics, so to produce a pain-free, amnesic, and sedate patient a combination of opioids, sedatives, and possibly a local anesthetic are necessary. Achieving the desired state of sedation/analgesia relies heavily on the synergistic action of two medications together (e.g., a sedative and an opioid), striving for the desired effect using the smallest possible doses. This method reduces adverse effects and promotes quicker recovery.

The level of sedation occurs along a continuum; therefore, titration (i.e., injecting small, incremental amounts of agents over time while continuously assessing the patient’s response to the medication) is crucial in achieving and maintaining a state of moderate sedation/analgesia. Timing is as important as careful assessment and observation. The non-anesthesia care provider should not be rushed by the person performing the procedure (e.g., surgeon) or misled by the patient’s and/or physician’s requests to administer more medication. It is important to remember that onset times of most local anesthetics are 2 to 5 minutes and have durations of 1.5 to 2 hours. The RN administering moderate sedation/analgesia must not lose sight of the clinical endpoints for this level of sedation (i.e., decreased anxiety and initiation of slurred speech). Doses are repeated according to physician orders until the desired effect (i.e., endpoint) is achieved. Standardized order sets with dosage ranges should be considered. Severely slurred speech, unresponsiveness, and unconsciousness are not objectives of moderate sedation/analgesia. The complications of deep sedation (e.g., cardiopulmonary depression, hypoxia, hypercarbia, delayed recovery) intensify proportionately as the sedation level deepens.

Intravenous (IV) Drug Administration

It is important to review the characteristics of the IV route of medication administration. The IV route affords a direct route of entry into the bloodstream. When agents are administered by IV injection, the onset of the effects is rapid, usually within 1 to 2 minutes. If the agents are administered incorrectly, untoward reactions, such as depression of the respiratory and cardiovascular systems, may occur very rapidly and be life threatening.

Since titration of the agents used for moderate sedation/analgesia is an often employed technique, this method of drug
Unit 4:

Monitoring Parameters

Standard of Care

Every patient undergoing moderate sedation/analgesia must be continually assessed during and after the procedure by a registered nurse. Before administering the sedation or analgesic agent, the RN should establish IV access and record the patient's baseline vital signs (e.g., heart rate and rhythm, blood pressure, respiratory rate), oxygen saturation, level of consciousness, and a pain assessment based on a pre-determined scale, i.e. the Wong-Baker FACES or 0-10 Numeric Pain Scale. As part of the patient care plan, the RN should explain to the patient how the procedure will be performed and what the patient can expect, the medications to be administered, and the monitoring equipment that will be used during the procedure.

Intraoperative Monitoring

Based on current recommended practices, the patient will be continuously monitored for reactions to medications and for physiologic and psychological changes. Close observation and vigilance alert the RN to responses to medications (i.e. relief of pain and anxiety, maintenance of protective reflexes and airway). Problems (i.e. airway obstruction, changes in level of consciousness, agitation, apnea, hypo- or hypertension, hypo- or hyperventilation, cardiac dysrhythmias) should be quickly identified and aggressively treated to prevent further deterioration of the patient’s condition.

At a minimum, the RN managing the care of the patient undergoing moderate sedation/analgesia should continuously monitor the patient's heart rate and rhythm by electrocardiogram (ECG); oxygenation using pulse oximetry; respiratory rate and adequacy of ventilation; blood pressure; level of consciousness (LOC); and comfort at regular intervals (e.g., every 5 minutes, after the administration of medications, and as needed in response to changes in the patient's condition). Please see Table 9 for intraoperative monitoring guidelines.

The appropriate monitoring equipment (e.g., noninvasive blood pressure device, electrocardiograph, pulse oximeter) as well as oxygen, oxygen delivery devices, and suction apparatus should be present and ready for use in the room. An emergency cart with appropriate resuscitation medications and equipment should be readily available. Many monitoring devices have the ability to monitor multiple physiological parameters at the same time. Some monitors provide a print-out of values which may be used as one form of documentation based on facility policy.

Registered nurses who provide moderate sedation/analgesia agents must be able to correlate the patient's symptoms with objective and subjective monitoring parameters to accurately assess, diagnose, and intervene. Therefore, understanding the desirable and undesirable side effects of moderate sedation and analgesic agents, as well as any medications the patient is currently taking, is paramount; the combination of drugs and patient anxiety may cause rapid, adverse physiologic and psychological changes in the patient.

Postoperative Monitoring

When the procedure has been completed, the patient may be monitored and recovered in the procedure or treatment area or be transferred to a designated recovery area. This phase allows the RN to assess, diagnose, and treat any complications associated with the procedure or with the administration of moderate sedation/analgesia agents.
Unit 5:
Recognizing and Managing Complications

Moderate sedation: Risks vs. benefits

While the benefits of moderate sedation/analgesia include posing less risk than general anesthesia and allowing the patient to recover more quickly from short surgical or other invasive procedures, there are some serious complications involved in the administration of these agents. Since the procedures for which moderate sedation/analgesia are used are uncomfortable, analgesics (opioids) and sedatives (benzodiazepines) are frequently administered simultaneously.

At typical IV doses, opioids produce analgesia without disrupting protective reflexes or ventilation. Also, at typical IV doses, benzodiazepines decrease anxiety, induce short-term amnesia, and do not interfere with protective reflexes or breathing. However, when both analgesics and sedatives are given concurrently, the potential for adverse patient reaction increases.

By definition, the patient receiving moderate sedation should have a decreased level of consciousness while retaining the ability to independently and continuously maintain a patent airway and respond appropriately to physical stimulation and/or verbal commands. In addition, the patient’s vital signs should remain stable. As the patient progresses into deeper levels of sedation, his/her respiratory, cardiac, and reflex functions are affected, often to the extent of needing external support. At this point, the patient’s care is beyond the scope of the RN, and the expertise of a qualified anesthesia care provider is required.

To safely participate in the administration of IV moderate sedation/analgesia, the non-anesthesia provider (RN) must be knowledgeable about the following:

- desired patient goals of moderate sedation/analgesia;
- pharmacokinetics of all agents (i.e., analgesics, sedatives, reversal agents);
- consequences of deeper levels of sedation and the appropriate measures by which to rescue the patient; and
- timely assessment and treatment of the common complications, including demonstration of proper:
  - airway management skills (i.e., skilled at supporting a patient’s oxygenation and ventilation needs);
  - interpretation of electrocardiogram readings; and
  - use of resuscitation medications and equipment.

Safe patient care is achieved by careful titration of the agents to the desired effect. In addition, attentive monitoring is a vital component in patient safety. Early detection of even the slightest deviation from baseline values helps prevent many potential complications. Some of the most common complications, along with their recognition and management, are reviewed here.

Nursing’s Role in Response to Complications

Complications that may arise during the administration of moderate sedation/analgesia are usually the result of over-sedation. If complications occur for any reason, the symptoms will typically manifest as either pulmonary or cardiovascular in
Unit 6:

Regulatory/Medico-Legal Issues

Requirements for safe practice

The legal issues surrounding the practice of non-anesthesia providers (RNs) administering moderate sedation/analgesia include the administration of medications, the regulation of nursing practice (i.e., scope of practice), and the standard of care to which the RN will be compared. The administration of agents for moderate sedation/analgesia is not considered to be part of the basic education of an RN. Should an RN choose to function in this expanded role, education and training beyond the knowledge and skills of basic RN training is required. Some state boards of nursing may require proof of the additional education and annual assessment of RN’s administering moderate sedation agents. Below are some recommended prerequisites of the RN who will be trained to provide moderate sedation/analgesia:

- Basic life support and/or ACLS and pediatric advanced life support, according to the population served;
- Proper patient selection and screening (i.e., assessment) skills;
- Ability to initiate and maintain peripheral IV access and IV fluid therapy;
- Ability to select, understand the function of, and maintain proficiency in the use of physiologic monitoring equipment;
- Knowledge of pharmacologic effects of medication that will be used;
- Basic dysrhythmia recognition and management;
- Understanding of airway management and oxygen delivery systems; and
- Ability to recognize and respond to complications associated with moderate sedation/analgesia (e.g., ability to rescue/support a compromised patient).

Understanding the legal scope of practice related to the administration of moderate sedation/analgesia is only the beginning of the responsibilities of this expanded role. The RN with appropriate additional education and training can safely participate in this role, beginning with patient selection. Attentive physiologic monitoring is essential to minimize the risk of complications that may occur in this patient population. Before accepting this responsibility, it is important to ensure that the following criteria are in place for liability reasons:

- State nurse practice act — although administering medications for moderate sedation/analgesia may be within the scope of practice in your state, certain drugs may be precluded. The RN may be permitted to administer some drugs for certain uses, such as pain control or moderate sedation, but not for other uses, such as anesthesia.
- Facility policy, procedure, and protocol — carefully review and follow the facility’s policy and procedure for administering moderate sedation. Ensure that the policies are consistent with the state’s nurse practice act and do not put the RN in a position of practicing outside his/her knowledge and scope of practice. This is both an ethical and legal responsibility of the individual RN.
Unit 7:

Documentation

The importance of documentation

Documentation using the nursing process should be completed for each patient undergoing a procedure. Clear and comprehensive documentation of all activities and patient responses during the care of the patient receiving moderate sedation/analgesia is legally and professionally important in maintaining continuity of goal-directed patient care and improving communication among all members of the health care team. Documentation also provides a mechanism for comparing actual versus expected patient outcomes.

Documentation on the patient record should reflect the patient’s plan of care, including the assessment, diagnoses, outcome identification, planning, implementation, and evaluation. The nursing assessment (i.e., physical, psychosocial, cultural) performed by the RN before the procedure should be included in the record. This documented nursing assessment provides a baseline for developing nursing diagnoses and planning patient care.

Nursing Diagnoses

Documentation should include the specific nursing diagnoses applicable to patients receiving moderate sedation/analgesia, such as:

X5 Risk for aspiration;
X7 Ineffective breathing pattern;
X8 Decreased cardiac output;
X20 Risk for fluid volume imbalance;
X21 Impaired gas exchange;
X55 Impaired spontaneous ventilation;
X29 Risk for injury;
X44 Ineffective protection;
X47 Disturbed sensory perception;
X4 Anxiety; and
X30 Knowledge deficit.

Nursing diagnoses are used for planning the care of patients who receive moderate sedation/analgesia and for providing patient care that focuses on the patient’s responses to the procedure and/or nursing interventions. The planning process begins when the RN identifies the nursing interventions that will address the patient’s actual or potential risk of health problems (i.e., nursing diagnoses). Identifying the desired patient outcomes that are individualized, prioritized, measurable, realistic, and attainable assist in the development of the nursing plan of care.

Nursing Care

In addition to the assessment and applicable nursing diagnoses, documentation of the nursing care for the patient should be included in the patient’s record. Medications given by the RN should be written as a verbal order and signed by the surgeon at the conclusion of the procedure per facility policy.
Administering moderate sedation/analgesia for procedures is a highly specialized skill. It should not be a “sometimes” job. It is critical that staff who are responsible for administering moderate sedation/analgesia keep in mind that the effects of these agents range from a placid, amnesic state to unresponsiveness and unconsciousness.

Recognition and prompt intervention for complications such as airway obstruction, adverse or unexpected reactions to drugs, and cardiac arrhythmias are additional skill sets required by all non-anesthesia RNs responsible for providing moderate sedation/analgesia. Education, competency assessment, and simulated training will provide these persons with the skills and confidence to manage the untoward effects of moderate sedation.

The use of moderate sedation/analgesia techniques will expand in response to pharmacologic advances and the increased demand for ambulatory and outpatient procedures necessitating short-acting agents that allow for speedy recovery. The non-anesthesia care provider RN will continue to face the challenge of providing skilled, knowledgeable, safe, and high-quality care. This challenge can be met effectively through dedicated practice, continuing education, and demonstrated competency.
Unit 9:

Case Studies

The following case studies are presented to allow the learner to apply the concepts discussed in the previous units to patient care scenarios. Read the scenarios carefully, integrating the patient data and information regarding administration of moderate sedation. List what nursing activities and interventions are most appropriate, and the rationale for those actions. See the Response Guide on page 55.

Case Study #1 — DH

DH is a 32-year-old male, 5’10” tall, weighing 155 pounds. He is admitted to the emergency department with a dislocated right index finger, which he injured in a motorcycle accident. Overall, DH is healthy and is not currently taking any prescription medications. He does have a history of smoking (about 2 packs per day), alcohol and substance (i.e., cocaine) abuse, and hepatitis B. He is scheduled for a closed reduction of his right index finger under moderate sedation.

Case Study #2 — MN

MN is a 40-year-old female, 5’2” tall, weighing 110 pounds. She is admitted to the ambulatory surgery unit for an incisional right breast biopsy with frozen section under moderate sedation. MN is healthy, engages in aerobic exercise 4 to 5 days a week, and is currently only taking cimetidine for esophageal reflux. At the time of admission, she is very apprehensive. Since both her mother and sister were diagnosed with breast cancer, she believes she is at a very high risk. She also reported that during her previous breast biopsy with moderate sedation, she was very nauseous and had to be admitted overnight because she “couldn’t wake up enough” to go home.

Case Study #3 — JR

JR is a 68-year-old female, 5’1” tall, weighing 140 pounds. She presents in the same day admission unit for insertion of a permanent pacemaker under moderate sedation. JR has a history of cardiac arrhythmias, hypertension, peripheral vascular disease (status post left carotid endarterectomy), and Type II diabetes, which is diet-controlled. She currently is taking simvastatin (Zocor®), lanoxin, and aspirin. At the time of admission, her vital signs were: blood pressure - 170/84; pulse rate - 80; respirations - 18; oxygen saturation - 94%.

Case Study #4 — RZ

RZ is a 70-year-old male, 6’ tall, weighing 160 pounds, who has just moved to a new city. He is admitted to the gastroenterology clinic for a recheck colonoscopy under moderate sedation. A review of his past medical history reveals that he is status post right hemicolecction for colon cancer 15 years ago, with his last recheck colonoscopy performed 8 years ago. The nurse’s notes from the preadmission interview indicate that his last colonoscopy was performed by the same general surgeon who performed his colectomy. RZ remembered “how bad it was — they gave me a shot before the procedure, but it never helped.” He has a history of angina and COPD and is currently taking nitroglycerin and albuterol via an inhaler.
References


24. The Joint Commission. *Comprehensive accreditation manual for hospitals: The official handbook*, PC 03.01.01 to PC 03.01.11. Oakbrook Terrace, IL: The Joint Commission; 2009.


MODERATE SEDATION/ANALGESIA
Competency Assessment Module

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