

Torrance Memorial Medical Center Sedation Learning Module and Test

I. Sedation levels

	Minimal Sedation (Anxiolysis)	Moderate Sedation (conscious sedation)	Deep Sedation	General Anesthesia
Definition	Drug induced state in which patient is able to respond normally to verbal commands	Drug induced depression of consciousness in which the patient is able to respond purposefully to verbal commands or tactile stimuli	Drug induced loss of consciousness during which patients are not arousable by verbal stimuli. Purposeful response after repeated or painful stimulation	Drug induced loss of consciousness during which patients are not arousable, even by painful stimulation
Airway	Unaffected	Unaffected	Intervention may be required	Intervention required, unable to maintain airway
Ventilation	Unaffected	Unaffected	Intervention maybe required	Intervention required to maintain ventilation
Cardiovascular	Unaffected	Unaffected	Unaffected	May be impaired

II. Standards of patient care/Equipment Requirements:

- a. All areas of the hospital shall practice comparable level of care for the patient undergoing sedation
- b. Minimum number of available staff is two
- c. Proceduralist is an MD
- d. RN monitoring patient receiving moderate or deep sedation will be ACLS or PALS certified. In the NICU the RN will have Neonatal Resuscitation Program certification.
- e. History and Physical is required and documented prior to beginning the procedure
- f. Pre-induction assessment must be performed by the proceduralist or anesthesiologist immediately prior to sedation induction.
- g. American Society of Anesthesiologists (ASA) scoring guidelines must be used to assess the patient's status before surgery/procedure and must be documented in the electronic health record (EHR) prior to sedation administration.

ASA I, II, and III may have sedation given by non-anesthesiologist. Patients with ASA IV and V scores must be consulted by an anesthesiologist (see grid below).

ASA Physical Status (PS) Classification System

ASA PS Category for Preoperative Health Status

Type	Patient Assessment and Findings	Who can Administer Sedation
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ASA PS 1	Normal healthy patient No organic, physiologic, or psychiatric disturbance; excludes the very young and very old; healthy with good exercise tolerance	May have sedation given by non-anesthesiologist
ASA PS 2	Patients with mild systemic disease No functional limitations; has a well-controlled disease of one body system; controlled hypertension or diabetes without systemic effects, cigarette smoking without chronic obstructive pulmonary disease (COPD); mild obesity, pregnancy	May have sedation given by non-anesthesiologist
ASA PS 3	Patients with severe systemic disease Some functional limitation; has a controlled disease of more than one body system or one major system; no immediate danger of death; controlled congestive heart failure (CHF), stable angina, old heart attack, poorly controlled hypertension, morbid obesity, chronic renal failure; bronchospastic disease with intermittent symptoms	May have sedation given by non-anesthesiologist
ASA PS 4	Patients with severe systemic disease that is a constant threat to life Has at least one severe disease that is poorly controlled or at end stage; possible risk of death; unstable angina, symptomatic COPD, symptomatic CHF, hepatorenal failure	Must be evaluated, monitored, and sedated by an anesthesiologist.

- h. Dosage regimens based upon patient age and physical status. Drugs should be titrated to obtain the desired effect with appropriate intervals between doses.
- i. Intravenous line must be in place and functioning during procedure
- j. Qualified RNs may only give IV sedation agents under supervision of a physician, who will remain available in the department.
- k. Patient will be monitored for at least 30 minutes after the last dose of sedation is given
- l. Patient may be discharged/transferred once they have met an Aldrete score of 8 or better, or back to baseline as assessed prior to procedure

II. Standards of patient care/Equipment Requirements: (continued)

- m. Procedures performed under sedation should be performed in locations with:
 1. Adequate lighting to observe the patient and monitors.
 2. Sufficient space for personnel, monitoring equipment, and emergency equipment.
 3. Adequate power outlets and clearly labeled outlets connected to the hospital emergency power supply.
 4. A reliable means of two-way communication to summon help, i.e., telephone or staffed intercom system, with emergency numbers displayed.
 5. The ability to provide immediate changes in patient position, including the Trendelenburg position.

6. A cart or shelf system with adequate space for monitoring equipment in a location where it is easily visible to personnel performing both the sedation and procedure.
- n. The resuscitation equipment, a standard hospital code blue cart or its equivalent (with a defibrillator), will be immediately available to the sedation team and recovery area. An intravenous line will be continuously maintained from immediately prior to sedation until the patient has fully recovered from the sedation.
- o. The following will also be available:
 1. A source of oxygen and the devices needed for the delivery of oxygen (i.e., regulators, nasal cannula) and a back-up source.
 2. A functional self-inflating bag and mask system.
 3. A functional system to suction the patient.

III. Monitoring Requirements

- a. The patient will be continuously monitored by a licensed physician or appropriate staff other than the person performing the procedure. During the procedure two personnel, at a minimum are required (the privileged practitioner performing the procedure and an assistant competent to monitor designated physiologic variables). Such personnel will be available to the patient from the time of drug administration until recovery is judged adequate or the care of the patient is transferred to personnel performing recovery care.
- b. Continuous pulse oximetry, blood pressure, heart rate, respiratory rate, and level of consciousness will be documented before the injection of medication and at least every 5 minutes for deep sedation and every 15 minutes for moderate sedation. In addition, the above should be documented every 15 minutes in the recovery phase.

IV. NPO guidelines

- a. Adults
 1. NPO prior to sedation: ASA Standard: Full or fatty meal (meat) 8 hours and Light meal (toast, crackers, juice with pulp, coffee with milk) and infant formula or nonhuman milk 6 hours prior to sedation
 2. Clear liquids (Water, tea, black coffee, apple juice) may be taken up to 4 hours prior to the procedure
- b. Children
 1. No milk, formula, or solid food 7 hours prior to the sedation
 2. Human Breast Milk 4 hours
 3. Clear liquids (water, tea, black coffee, apple juice) are permitted 2 hours prior to procedure

V. Procedural Medication - benzodiazepines and opiates are the two classes of medication used to provide procedural sedation. The goal is to relieve anxiety, and prevent or relieve pain. (These doses are for adult patients.)

- a. **Benzodiazepines** – have amnesic, sedation, muscle relaxant, and anticonvulsant properties. They are used to produce sedation and amnesia for diagnostic procedures.
 1. **Midazolam (Versed)** has a rapid onset of action, short elimination half-life, and amnesic effects. Paradoxical reactions, including hyperactivity or aggressive behavior can occur. It should be titrated to effect and never given rapid bolus.

Initial dose:	0.5 to 2mg
Onset:	1-2 minutes
Peak:	3-5 minutes
Duration:	15-30 minutes

Half-life: 1-12 hours

2. **Diazepam (Valium)** – longer half-life, higher incidence of phlebitis, and less amnesic capabilities

Initial dose: 2-5mg

Onset: 1-5 minutes

Peak: 10-30 minutes

Duration: 2 – 6 hours

Half-life: 20- 40 hours

3. **Adverse reactions** - include respiratory depression, hypotension, coma, stupor, confusion and apnea

b. **Opiates** – are administered for analgesia, sedation, cough suppression, and alters mood and perception of surroundings.

1. **Meperidine (Demerol)** – do not give if patient on tricyclic or MAO inhibitors

Initial dose: 25mg (ADULT DOSE)

Onset: 1-5 minutes

Peak: 10-20 minutes

Duration: 20-40 minutes

Half-life: 2-6 hours

2. **Sublimaze (Fentanyl)** – gives both pain management as well as amnesic effect. Causes chest wall rigidity.

Initial dose: 0.5-1 mcg/kg (ADULTS & CHILDREN DOSE)

Onset: 1-1.5minutes

Peak: 5-15minutes

Duration: 30-60 minutes

Half-life: 3-4 hours

3. **Morphine**

Initial dose: 2-4mg slowly (ADULT DOSE)

Titrate: 1-2 mg every 5- 10minutes

Onset: 5 minutes

Peak: 10-20 minutes

Duration: 30-60 minutes

Half life: 3-7 hours

4. **Adverse reactions of opiates** – respiratory depression, apnea, hypotension, arrhythmias, nausea, vomiting, deep sedation.

V. Procedural Medication cont'd

c. Reversal agents

1. **Flumazenil (Romazicon)** – antagonist for benzodiazepines. It antagonizes the sedative and respiratory depressant, but not the amnesic effects.

Initial dose: 0.2mg IVP

Onset: 1-2 minutes

Peak: 6 to 10 minutes

Duration: 30 minutes

Half life:

Administration technique: give initial dose of 0.2mg over 15 seconds, wait an additional 45 seconds before repeating if necessary. This dose may be repeated four times up to a maximum dose of 1mg over 5 minutes.

Adverse effects: Nausea, vomiting, agitation, diaphoresis, excitement, tachydysrhythmias, convulsions for patients taking benzodiazepines for seizure control and convulsions for patients on tricyclic agents.

Patient should be monitored for 2 hours after last dose of administration due to possibility of re sedation.

2. **Naloxone (Narcan)** – antagonist for opiates, it reverses the respiratory depression and sedation effects.

Initial dose: 40mcg IVP

Onset: 1-2 minutes

Peak: 5 to 10 minutes

Duration: varies depending on opiate dose.

Half life: 30 to 80 minutes

Administration Technique: Mix 0.4mg/1ml with 9ml of normal saline. Administer 40mcg or 1ml increments. Titrate dose, do not give rapid injection. Dose is titrated according to desired response. Normal dosage is 0.4 to 2mg.

Adverse effects: Nausea, vomiting, cardiac irritability, dysrhythmias, pulmonary edema, CHF, hypertension, stroke, and cardiac arrest.

Patient should be monitored for one hour after last dose due to possibility of becoming re-narcotized.

VI. Airway

- a. Assessment – drugs used for sedation and analgesia can interfere with a patient's ventilation by both relaxing the airway muscles and suppressing the urge to breathe. Primary risk of sedation is respiratory complications. Ability to maintain a patent airway is an essential prerequisite for administration of sedation.
- b. Patients at risk for sedation and airway obstruction are those with stridor, significant snoring, sleep apnea, advanced rheumatoid arthritis, dysmorphic facial features, Down's Syndrome, obesity, radiation therapy or surgery to head/neck, short and thick, neck, and upper respiratory infections.
- c. Management: Oxygen by cannula or mask on all patients undergoing sedation
- d. Manual maneuvers-
 1. Verbal and tactile stimulation
 2. Head chin lift
 3. Jaw thrust

VI. Airway (continued)

e. Artificial airway devices –

1. Oral airway- curved, firm, hollow tube which prevents obstruction by the tongue and soft tissue. Should only be used in unconscious patients. To select proper size place airway against side of face with the tip at the teeth and the flange at the angle of the mandible.
2. Nasopharyngeal airway –soft rubber or plastic hollow tube that is passed through the nose into the posterior pharynx just above the epiglottis. To select proper size place airway against side of face and measure from the tip of the patient's nose to the earlobe.

VII. Aldrete Score - Is a physiologic assessment scoring system. It monitors activity, respirations, circulation, consciousness, and color. Patient must have a score of 8 or better, with a minimum of 2 in respirations or be as the same as baseline if score is below 8.

VIII. Complications, Possible Causes and Interventions

Complication	Possible Cause	Intervention
Vomiting	<ul style="list-style-type: none"> • crying • full stomach • pain • drugs (narcotics, chloral hydrate) 	<ul style="list-style-type: none"> • <u>patient in lateral decubitus position</u> • assure patent airway • suction • consider antiemetic treatment
Untoward Reactions (agitation, dysphoria, hallucinations)	<ul style="list-style-type: none"> • deep sedation • hypoxemia • minimal stimulation • hypoglycemia • hypothermia • drugs (midazolam, narcotics, chloral hydrate) 	<ul style="list-style-type: none"> • assure patent airway • supplemental oxygen • restraints • drug treatment when applicable
Respiratory Depression	<ul style="list-style-type: none"> • airway obstruction • drugs (narcotics) 	<ul style="list-style-type: none"> • assure patent airway • <u>chin lift/neck extension</u> • supplemental oxygen • nasal/oral airway • consider ventilation/intubation • consider reversal agents
Hypotension	<ul style="list-style-type: none"> • bleeding • hypoxia • myocardial depression • allergic reaction • drugs (barbiturates) 	<ul style="list-style-type: none"> • position • fluids • vasopressors • reversal agent • inotropes
Cardiac Dysrhythmias	<ul style="list-style-type: none"> • hypoxia • vagal • pain • hypovolemia • fever • drugs 	<ul style="list-style-type: none"> • assure patent airway • supplemental oxygen • consider ventilation/intubation • drug treatment • CPR • analgesics
Seizures	<ul style="list-style-type: none"> • hypoxia • hypoglycemia • underlying medical condition • fever • drugs (local anesthetics) 	<ul style="list-style-type: none"> • assure patent airway • supplemental oxygen • consider ventilation/intubation • blood sugar • anticonvulsants
Anaphylaxis	<ul style="list-style-type: none"> • drugs • latex sensitivity 	<ul style="list-style-type: none"> • assure patent airway • consider ventilation/intubation • epinephrine • fluids • ACLS • steroids/benadryl/zantac

*For any of the above, strongly consider calling RRT, the Code Blue Team or an anesthesiologist.