Kingston General Hospital
Outstanding care, always™

KINGSTON GENERAL HOSPITAL

PROCEDURAL SEDATION & ANALGESIA (Adult)

LEARNING GUIDE

FOR

REGISTERED NURSES and REGISTERED RESPIRATORY THERAPISTS

Final

Prepared by: **IPE**
Date: **2000 June**
Revised: **2015 August**

TABLE OF CONTENTS

NOTE: This learning guide contains information current at the time of distribution. Policies and procedures are frequently revised. Please refer to related policies and procedures for ongoing current information.

1.0 INTRODUCTION

Procedural sedation is a state of reduced excitement or anxiety induced with medication that allows patients to tolerate unpleasant procedures. It occurs on a continuum from minimal sedation to general anesthesia.
As it is difficult to predict how individual patients will respond, practitioners intending to produce a given level of sedation should be able to recognize the level of sedation and rescue patients whose level of sedation becomes deeper than intended.

Definitions:

The American Society of Anesthesiologist has adopted a sedation assessment scoring tool called the Ramsay Sedation Scale (see below or Appendix A). This six point scale is easy to interpret and replicate and it has specifically defined endpoints.

Minimal Sedation (RSS 2-3). A drug-induced state during which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.

Moderate Sedation (RSS 3-4). 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.

Deep Sedation (RSS 5). A drug-induced depression of consciousness during which the patient cannot be easily aroused but responds purposefully following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway, and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained.

Dissociative sedation: Dissociative sedation is a trance-like cataleptic state characterized by profound analgesia and amnesia, with retention of protective airway reflexes, spontaneous respirations, and cardiopulmonary stability. Ketamine is commonly administered to evoke dissociative levels of sedation

Ramsay Sedation Score (RSS)

Value	Level of Sedation (Description)	Test to follow
1	Anxious and agitated	Observe the patient
2	Awake, cooperative and tranquil	Observe the patient. Does the patient make eye contact and respond to commands?
3	Drowsy but responds easily to verbal commands	Talk to the patient. Responds easily.
4	Asleep but responsive to tactile or loud auditory stimulus	Physically stimulate the patient by shaking the shoulder while speaking loudly. Brisk purposeful response to tactile stimulus
5	Asleep with minimal response to a tactile or loud auditory stimulus.	Physically stimulate the patient by shaking the shoulder while speaking loudly. Minimal response to tactile or auditory stimulus
6	Asleep and does not respond to pain.	Use painful stimuli. No response

Modified after Ramsay M.A., Sevege T.M., Simpson B.R., Goodwin, R.: Controlled sedation with alphazalonealphadolone, BMJ 1974, 2:656-659, and van Dishoeck A.M. et al. Reliable assessment of sedation level in routine clinical practice by adding an instruction to the Ramsay Scale. Eur J Caridovase Nurs. 2009 June; 8(2):125-8

2.0 EXPECTED COMPETENCY AND AUTHORIZATION

Competency Statement

On completion of the learning guide for this advanced competency, the regulated health care professional (RHCP) can safely and effectively monitor and manage the care of the patient receiving procedural sedation and analgesia.

Criteria

On completion of the learning program, the RHCP will be able to:

1. Identify indications for procedural sedation and analgesia.
2. Differentiate between the various levels of sedation.
3. Identify the necessary emergency equipment and personnel required to perform procedural sedation.
4. Describe and perform the pre-procedure, intra-procedure and post-procedure monitoring requirements of the patient.
5. Identify the effects, side-effects and management related to the agents used during procedural sedation and analgesia, e.g:
    - fentanyl;
    - midazolam;
    - propofol;
    - ketamine.

    Reversal agents:
    - naloxone;
    - flumazenil.
6. Monitor for airway patency and adequacy of breathing and cardiac dysrhythmias appropriate for the patient's size and age.
7. Identify discharge criteria (to inpatient unit or to home setting) for the patient who has received procedural sedation and analgesia.
8. Document appropriately in the patient record.

Authorization

To be authorized to administer physician-ordered sedative and analgesic drugs and monitor patients during procedural sedation, the Registered Nurse (RN) and Registered Respiratory Therapist (RRT) must complete the following credentialing process:

- review the Procedural Sedation and Analgesia Learning Guide;
- achieve a minimum score of 80% on the test;
- have experience appropriate for the patient's size and age, with monitoring for airway patency, adequacy of breathing, and cardiac dysrhythmias.

3.0 NON-PHARMACOLOGIC APPROACHES

Patients with health problems or injuries can be placed into strange and threatening situations. Many procedures they encounter may cause pain and anxiety.

Adults require explanations regarding the procedure. Preparing the patient in advance and allowing time for questions before the procedure is recommended. Practice of relaxation techniques may be helpful.

Interventions to reduce the patient's anxiety might include:

- explaining what is being done as the procedure is being performed;
- holding the patient's hand;
- positioning the patient comfortably and ensuring that the patient is covered adequately;
- providing diversional activities appropriate to patient age and patient wishes.

4.0 INDICATIONS FOR PROCEDURAL SEDATION AND ANALGESIA

Situations requiring procedural sedation and analgesia occur most commonly in the Emergency Department (ER), Critical Care Units, the Cardiovascular Laboratory (CVL), Imaging Services/Interventional Radiology (IVR), and Endoscopy. Examples of situations requiring procedural sedation include:

Emergency	CVLab	IVR	Endoscopy
Orthopedic • reduction fracture/dislocation • hand & fingertip repair	• Permanent pacemaker/ICD insertion • Electrophysiologic studies • Catheter ablation	• Percutaneous Nephrostomy insertion • Angiography • Embolization procedures • Carotid stent insertion • GI/biliary procedures	• Bronchoscopy • Colonoscopy • Endoscopy
Surgical • I&D abscesses • chest tube insertion • burn debridement or road rash • foreign body removal			
• Cardioversion • Lumbar puncture • CT scanning (if uncooperative)			

5.0 PHARMACOLOGY REVIEW

Opioid analgesics and sedatives are the most common drugs used to provide procedural sedation and analgesia. All RHCP's administering these medications must be authorized for the added skill of administration of medications below the drip chamber. The RHCP's administering these medications must be familiar with the dosing requirements, onset, and duration of action, side effects and complications of each medication administered.

Opioids and sedatives, when administered together, have additive effects in procedural sedation and analgesia.

The opioids (e.g. fentanyl, morphine, meperidine) cause sedation but do not act as amnestics. All increase the pain threshold and modify the perception of pain. Painful stimuli may be felt as distant or dislocated, but are not perceived as painful. They are most effective in managing dull, continuous pain rather than sharp, intermittent pain. They should be given with caution to patients with chronic obstructive pulmonary disease, acute asthma and the elderly.

Propofol is an ultra-short-acting sedative. It is a hypnotic, with amnestic and antiemetic properties. It has no analgesic properties; therefore, use of an analgesic is required for painful procedures. The prescribing of Propofol is restricted as per the KGH Drug Formulary. During the administration of Propofol for procedural sedation and analgesia, the ongoing presence of a practitioner authorized to prescribe it is required.

Ketamine is an analgesic, sedative and amnestic agent that produces a dissociative or trance-like state. The patient will maintain their airway reflexes and remain with their eyes open exhibiting spontaneous movements and nystagmus.

Benzodiazepines (midazolam, diazepam) are sedatives that reduce anxiety and induce some short-term amnesia. They may be given alone or in combination with analgesics. Amnesia is most pronounced when sedation is produced. Patients often respond appropriately to questions, but there is noticeable suppression of recall. Heavy, slurred speech and nystagmus often precede sleep at the point of clinical sedation. These two signs are often used as end point when titrating doses.

Titrating Doses

Response to opioids and sedatives can be variable between patients. Start with the lowest dose of the drug and repeat the dose to achieve patient comfort. It is easier to give additional medication than it is to reverse adverse effects.

Note: Not all drugs listed in the following chart are used in all the clinical areas where procedural sedation is performed. Become familiar with those medications that are administered in your area of practice.

Sedative and Analgesic Agents

The following table provides a summary of general information regarding the medications and dosages that the RHCP can expect the physician to use/order in procedural sedation.

Drug	Administration Guidelines	Pharmacokinetics	Precautions/ Contraindications/ Adverse Effects *	Notes

Drug	Administration Guidelines	Pharmacokinetics	Precautions/ Contraindications/ Adverse Effects *	Notes
Fentanyl (Synthetic opioid) -Analgesic, Narcotic -General anesthetic	**Anesthetic Adjunct** *Regional anesthesia*: 50-100 mcg IM or IV when analgesia required *General anesthesia:* • minor surgery: 2 mcg/kg IV • moderate-major surgery: 2 – 20 mcg/kg IV followed by 25 - 100 mcg IV PRN for maintenance. • open heart/complicated surgery: 20 – 50 mcg/kg IV followed by dose of 25 mcg to one half the initial dose IV PRN for maintenance **General Anesthetic** 50 – 100 mcg/kg (up to 150 mcg/kg may be required in certain cases) IV with oxygen and a skeletal muscle relaxant. **Perioperative Analgesia:** Intermittent dosing: 50 – 100 mcg IM or IV q1-2h PRN Continuous IV infusion: 25 – 200 mcg/hr or 1 – 2 mcg/kg/hr Titrate to effect	Onset: 3 - 5 min Peak: shortly after administration Duration: 30 - 60 min[2] .	**Contraindications** • hypersensitivity • severe liver or renal insufficiency **Precautions** • elderly • bradyarrhythmia • biliary tract disease (including acute pancreatitis) • use with caution head injuries, hepatic or renal dysfunction. **Adverse Effects** • hypotension, bradycardia • nausea, vomiting • chest wall rigidity (with rapid • administration) leading to respiratory depression, apnea, bronchoconstriction, laryngospasm dizziness, sedation	• Reduce dose when given with anxiolytics and other CNS depressants • Reduce dose in the elderly

Drug	Administration Guidelines	Pharmacokinetics	Precautions/ Contraindications/ Adverse Effects *	Notes
Ketamine (Ketalar) - General anesthetic	Adults[4]: **Anesthesia** **IV:** *Induction:* 1 – 2 mg/kg (range 0.5 – 4.5 mg/kg) *Maintenance*: 50 – 100% induction dose PRN or infusion of 0.1 – 0.5 mg/min. A continuous maintenance infusion can also be used with a range from 0.3 – 1.8 mg/kg/hr. **IM:** *Induction:* 5 – 10 mg/kg (range 4 – 13 mg/kg). *Maintenance:* 50 –100% induction dose PRN **Procedural Sedation** **IV:** 0.5 – 1 mg/kg slowly over 1 minute ** IV slowly titrated may minimize emergence reaction	Onset: 1- 2min Duration: 5-15 min[2]	**Contraindications** • Increased ICP • hypertension • Psychotic disorders • Hypersensitivity • History of a cerebrovascular accident • Pregnancy • Aneurysms • Thyrotoxicosis • Congestive heart failure, angina **Precautions** • mild to moderate hypertension, chronic congestive heart failure, tachyarrhythmia, or myocardial ischemia • catecholamine depletion **Adverse Effects** • respiratory depression • emergence reactions – vivid dreams, hallucinations, and/or frank delirium • tachycardia, hypertension, increased cardiac output, paradoxical direct myocardial depression • increased intracranial pressures • tremors, tonic clonic movements • nausea & vomiting	**Caution is advised in using this agent in the patient with abnormal personalities as the incidence of emergence reactions is increased** • Emergence reactions may be reduced by pretreatment with midazolam • Optional pre-treatment with atropine 0.01 mg/kg to reduce airway secretions

Drug	Administration Guidelines	Pharmacokinetics	Precautions/ Contraindications/ Adverse Effects *	Notes
Midazolam (Versed) -benzodiazepine Hypnotic, Sedative	Use 1 mg/mL formulation to facilitate slow injection[4] Adults[4]: **Initial Dose**: 1 – 2.5 mg IV (approx. 0.015 – 0.03 mg/kg) Administer over 2 – 3 minutes. After 2 minutes, dosage may be further titrated incrementally to a total dose of 5 mg Elderly, Chronically Ill, or Debilitated[4]: **Initial Dose**: 1 – 1.5 mg IV Total Dose: 3.5 mg **Maintenance:** may be administered in increments of 25% of initial total dose.	Onset: 1 - 5 min[2] Peak: 20 - 30 min[2] Duration: up to 6 hours; mean 2 hours[2]	**Contraindications** • hypersensitivity **Precautions** • elderly • congestive heart failure • chronically ill, debilitated • respiratory disease • renal impairment • hepatic impairment **Adverse Effects** • Hypotension • Respiratory depression, respiratory arrest, or apnea • Coughing • Hiccups • Headache, drowsiness • Paradoxical agitation	• Reduce dosage ~ 30% when used in conjunction with a narcotic or other CNS depressant[4]

Drug	Administration Guidelines	Pharmacokinetics	Precautions/Contraindications/Adverse Effects	
Propofol (Diprivan) - General anesthetic	Dosage: Variable patient response <u>Adults[4]:</u> 0.15 to 0.5 mg/kg IV (total dose) titrated to effect <u>Elderly, debilitated or hypovolemic:</u> 70-80% of adult dose	Onset: approx. 60 seconds (higher dose = faster onset)[3,4] Duration: 3-10 minutes[3] (Variable with boluses because of rapid clearance, steady state achievable with infusion.)	**Precautions** • Allow longer time between boluses in the elderly due to decreased circulation time • May rapidly achieve deep sedation with IV boluses **Contraindications** • known severe allergy/hypersensitivity (anaphylaxis/anaphylactoid) to egg • or soy, propofol, or lipid emulsion **Adverse Effects** • hypotension • vein irritation (local pain on injection) • twitching, headache • nausea, vomiting	• No analgesic effects; patient will be premedicated with fentanyl for painful procedures • Addition of 10 mg (1mL) preservative -free lidocaine to 20 mL syringe of propofol reduces pain on injection • Do not mix with other drugs prior to use • If diluted, use only D5W

References:
1. The 2010-2011 Drug Handbook and Formulary. Toronto, The Hospital for Sick Children
2. Micromedex Database – Feb 2015
3. CPS 2014
4. HDH/KGH Parenteral Drug Therapy Guidelines
Updated and approved by pharmacy March 2015

Reversal Agents

Drug	Administration Guidelines	Action	Precautions/ Contraindications/ Adverse Effects	Comments
Flumazenil (Anexate) Benzodiazepine Antagonist	Adults[4]: **Initial Dose**: 0.2 mg IV over 15 seconds. If no response in 60 seconds, 0.1 mg repeated at 1 min intervals to maximum of 1 mg **Usual dose**: 0.3 - 0.6 mg	Onset: 1 - 2 min[3] Peak effect: 6-10 min[2] Duration: 1 hr[2]	**Contraindications** • known hypersensitivity • epileptic patients have been receive benzodiazepine treatment for a prolonged period of time • patients who are showing signs of serious cyclic antidepressant overdose **Precautions** • physical dependence on benzodiazepines • resedation may occur **Adverse Effects** • flushing, agitation • anxiety • transient increases in BP, heart rate • benzodiazepine withdrawal reaction	• Monitor for seizures • Not to be used to advance discharge
Naloxone (Narcan) Opiate antagonist	Adults[4]: 0.1 - 0.2 mg IV, repeated PRN at 2-3 min intervals The Acute Pain Management Service recommends dilution of 1 ampoule (0.4 mg/1 mL) with 9 mL 0.9% NaCl. 1 mL of this solution (final concentration = 0.04 mg/mL) to be administered q 2 min until desired response **Maximum Dose**: 0.8 mg	Onset: 2 min[2] Duration: 20-60 min[2]	**Precautions** • opioid dependency **Adverse Effects** • opioid withdrawal symptoms in opioid-dependent patients • hypersensitivity reactions	• Monitor closely for recurrence of respiratory depression • Repeated doses usually needed since naloxone has a shorter duration of action than most narcotics

6.0 STAFFING AND CREDENTIALS

1. A minimum of two personnel are required to perform procedural sedation:
   - The clinician performing the procedure, and
   - An appropriately trained RHCP whose sole responsibility is to monitor the patient during the procedure.
     Exception: For stable patients with minimal to moderate sedation, the regulated health care professional may briefly assist in minor, interruptible tasks as long as appropriate monitoring of the patient is maintained.

2. Registered Nurses and Respiratory Therapists who administer physician-ordered sedative and analgesic drugs and monitor patients are restricted to moderate procedural sedation (RSS 3-4) and may not administer medications to provide deep sedation. They must successfully complete sedation-specific learning as determined by their respective disciplines.

3. Physicians require specific hospital privileges to:
a) administer or supervise moderate sedation or
b) administer deep sedation.

4. Credentialing for moderate procedural sedation (RSS 3-4) will be restricted to physicians with formal training in the safe administration of sedative and analgesic drugs and the rescue of patients who exhibit adverse physiologic consequences of sedation. This training may be part of a residency or fellowship program or separate educational program. The Department Head is responsible for ensuring the physician requesting privileges has the appropriate training with knowledge and competence in:

- Identifying patients at high risk for sedation-related adverse events
- Pharmacokinetics of commonly used medications and reversal agents
- Determining the depth of sedation using the Ramsay sedation scale
- Management of sedation-related adverse events
- Recognizing the adequacy of ventilatory function
- Basic airway management skills including bag-mask ventilation
- Knowledge of ACLS guidelines

5. For procedures requiring deep (RSS 5) or dissociative sedation, two physicians must be present. Privileges for deep and dissociative sedation are restricted to anesthesiologists, emergency medicine physicians, and adult intensivists. The physician providing this level of sedation must meet the following additional criteria:

- Ability to perform and interpret capnographic monitoring
- Proficiency in advanced airway management including endotracheal intubation

6. The prescribing of Propofol is restricted as per the KGH Drug Formulary, Section 1. During the administration of Propofol for procedural sedation, the ongoing presence of a physician authorized to prescribe it is required.

7.0 PATIENT ASSESSMENT

It is useful for the nurse to be familiar with the responsibilities of the members of the health care team performing procedural sedation.

Equipment that is required at the bedside includes the following:

- Oxygen source and administration equipment;
- Suction source and equipment;
- Basic airway equipment (resuscitation bag, face mask, oral airways)
- Intravenous equipment;
- Medications, including reversal agents;
- Non-invasive blood pressure;
- Pulse oximeter
- Cardiac monitor.
- Capnography – recommended for moderate sedation where available *__Required for deep sedation__

- Equipment that must be readily available includes the following:
  - Advanced airway equipment (laryngoscope and endotracheal tubes)
  - Resuscitation cart with defibrillator

7.1 Pre-Sedation Assessment

Physician Responsibilities

Informed consent for the procedure (including the procedural sedation) will be obtained by the physician prior to procedural sedation. Either a verbal or written consent will be recorded in the patient record, except as provided in Administrative Policy # 06-040 Consent to Treatment, sections 5.1 (Emergency) and 5.5 (Overriding a Substitute Decider's Decision).

The patient or the patient's legal guardian (in the case of legally incompetent adults) should be informed of the indications for sedation/analgesia, the risks and benefits associated with it and any alternatives. They should be counseled as to changes in behaviour during and after sedation/analgesia and to the length of post-procedure monitoring.

The physician is responsible for the assessment of the patient prior to administration of medications for procedural sedation. The assessment and documentation will include the following:

- Present medical history and indication for the procedure
- Current medications

- Adverse reactions
- Fasting status
- ASA classification (Appendix B)
- Weight and baseline vitals signs
- Physical examination including an airway assessment

The physician will identify patients at high risk of complications from procedural sedation and consider an Anesthesiology consultation before the administration of medications. Conditions that increase the risk of sedation include but are not limited to:

- ASA class > 3 (Appendix B)
- Morbid obesity
- Obstructive sleep apnea
- Pregnancy
- Severe neurologic impairment
- Severe cardiovascular or pulmonary disease
- Known or suspected difficult intubation or ventilation
- Invasive or prolonged procedures
- Patients at high risk for aspiration (e.g. small bowel obstruction)

All members of the interdisciplinary team involved with the procedure will complete the "Brief" section of the Procedural Sedation Safety Checklist (see Appendix C,F). The team will discuss the target depth of sedation required for the procedure.

7.2 Intra-Procedure Assessment

A minimum of two personnel are required to perform procedural sedation:

- the clinician performing the procedure and
- an appropriately trained RHCP whose sole responsibility is to monitor the patient during the procedure

Exception: For stable patients with minimal to moderate sedation, the regulated health care professional may briefly assist in minor, interruptible tasks as long as appropriate monitoring of the patient is maintained.

Intra-Procedure

1. The physician performing the procedure and the RHCP providing sedation will remain in constant attendance with the patient throughout the procedure.

Continuously monitor vital signs and depth of sedation throughout the procedure. Required monitors include pulse oximeter, cardiac monitor, and blood pressure. Capnography is required for deep sedation.

2. The RHCP providing sedation will document all medications, dosages, and the time of administration and any adverse events (e.g., desaturation, apnea, hypotension, emesis etc) and interventions.

3. The RHCP providing sedation will document vital signs (heart rate, blood pressure, respiratory rate), RSS level, oxygen saturation before the procedure and at least every 5 minutes during the procedure.

4. When the procedure is finished, the team will complete the "Debrief" section of the Procedural Sedation Data (Adult) form (see Appendix F).

7.3 Post-Procedure Assessment

1. Post-procedure care of the sedated patient may be delegated to an appropriately trained and qualified individual once the patient has recovered to a RSS 2 (awake, cooperative, and oriented) and meets an Aldrete score of 9 or greater (Appendix D).

2. The attending physician must be available to attend to the patient until discharge criteria are met.

3. Monitor and document vital signs (heart rate, blood pressure, respiratory rate), RSS level and continuous oxygen saturation:
   - Every 15 minutes until discharge criteria are met
   - Patients must remain in the recovery area for at least 30 minutes after the last dose of sedative or analgesic medication.
   - Patients must remain in the recovery area for at least 120 minutes if opioid or benzodiazepine reversal agents have been administered
   - Intravenous access must be maintained until discharge criteria are met
   - Prior to discharge or transfer to another patient care area

4. Once an Aldrete score of 9 or greater is achieved (see Appendix D), a Registered Nurse with a physician order may:
   - discharge a patient to another patient care area or
   - discharge a patient home if modified PADDS score of 9 or greater is achieved (see Appendix E) and the following discharge criteria are met:

   - At least 30 minutes since the last sedative and 120 minutes since reversal agents

- A responsible adult is present to transport the patient home and remain with the patient for at least 12 hours
- Verbal and written discharge instructions have been given to the patient and caregiver.
- Patients must be instructed to refrain from driving or operating heavy machinery for 24 hours

7.4 Documentation

1. Documentation of all aspects of care during procedural sedation is required (see example, Appendix F). The clinical records will contain the following:

- Details of the pre-procedure/sedation assessment
- Procedural Sedation Safety Checklist
- Record of all medications administered
- Record of all observations; baseline, intra and post-procedure
- Record of all adverse events
- Record of discharge process; criteria, instructions, escort

2. Serious adverse events and critical incidents related to sedation must be documented in online safe reporting tool for auditing purposes. Examples of reportable adverse events include:

- Administration of sedation without the appropriate equipment or human resources
- Suspected aspiration of gastric contents
- Prolonged oxygen desaturation ($SpO_2 < 85\%$ for 3 minutes)
- Use of reversal agents
- Need for unplanned endotracheal intubation
- Unplanned admission due to complications from sedation
- Cardiac or respiratory arrest

8.0 COMPLICATIONS

8.1 Respiratory

The major complications of procedural sedation are respiratory depression and respiratory insufficiency. Any health care provider involved in procedural sedation and analgesia must be able to identify respiratory complications and quickly intervene.

Airway obstruction or respiratory depression

- If signs of respiratory depression are observed, ensure a patent airway by positioning the patient's head using the head-tilt/chin lift maneuver in adults, Suction or insert an airway if necessary. Administer oxygen. Positive pressure ventilation using a bag-valve mask may be required.
- Ask the patient to take some deep breaths. Check respiratory rate for a full minute by auscultation and observation. Monitor oxygen saturation.
- Dusky skin or nail bed colour is late signs of respiratory depression. Initiate action before these occur.
- Prepare to administer drugs to reverse sedation. Naloxone is given to reverse the effects of opioids, while flumazenil is given to reverse the effects of benzodiazepines.
- Monitor the patient for recurrent sedation or respiratory depression.

8.1.1 Emergency Airway Management

Jaw Thrust

This technique can be used for the patient with suspected neck trauma or injury. Position both elbows on a surface on either side of the patient’s head. Using both hands, grasp the mandible at the angle (anterior to the ear lobes) and lift the jaw forward (or up).

Head-Tilt/Chin-Lift

This technique should not be used for the patient with suspected neck trauma or injury. Apply enough pressure on the patient's forehead with the palm of your hand to tilt the head back into the "sniffing" position. Use the first 2 fingers of your other hand to lift up on the mandible near the chin. The thumb should not be used. This maneuver brings the tongue forward while supporting the jaw and helps to hold the head-tilt position.

FIGURE 40. JAW THRUST MANEUVER

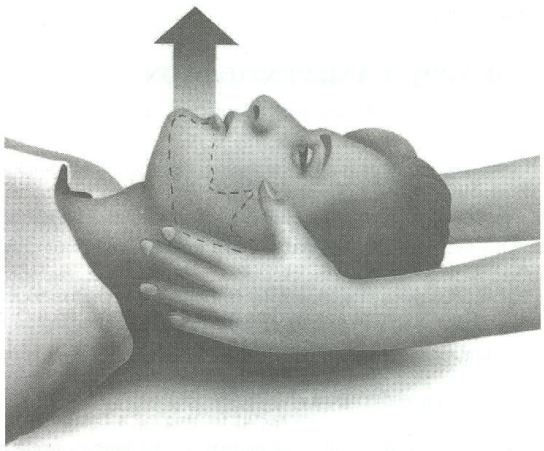
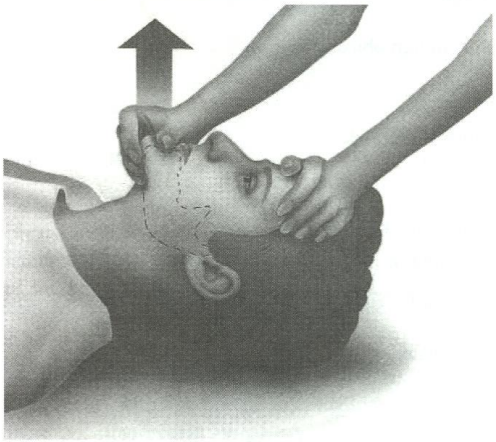


FIGURE 41. CHIN LIFT MANEUVER



Trauma Nursing Core Course, Emergency Nurses Association, 2000, ENA. Reprinted with permission

8.1.2 Maintaining the Open Airway using Airway Adjuncts

Oropharyngeal Airways

This airway is inserted orally in the unconscious patient.

1). Select the correct sized airway by holding the proximal end of the airway at the corner of the mouth and the distal end should reach the tip of the earlobe.
2). Insert the airway with the distal tip turned toward the roof of the mouth. As the airway passes across the back of the tongue, gently rotate the airway 180 degrees. * Do not use this technique on children

OR Use a tongue depressor to hold the tongue down and insert the airway following the curvature of the mouth.

Nasopharyngeal Airways

This airway is selected in the responsive or unresponsive patient.

1). Select the correct sized airway by holding the proximal end of the airway at the nares and the distal end should reach the tip of the earlobe.
2). Lubricate the airway with a water-soluble lubricant
3). Insert the airway with the bevel facing the nasal septum close to the midline. Direct the airway posterior and behind the tongue. If resistance is encountered, rotate the tube slightly.

Laryngospasm

Laryngospasm is a rare complication of the administration of ketamine. Reposition the head and use gentle suctioning with possible positive pressure ventilation.

Chest wall and glottic rigidity

Rapid boluses of fentanyl cause 'wooden chest syndrome' where the chest wall and glottis become rigid, making even manual ventilation difficult or impossible. This syndrome is seen when fentanyl is used in doses greater than 15 mcg/kg.

.

- This complication can be partially reversed with naloxone, followed by a skeletal muscle relaxant.
- Intubation with ventilatory support may be required.

8.2 Cardiovascular

Hypotension

During procedural sedation, the patient's blood pressure (BP) may fluctuate 10% from baseline. If the blood pressure fluctuates more than 20 - 30% below the normal pressure, notify the physician and investigate possible causes, such as a pre-existing problem, a response to medication, and hypovolemia or blood loss.

Management :

- Support the patient's respiratory status. Apply supplemental oxygen
- Place the patient in the Trendelenburg position.
- Administer IV fluids, reversal agents, vasopressors, (volume loading before the administration of Propofol is recommended).
- Continue to assess BP every 1-5 minutes.

Cardiac arrhythmias

The two most common cardiac arrhythmias encountered with procedural sedation are:

Bradycardia secondary to hypoxemia or to vagal stimulation during the procedure; and
Tachycardia related to pain, anxiety, hypoxemia or hypovolemia.

More serious arrhythmias such as PVCs or atrial arrhythmias can be encountered, caused by hypovolemia or hypoxemia.

Management:

- Administer fluids and antiarrhythmic drugs
- Obtain an ECG, if the patient develops shortness of breath or chest pain.
- Apply supplemental oxygen
- Assess patency of airway, and follow the ABCs.

Hypertension

Hypertension is usually caused by pain or the stress of the procedure.

- Provide additional sedation or analgesia
- Apply supplemental oxygen

8.3 Emergence Phenomena

This is occasionally seen in the recovery phase of sedation with Ketamine. The risk factors for emergence hallucinations include an age greater than 15 years, rapid IV administration and excessive environmental noise or stimulation during recovery.

8.4 Increased Intracranial Pressure

Ketamine causes increased intracranial pressure. Fentanyl has been associated with acute elevations of intracranial pressure in the head-injured child. Both of these agents should be avoided in patients with head trauma.

8.5 Nausea and Vomiting

Nausea and vomiting are reported with many of the agents used for sedation and analgesia. Loss of airway protective reflexes can place the patient at risk of aspiration. Antiemetics can be given to relieve nausea and vomiting.

9.0 Appendices

9.1 Appendix A: Ramsay Sedation Score (RSS)

Value	Level of Sedation (Description)	Test to follow
1	Anxious and agitated	Observe the patient
2	Awake, cooperative and tranquil	Observe the patient. Does the patient make eye contact and respond to commands?
3	Drowsy but responds easily to verbal commands	Talk to the patient. Responds easily.
4	Asleep but responsive to tactile or loud auditory stimulus	Physically stimulate the patient by shaking the shoulder while speaking loudly. Brisk purposeful response to tactile stimulus
5	Asleep with minimal response to a tactile or loud auditory stimulus.	Physically stimulate the patient by shaking the shoulder while speaking loudly. Minimal response to tactile or auditory stimulus
6	Asleep and does not respond to pain.	Use painful stimuli. No response

Modified after Ramsay M.A., Sevege T.M., Simpson B.R., Goodwin, R.: Controlled sedation with alphazalonealphadolone, BMJ 1974, 2:656-659, and van Dishoeck A.M. et al. Reliable assessment of sedation level in routine clinical practice by adding an instruction to the Ramsay Scale. Eur J Caridovase Nurs. 2009 June; 8(2):125-8

9.2 Appendix B: Assignment of an ASA classification (American Society of Anesthesiologist)

- **ASA Class I** – Healthy patient
- **ASA Class II** – Mild systemic disease – no functional limitation

  (e.g., NIDDM, HTN, well controlled asthma)
- **ASA Class III** – Severe systemic disease – definite functional impairment

  (e.g., IDDM, moderate COPD, Class II angina)
- **ASA Class IV** – Constant threat to life (e.g., Unstable Angina, Multiple Trauma)
- **ASA Class V** – Moribund

9.3 Appendix C: Procedural Sedation Safety Checklist

Additional items may be added to the checklist to meet the needs for specific procedures / locations.

Examples include: antibiotic prophylaxis, imaging, laboratory results, labeling of specimens etc.

Brief – prior to giving sedation

□ All team members introduce themselves by name and role

□ Patient identification band on

□ Procedure - site and side confirmed

□ Consent

□ Adverse Reactions documented

□ Discussion of depth of sedation

□ Equipment and monitors available and checked

□ Anticipated concerns (e.g. high risk patient)

□ Post-procedure disposition

Debrief – completion of procedure

Equipment problems □ Yes □ No

Post-procedure concerns □ Yes □ No

Post-procedure disposition / instructions □ Yes □ No

9.4 Appendix D: Modified Aldrete Scoring System

THE MODIFIED ALDRETE SCORING SYSTEM		
ACTIVITY	Able to move four extremities voluntarily or on command	2
	Able to move two extremities voluntarily or on command	1
	Unable to move extremities voluntarily or on command	0
RESPIRATION	Able to breathe deeply and cough freely	2
	Dyspnea or limited breathing	1
	Apneic	0
CIRCULATION	BP ± 20% of preanesthetic level	2
	BP ± 20-49% of preanesthetic level	1
	BP ± 50% of preanesthetic level	0
CONSCIOUSNESS	Fully awake	2
	Arousable on calling	1
	Not responding	0
O_2 Saturation	Able to maintain O_2 saturation > 92% on room air	2
	Needs O_2 inhalation to maintain O_2 saturation > 90%	1
	O_2 saturation < 90% even with O_2 supplement	0

Aldrete, J. A. (1998). Modifications to the postanesthesia score for use in ambulatory surgery. *Journal of PeriAnesthesia Nursing*, 13(3), 148-155.

9.5 Appendix E: Modified Post- Anesthesia Discharge Scoring System (PADSS) for determining home-readiness

Maximum score is 10; patients scoring 9 or more are fit for discharge

Vital Signs

Vital signs must be stable and consistent with age and preoperative baseline

BP and pulse within 20% of preoperative baseline	2
BP and pulse 20 - 40% of preoperative baseline	1
BP and pulse > 40% of preoperative baseline	0

Activity Level

Patient must be able to ambulate at preoperative level

Steady gait, no dizziness, or meets preoperative level	2
Requires assistance	1
Unable to ambulate	0

Nausea and Vomiting

The patient should have minimal nausea and vomiting prior to discharge

Minimal: successfully treated with oral medication	2
Moderate: successfully treated with IM medication	1
Severe: continues after repeated treatment	0

Pain

The patient should have minimal or no pain prior to discharge.
The level of pain that the patient has should be acceptable to the patient.
Pain should be controllable with oral analgesics.
The location, type and intensity of the pain should be consistent with anticipated postoperative discomfort.

Acceptability	Yes	2
	No	0

Surgical Bleeding

Postoperative bleeding should be consistent with expected blood loss for the procedure.

Minimal: does not require dressing change	2
Moderate: up to two dressing changes required	1
Severe: more than three dressing changes required	0

Reprinted from Marshall, S., & Chung, F. (1997) Assessment of 'home readiness': discharge criteria and post discharge complications. *Current opinion in Anesthesiology*, 10, 445-450.

Appendix F: Procedural Sedation Data (Adult)

Kingston General Hospital

PROCEDURAL SEDATION DATA (ADULT)

SAFETY CHECKLIST - BRIEF

- ☐ All team members introduce themselves by name and role
- ☐ Patient Identification band on
- ☐ Procedure - site and side confirmed
- ☐ Consent
- ☐ Adverse Reactions documented
- ☐ Discussion of depth of Sedation
- ☐ Equipment and monitors available and checked
- ☐ Anticipated concerns (e.g. high risk patient)
- ☐ Post-procedure disposition

Adverse Reaction: _____

Procedure: _____

Date/Time (yyyy/mm/dd/(hhmm)	Na	K	Cl	Gluc.	Urea	GFR	Cr.	Mg	Hb	Plate lets	Leuk	INR	PT	PTT	Init.

PRE-SEDATION ASSESSMENT

Blood Pressure /	Pulse	Oxygen Saturation %	Respirations	Temperature _____ °C	Weight _____ Kg	Height _____ Cm	BMI _____

Pain Status (Circle Appropriate) 0 1 2 3 4 5 6 7 8 9 10

Location/Other _____

Glucometer Reading _____ (mmols/L) Time (hhmm) _____

Date (yyyy/mm/dd) _____ Time (hhmm) _____ Initial _____

Physician to complete

History of Present Illness _____

Past Medical History _____

Medications _____

Fasting Solids _____

Fasting Clear Fluids _____

Patient/Substitute Decision Maker Informed of Risks/Benefits

Yes ☐ No ☐

Airway Assessment _____

Respiratory Assessment _____

Cardiovascular Assessment _____

Other _____

ASA Classification (circle one) I II III IV V

Printed Name _____

Signature/Status _____ MD (Physician must sign)

Date (yyyy/mm/dd) _____ Time (hhmm) _____

Signature Record

Printed Name	Designation	Signature	Initial

Legend: BMI - Body Mass Index

Appendix F: Procedural Sedation Data (Adult)

Kingston General Hospital

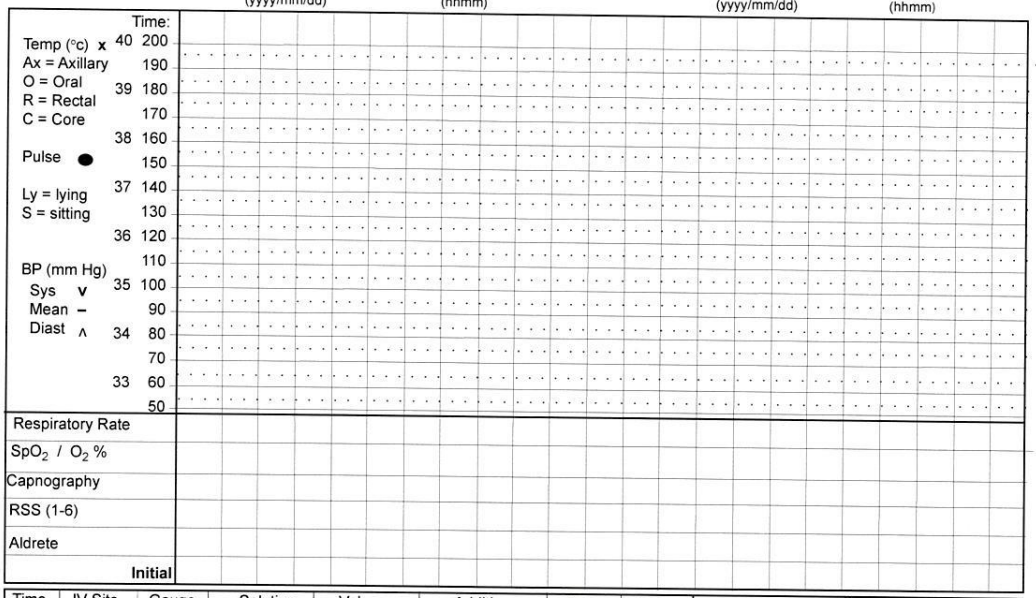
PROCEDURAL SEDATION DATA (ADULT)

Ramsay Sedation Score (RSS)
1. Anxious and agitated
2. Cooperative, orientated, and tranquil
3. Drowsy but responsive to verbal command
4. Asleep but responsive to tactile or loud auditory stimuli
5. Asleep with minimal response to tactile or loud auditory stimuli
6. Asleep and does not respond to pain

Monitoring Frequency
- Before procedure
- Every 5 minutes during procedure
- Every 15 minutes after the procedure until discharge criteria are met
- Prior to transfer or discharge

Debrief - Completion of Procedure
Equipment Problems ☐ Yes ☐ No
Post Procedure concerns ☐ Yes ☐ No
Post Procedure disposition/ instructions ☐ Yes ☐ No
Initial_____

Procedure Date & Time _____ (yyyy/mm/dd) _____ (hhmm) to _____ (yyyy/mm/dd) _____ (hhmm)



Time (hh mm)	IV Site	Gauge	Solution	Volume	Additive	Rate	Initial	Volume Infused	Discontinued (hhmm)	Initial

Time (hhmm)	Medication/ Dose/Route	Initial	Time (hhmm)	Medication/ Dose/Route	Initial	Time (hhmm)	Medication/ Dose/Route	Initial

Discharge Date (yyyy/mm/dd): _____ Initials _____
☐ to unit at **(hhmm):** _____ **Location:** _____
Modified Aldrete Score: _____

THE MODIFIED ALDRETE SCORING SYSTEM

ACTIVITY	Able to move four extremities voluntarily or on command	2
	Able to move two extremities voluntarily or on command	1
	Unable to move extremities voluntarily or on command	0
RESPIRATION	Able to breathe deeply and cough freely	2
	Dyspnea or limited breathing	1
	Apneic	0
CIRCULATION	**BP** ± 20% of preanesthetic level	2
	BP ± 20 - 49% of preanesthetic level	1
	BP ± 50% of preanesthetic level	0
CONSCIOUSNESS		
	Fully awake	2
	Arousable on calling	1
	Not responding	0
O_2 SATURATION	Able to maintan O_2 saturation > 92% on room air	2
	Needs O_2 inhalation to maintain O_2 saturation > 90%	1
	O_2 saturation < 90% even with O_2 supplement	0

Discharge Date (yyyy/mm/dd): _____ Initials _____
☐ to home at **(hhmm):** _____ **accompanied by:** _____
Mode: ☐ ambulance ☐ stretcher ☐ wheelchair ☐ other _____
Aldrete Score ≥ 9 ☐
PADSS Score: ____
☐ Printed Instruction given
☐ Verbal Instruction given
☐ Patient verbalized accurate information given

Modified Post-Anesthesia Discharge Scoring System(Modified PADSS)

Vital Signs (stable and consistent with age and preop baseline)
2 = BP/Pulse within 20% of preoperative
1 = BP/Pulse 20% to 40% of preoperative
0 = BP/Pulse >40% of preoperative

Activity Level
2 = steady gait / no dizziness or as preop
1 = with assistance
0 = unable to ambulate

Nausea and Vomiting
2 = minimal: successfully treated with medication
1 = moderate: successfully treated with IM medication
0 = severe: continues after repeated treatment

Pain Acceptability
2 = Yes
0 = No

Surgical Bleeding (as expected tor the procedure)
2 = minimal: no dressing change
1 = moderate: up to 2 dressing changes
0 = severe: more than 3 dressing changes

10.0 REFERENCES

Aldrete, J. A. (1998). Modifications to the postanesthesia score for use in ambulatory surgery. *Journal of PeriAnesthesia Nursing*, 13(3), 148-155.

American Society of Anesthesiologists. (2002). Practice guidelines for sedation and analgesia by non-anesthesiologists. *Anesthesiology*, 96(4), 1004-17.

American Society of Anesthesiologists: Statement on Granting Privileges for Administration of Moderate Sedation to Practitioners Who are Not Anesthesia Professionals (Approved by the ASA House of Delegates on October 25, 2005, and amended on October 19, 2011) accessed online 2014 April 7 at https://www.asahq.org/For-Members/Standards-Guidelines-and-Statements.aspx

American Society of Anesthesiologists: Statement on Granting Privileges for Deep Sedation to Non-Anesthesiologist Sedation Practitioners. (Approved by the ASA House of Delegates on October 20.2010) accessed online 2014 April 7 https://www.asahq.org/For-Members/Standards-Guidelines-and-Statements.aspx

College of Nurses of Ontario (2003). Sedation for Providers. Medication Standards. Toronto: Author.

Emergency Nurses Association. (2000). Trauma Nursing Core Course, 5th edition, Emergency Nurses Association. U.S.A.

Guidelines to the Practice of Anesthesia Revised Edition 2014 - Appendix 6 Position Paper on Procedural Sedation: An Official Position Paper of the Canadian Anesthesiologists' Society. Accessed online 2014 April 7 at https://www.cas.ca/English/Page/Files/97_Appendix%206.pdf

Hotel Dieu Hospital/Kingston General Hospital. (2014). HDH/KGH Intravenous Drug Therapy Manual. 1st ed. Kingston, ON: Author.

Kost, M. (1999). Conscious sedation: Guarding your patient against complications. *Nursing '99*, 29(4), 35-39.

Marshall, S., & Chung, R. (1997). Assessment of 'home readiness': Discharge criteria and postdischarge complications. *Current Opinion in Anesthesiology*, 10, 445-50.

Messinger, J.A., Hoffman, L.A., O'Donnell, J.M., & Dunworth, B.A. (1999). Getting conscious sedation right. *American Journal of Nursing*, 99(12), 44-49.

Practice guidelines for sedation and analgesia by non-anesthesiologists: A report by the American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. *Anesthesiology 2002*, 96(4), 1004 – 1017.

Ringland, R. Creating guidelines for conscious sedation. *The Canadian Nurse*, 93(2), 45-46.

11.0 EVALUATION OF LEARNING GUIDE

Your feedback and comments are most appreciated. Thank you for your time in responding to this questionnaire. It will help us in planning/revising learning materials.

Circle appropriate response	Strongly agree				Strongly disagree
1. The content was clear and easy to understand.	1	2	3	4	5
Comments:					
2. The content was relevant.	1	2	3	4	5
Comments:					
3. I feel that my learning needs were met.	1	2	3	4	5
Comments:					
4. This manual will help me to meet the knowledge/skill requirements of caring for patients undergoing procedural sedation and analgesia.	1	2	3	4	5
Comments:					

Additional comments/suggestions

Please return completed evaluation to your Clinical Educator or delegate. Thank you.