Moderate (Conscious) Sedation Protocol

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Objectives

- Sedation definitions
- Pre-operative evaluation
- Drugs utilized
- Airway management
Minimal Sedation

- Does not mandate implementation of Conscious Sedation Policy
- Patient maintains
  - Normal respiration
  - Normal eye movement
  - Normal response to command, and
  - Normal or baseline mental orientation
Moderate Sedation

- Protective reflexes are intact
- Airway remains patent
- Spontaneous ventilation is adequate
- Patient responds to physical stimulation or verbal command
- No adverse effect on cardiorespiratory function
Deep Sedation

• Use of medication to induce a level of depressed consciousness from which the patient is not easily aroused

• Can result in partial or complete loss of protective airway reflexes

• Need for airway support

• Beyond the scope of this policy
Pre-Operative Evaluation of Cardiopulmonary Diseases

• Patients with moderate to severe heart or lung disease will have decreased ability to tolerate deviations from normal levels of consciousness

• They can easily decompensate during mild hypoxia or hypercarbia

• Consider Anesthesiology consult for such patients
American Society of Anesthesiologists Classification

- ASA 1: No health problems.
- ASA 2: Mild to moderate systemic disease
- ASA 3: Severe systemic disease
- ASA 4: Severe systemic disease that is a constant threat to life
- ASA 5: Moribund patient not expected to survive without procedure
Airway Assessment

• Mallampati class
• Difficult airway anatomy
• History of difficult intubation
• Disease states associated with a difficult airway
Mallampati Classification

Class I: can see soft palate, entire uvula, tonsils, & posterior pharynx

Class II: can see soft palate, part of uvula, & posterior pharynx

Class III: can see soft palate & base of uvula

Class IV: can see hard palate only

Class III or IV suggests a difficult intubation
Diseases with Difficult Airways

- Acquired
  - Obesity/Sleep apnea
  - Rheumatoid arthritis
  - Ankylosing spondylitis

- Congenital
  - Pierre Robin
  - Treacher Collins
  - Down’s syndrome
  - Goldenhar’s

- Airway tumors
- Airway infections
- Acromegaly
- Burn patients
Difficult Airway Anatomy

- Short/fat neck
- Decreased mobility of the airway joints
- Dental overbite or small mandible
- Large tongue
- Distortion in the airway (extrinsic or intrinsic)

Difficult anatomy may make mask/bag ventilation difficult or impossible
## NPO Guidelines

<table>
<thead>
<tr>
<th>Age</th>
<th>Solids/Milk/Formula</th>
<th>Breast Milk</th>
<th>Clear Liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 months</td>
<td>4 hours</td>
<td>4 hours</td>
<td>2 hours</td>
</tr>
<tr>
<td>6 months- adult</td>
<td>6 hours</td>
<td>4 hours</td>
<td>2 hours</td>
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</tbody>
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Possible Anesthesiology Consults

- Patient has failed conscious sedation in past
- Medically or psychologically unstable (ASA class III, IV, V)
- Complicated airway (MP class III or IV, difficult anatomy)
- Patients with recent oral intake
- Pregnant patients
Moderate Sedation Risks

- Respiratory depression
- Loss of airway
- Vomiting/aspiration
- Arrhythmias
Arrhythmias

- Sinus bradycardia: sedation may cause a drop in heart rate
- Sinus tachycardia: may due to pain, hypoxia, or hypercarbia
- PVCs: may be due to hypoxia or hypercarbia
- SVT
Equipment needed

- Pulse oximeter
- Oxygen source
- Ambu-bag with mask and oral airway
- Laryngoscopes with Miller and Mac blades
- Endotracheal tubes with stylet
- Functioning suction with Yankauer tip
- ECG monitor
Equipment needed

- Emergency “Code Alpha” Cart w/ defibrillator
- Standard resuscitative drugs
- Anesthesia emergency drugs
  - Narcan (naloxone)
  - Romazicon (flumazenil)
  - Succinylcholine
Intra-procedure monitoring

- $\text{SaO}_2$ (via pulse oximetry)
- Blood pressure
- EKG monitor (rhythm & rate)
- Respirations
- Level of consciousness
The steep part of curve occurs at 90% O\textsubscript{2} sat. resulting in a rapid drop in O\textsubscript{2} sat.
Intra-procedure

- Patient should be responsive to physical and verbal stimuli at all times
- If unresponsive, patient has become deeply sedated
- Stop procedure
- Initiate appropriate airway management
- Defer further administration of sedatives until patient returns to moderate sedation
Airway Obstruction

Loss of airway muscle tone in anesthetized patient leads to obstruction
Airway Obstruction: Recognition

- Respirations
  - Labored
  - Paradoxical chest movement
  - Tachypnea
  - Inspiratory stridor
  - Snoring (partial), No breath sounds (complete)
  - Decreased $O_2$ sats
Airway Obstruction: Recognition

- Neuro: Restlessness, decreased mental status, unconscious
- Skin: cyanosis
- Vitals: Tachycardia, bradycardia, hypertension
One-handed Mask Technique

For airway maintenance consider:
- raising head position
- head extension/chin lift
- jaw thrust
- oral or nasal airway placement
Two-handed Mask Technique
(When patient is difficult to mask/bag ventilate)

With one person to squeeze ventilation bag and the other to obtain proper mask fit
Benzodiazepines

- Produce amnesia, sedation, anxiolysis
- Anticonvulsants
- Minimal effects on circulation
- Diazepam (Valium) – $T_{1/2}$ is 25 – 30 hours
- Lorazepam (Ativan) – $T_{1/2}$ is 10 – 20 hours
- Midazolam (Versed) – $T_{1/2}$ is 1 – 4 hours
Versed (midazolam)

- Dosing – 0.02 – 0.03 mg/kg…max 0.1 mg/kg
- For 70 kg patient: 2mg incrementally; max of 7 mg
- 1 – 3 minutes onset; Clinical duration: ~ 20 - 40 minutes
- Decreased pain on injection
Romazicon (flumazenil)

- A benzodiazepine receptor antagonist
- Treat overdoses of benzodiazepines with 0.2 mg IV per minute (maximum single dose is 1 mg)
- Rapid reversal with large boluses may result in arrhythmias, hypertension, agitation or seizures
Opioids

• Drugs that bind to opioid receptors and produce
  – Analgesia – desired effect
  – Euphoria – clinically useful but potentially dangerous
  – Respiratory depression – depresses medullary ventilation centers.
  – Other side effects: Nausea, pruritis, orthostatic hypotension.
Opioids

- Opioids such as morphine, Demerol (meperidine), Sublimaze (fentanyl) produce a rapid and sustained dose-dependent depression of ventilation.
- They depress the medullary respiratory drive centers’ response to CO$_2$.
- The CO$_2$ response curve is shifted to the right, ie, a higher CO$_2$ is required to stimulate ventilation.
CO2 Response Curve to Narcotics

![CO2 Response Curve](image-url)
The above graph is meant to show the decrease in minute ventilation with consequent rise in pCO$_2$ in a normal patient (A), with the administration of narcotics (B), and the synergism on ventilation with narcotics and benzodiazepines (C)
Factors that Potentiate Respiratory Depression

- Drugs
- COPD
- Obesity
- Obstructive Sleep Apnea
Opioids

- Opioids do not reliably produce unconsciousness but they can make a semi-conscious patient apneic.
- It is possible to have a patient that responds to stimuli (voices, sternal rub) but will not breath.
Opioids : Some I.V. Dosing Guidelines

• Morphine : 0.025 – 0.05 mg/kg, max of 0.1 mg / kg
  – 70 kg patient : 1.75 – 3.5 mg, Max of 7 mg

• Mederidine (Demerol) 0.5 – 1.0 mg / kg, max of 50 – 100 mg

• Fentanyl : 1 – 2 mcg / kg, max of 3 mcg / kg
Opioids: Agonist / Antagonists

- Nubain partially stimulates some opioid receptors and inhibits others.

- There should be a “ceiling” on the analgesia and respiratory depression, i.e. after 0.15 mg / kg (max 10mg) is administered, no further analgesia nor respiratory depression SHOULD occur. However, clinically significant respiratory depression CAN OCCUR.

- Can precipitate severe withdrawal symptoms or a pain crisis (if on chronic pain meds)
Narcan (naloxone)

- A pure narcotic agonist that reverses the respiratory depression caused by narcotics
- Reverses respiratory depression AND analgesic effects of opioids
- Rapid reversal with a large bolus is undesirable
- Titrate 0.05 mg – 0.1 mg to effect
- Half-life about 30 min
- Pulmonary edema, narcotic withdrawal symptoms, and pain crisis (if on chronic opioids) are possible
Opioids with Benzodiazepines

- Benzodiazepines (i.e. Versed) and narcotics (i.e. fentanyl) together with have a synergistic effect on sedation and respiratory depression.

- Use extreme caution when using these two drug families together !!!!!
Local anesthetics for infiltration

• **Bupivacaine**
  – Max dose 3 mg/kg (max total = 250 mg)
  – Max dose is same with epinephrine
  – Increased cardiac toxicity vs other local anesthetics

• **Lidocaine**
  – Max dose: 3-4 mg/kg without epinephrine
  – When injected with epinephrine: 5-7 mg/kg
  – Max dose = 500 mg