Moderate (Conscious) Sedation Protocol

Prepared by

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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

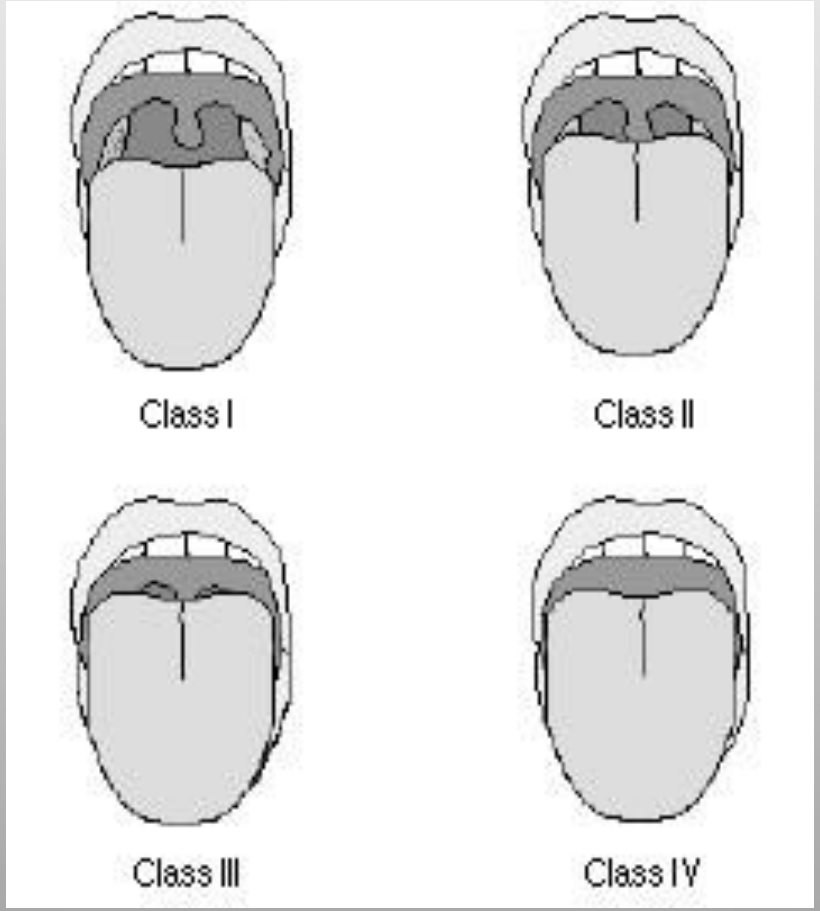
- ASA 1 : No health problems.
- ASA 2 : Mild to moderate systemic disease
- ASA 3 : Severe systemic disease
- ASA 4: Severe systemic disease that is a constant threat to life
- ASA 5: Moribund patient not expected to survive without procedure

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



& posterior pharynx

Class IV: can see hard palate only

Class III: can see soft palate & base of uvula

Class II: can see soft palate, part of uvula,

Class III or IV

suggests a difficult intubation

Diseases with Difficult Airways

- Acquired
  - Obesity/Sleep apnea
  - Rheumatoid arthritis
  - Ankylosing spondylitis
  - Airway tumors
  - Airway infections
  - Acromegaly
  - Burn patients
- Congenital
  - Pierre Robin
  - Treacher Collins
  - Down's syndrome
  - Goldenhar's

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

Age	Solids/Milk/ Formula	Breast Milk	Clear Liquids
0-6 months	4 hours	4 hours	2 hours
6 months- adult	6 hours	4 hours	2 hours

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

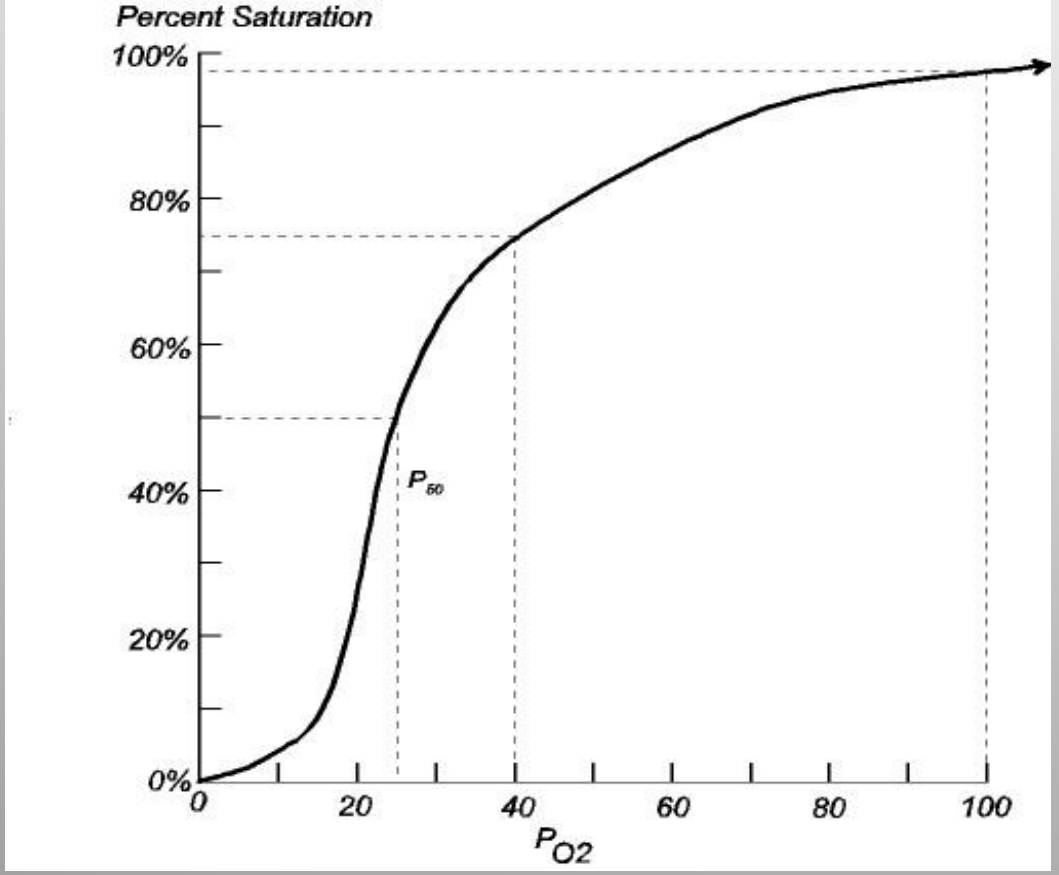
Equipment needed

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

Intra-procedure monitoring

- SaO_2 (via pulse oximetry)
- Blood pressure
- EKG monitor (rhythm & rate)
- Respirations
- Level of consciousness

Oxygen Saturation Curve



PaO_2 (mmHg)	O_2 saturation (%)
30	60%
40	75%
60	90%

The steep part of curve occurs at 90% O_2 sat. resulting in a rapid drop in O_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 anesthesized 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

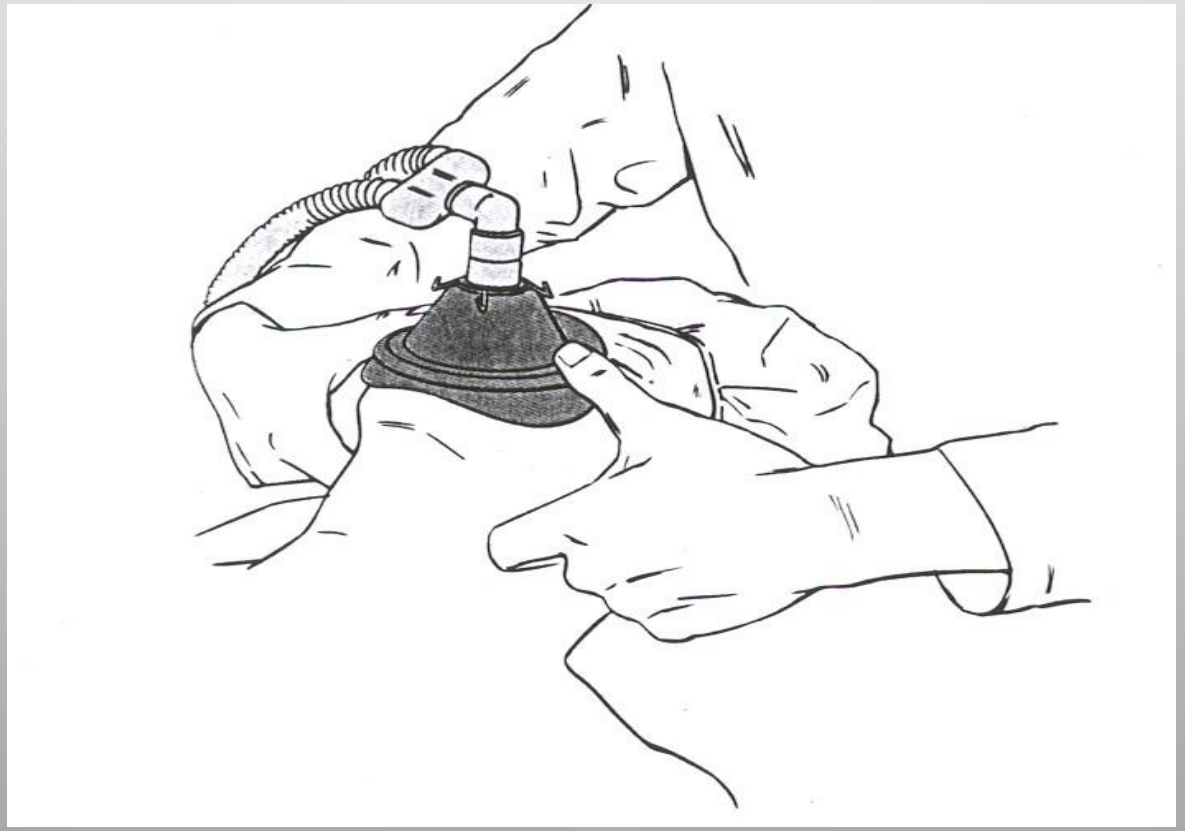
-head extension/chin lift

-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, aggitation or seizures

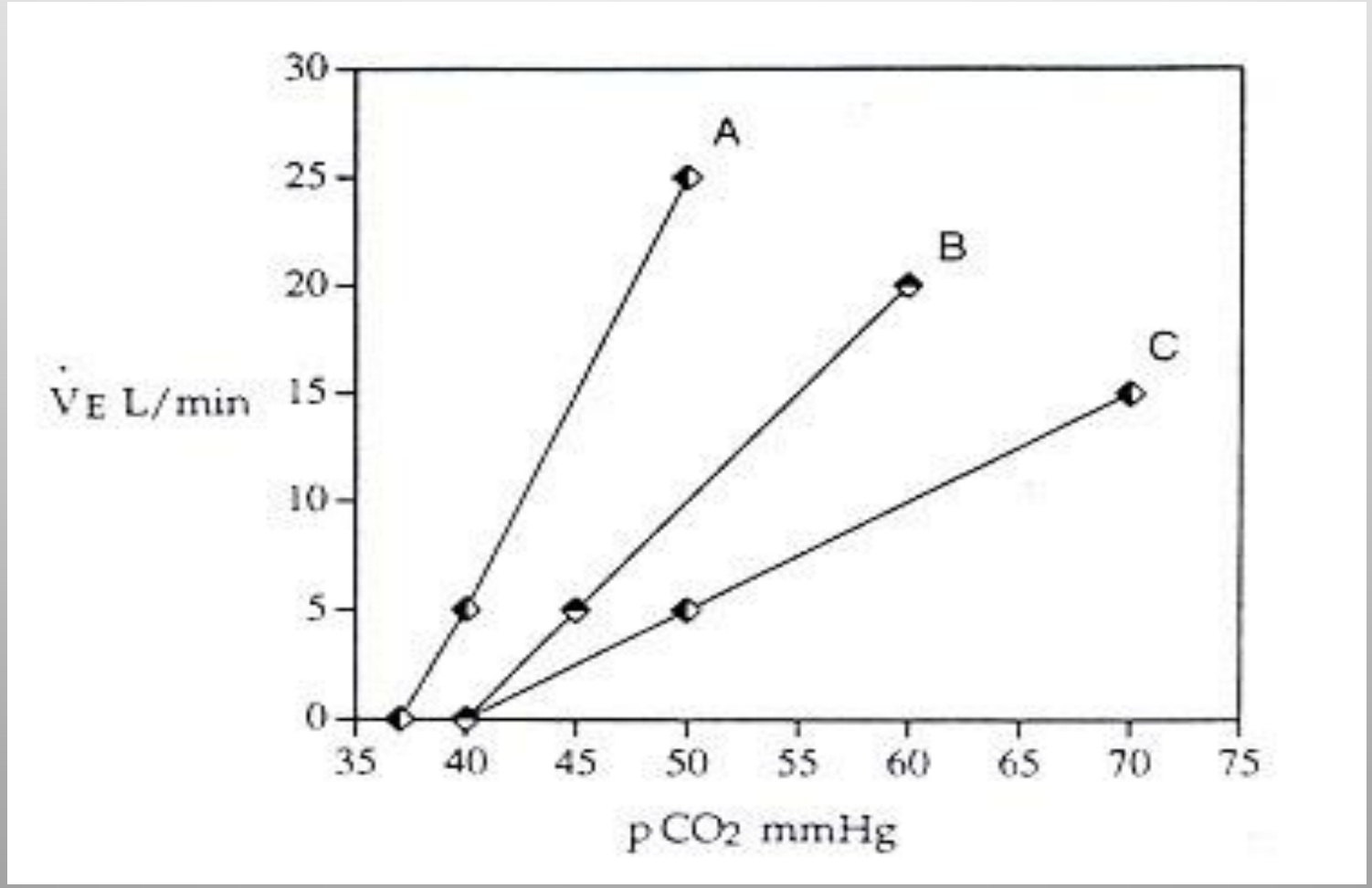
Opioids

- 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



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

- Benzodiapines (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

- Bupivicaine
  - 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