Sedation and Analgesia

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Goals

- Why discuss sedation and analgesia?
- Guidelines
- Definitions
- Levels of sedation
- Pharmacology
- Wrap up
ABP Content Specifications

XXXII Pharmacology

C. Pain Management

- 1. Minimal sedation (anxiolytic)
- 2. Moderate sedation
  - Understand the **definition** of procedural sedation as opposed to deep sedation and general anesthesia
  - Understand what **level of observation and monitoring** is recommended for a patient undergoing procedural sedation
  - Recognize **side effects** and signs and symptoms of an **overdosage** of commonly prescribed sedatives, and **manage appropriately**
  - Understand the **indications and contraindications** for moderate sedation
  - Understand there should be an appropriate interval of **fasting** before moderate sedation
- 3. Sedative analgesia (eg, opioids, nitrous oxide, ketamine)
- 4. Non-pharmacologic techniques (eg, biofeedback, hypnosis, distraction)
Real world application

- Sedation/analgesia may be needed to facilitate:
  - Imaging (CT/MRI)
  - ER procedures (laceration repair)
  - Outpatient procedures (bone marrow biopsy)

- Residents may be called to provide sedation in some of these settings.
What can go wrong?

- Deeper sedation than intended
- Most complications are due to airway/respiratory compromise.
- Majority can be managed by supplemental O2, opening airway, suctioning, bag mask ventilation.
- Occasionally need to intubate/place LMA.
Initial guidelines

- AAPD/ASA guidelines for pediatric sedation
  - First published in 1985 in response to 3 deaths in a single dental office involved with dental sedation.

- Guidelines addressed: informed consent, fasting, vital sign measurements, age appropriate equipment, BLS skills, recovery and discharge criteria

- Three levels of sedation:
  - conscious sedation
  - deep sedation
  - general anesthesia
Later guidelines

- AAP Committee on Drugs:
  - Guidelines for Monitoring and Management of Pediatrics Patients During and After Sedation for Diagnostic and Therapeutic Procedures
  - 1992 statement and 2002 addendum
  - 2006 addendum with AAPD

- ASA Task Force on Sedation and Analgesia by Non-Anesthesiologists:
  - Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists
  - 1995 statement and 2002 updated report
1000+ pediatric specialists in survey. 95 adverse events from both hospital and nonhospital reviewed.

51 deaths, 9 neurologic injury, 21 prolonged hospital stay, 14 no harm

80% of complications during sedation/analgesia are secondary to adverse airway/respiratory events.

Remaining 20%: drug interaction/overdose, inadequate monitoring, inadequate initial health evaluation, lack of independent observer, inadequate management of resuscitation.
2006 study: 30,000 sedations in 26 institutions for procedures outside the OR

- Dedicated sedation team (anesthesiologists, EM physicians, internists/hospitalists)

- No deaths, 1 cardiac arrest, 1 aspiration.

- 1/400 procedures had stridor, laryngospasm, wheezing, apnea

- 1/200 procedures required airway/ventilation intervention
Adequately sedated?
Definitions

- **Sedative**: “to calm” (calming of mental excitement or physiological function)

- **Anxiolytic**: “relieving anxiety”

- **Amnestic**: “causing total or partial loss of memory”

- **Analgesic**: “relieving pain”

- **Anesthetic**: “general or local insensibility, to pain or other sensations, with or without loss of consciousness”
SEDATION LEVELS

- General Description
- Responsiveness
- Airway
- Ventilation
- Cardiovascular
## SEDATION LEVELS

<table>
<thead>
<tr>
<th>Risk of Adverse Event</th>
<th>No Sedation</th>
<th>Minimal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Description</strong></td>
<td>“Anxiolysis”</td>
<td></td>
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<tr>
<td><strong>Responsiveness</strong></td>
<td>“appropriate”</td>
<td></td>
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<tr>
<td><strong>Airway</strong></td>
<td>unaffected</td>
<td></td>
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<tr>
<td><strong>Ventilation</strong></td>
<td>unaffected</td>
<td></td>
</tr>
<tr>
<td><strong>Cardiovascular</strong></td>
<td>unaffected</td>
<td></td>
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</tbody>
</table>
### SEDATION LEVELS

<table>
<thead>
<tr>
<th>Risk of Adverse Event</th>
<th>No Sedation</th>
<th>Mild Sedation</th>
<th>Moderate Sedation</th>
</tr>
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<tbody>
<tr>
<td>General Description</td>
<td>“Anxiolysis”</td>
<td>“Conscious”</td>
<td></td>
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<tr>
<td>Responsiveness</td>
<td>“appropriate”</td>
<td>“Purposeful” to light stimulation</td>
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</tr>
<tr>
<td>Airway</td>
<td>unaffected</td>
<td>No intervention</td>
<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td>unaffected</td>
<td>Adequate</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>unaffected</td>
<td>Maintained</td>
<td></td>
</tr>
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</table>

**Minimal**

**Moderate**
SEDATION LEVELS

<table>
<thead>
<tr>
<th>Risk of Adverse Event</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Deep</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Sedation</td>
<td>“Anxiolysis”</td>
<td>“Conscious”</td>
<td>“Deep sleep”</td>
</tr>
<tr>
<td>Mild Sedation</td>
<td>“appropriate”</td>
<td>“Purposeful” to light stimulation</td>
<td>“Purposeful” to pain stimulation</td>
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<tr>
<td>Moderate Sedation</td>
<td>Unaffected</td>
<td>No intervention</td>
<td>(±) Intervention</td>
</tr>
<tr>
<td>Deep Sedation</td>
<td>Unaffected</td>
<td>Adequate</td>
<td>(±) Inadequate</td>
</tr>
<tr>
<td></td>
<td>Unaffected</td>
<td>Maintained</td>
<td>(±) Maintained</td>
</tr>
</tbody>
</table>
Continuum of Depth of Sedation

- **Minimal Sedation (Anxiolysis)** 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/Analgesia (Conscious Sedation)** 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/Analgesia** a drug-induced depression of consciousness during which patients cannot be easily aroused but respond 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.

- * Reflex withdrawal from a painful stimulus is not considered a purposeful response.
**We’ve Gone Too Far!**

- **General Anesthesia** a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

- Because sedation is a continuum, it is not always possible to predict how an individual patient will respond. Hence, practitioners intending to produce a given level of sedation should be able to rescue patients whose level of sedation becomes deeper than initially intended.

- Individuals administering *Moderate Sedation/Analgesia (Conscious Sedation)* should be able to rescue patients who enter a state of *Deep Sedation/Analgesia*, while those administering *Deep Sedation/Analgesia* should be able to rescue patients who enter a state of general anesthesia.
Levels of Sedation/Analgesia

- **Minimal sedation (Anxiolysis)**
  - (Conscious sedation)
- **Moderate sedation/analgesia**
- **Deep sedation/analgesia**
- **General anesthesia**

<table>
<thead>
<tr>
<th></th>
<th>Response</th>
<th>Airway</th>
<th>CV support</th>
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</thead>
<tbody>
<tr>
<td>Minimal sedation/analgesia</td>
<td>Responds normally to verbal commands</td>
<td>Maintained</td>
<td>Not needed</td>
</tr>
<tr>
<td>Moderate sedation/analgesia</td>
<td>Responds purposefully to verbal commands or light touch</td>
<td>Maintained</td>
<td>Not needed</td>
</tr>
<tr>
<td>Deep sedation/analgesia</td>
<td>Responds to pain</td>
<td>May require support</td>
<td>May be needed</td>
</tr>
<tr>
<td>General anesthesia</td>
<td>No response</td>
<td>Requires support</td>
<td>May be necessary</td>
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</tbody>
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# 15 ASA Recommendations

<table>
<thead>
<tr>
<th>Preprocedure evaluation</th>
<th>Choice of Agents</th>
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<tr>
<td>Patient counseling</td>
<td>Dose Titration</td>
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<tr>
<td>Preprocedure fasting</td>
<td>Use of induction agents</td>
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<tr>
<td>Monitoring</td>
<td>IV access</td>
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<tr>
<td>Personnel</td>
<td>Reversal Agents</td>
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<tr>
<td>Training</td>
<td>Recovery observation / discharge criteria</td>
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<tr>
<td>Emergency Equipment</td>
<td>Special Situations</td>
</tr>
<tr>
<td>Supplemental Oxygen</td>
<td></td>
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</tbody>
</table>
ASA Guidelines

1. Preprocedure evaluation
   - Relevant history (major organ systems, sedation–anesthesia history, medications, allergies, last oral intake)
   - Focused physical examination (to include heart, lungs, airway)
   - Laboratory testing guided by underlying conditions and possible effect on patient management
   - Findings confirmed immediately before sedation

2. Patient counseling
   - Risks, benefits, limitations, and alternatives

3. Preprocedure fasting
   - Elective procedures—sufficient time for gastric emptying
   - Urgent or emergent situations—potential for pulmonary aspiration considered in determining target level of sedation, delay of procedure, protection of trachea by intubation
NPO Guidelines ASA vs AAP

ASA:
2 hrs after clears liquids
4 hrs after breast milk
6 hrs after anything else (formula)

AAP:
Any age 2 hrs after clears
Up to 5 months 4 hrs after milk or solids
6 to 36 months 6 hrs after milk or solids
Over 36 months 8 hrs after milk or solids
ASA Guidelines

4. Monitoring
(Data to be recorded at appropriate intervals before, during, and after procedure)
- Pulse oximetry
- Response to verbal commands when practical
- Pulmonary ventilation (observation, auscultation)
- Exhaled carbon dioxide monitoring considered when patients separated from caregiver
- Blood pressure and heart rate at 5-min intervals unless contraindicated
- Electrocardiograph for patients with significant cardiovascular disease

For deep sedation:
- Response to verbal commands or more profound stimuli unless contraindicated
- Exhaled CO2 monitoring considered for all patients
- Electrocardiograph for all patients
A note on monitoring

- Pulse ox!!!
- Not always required to have cardiac monitoring, but be wary if you are not using it.
ASA Guidelines

5. Personnel
- Designated individual, other than the practitioner performing the procedure, present to monitor the patient throughout the procedure. This individual may assist with minor interruptible tasks once patient is stable.
- For deep sedation: The monitoring individual may not assist with other tasks.

6. Training
- Pharmacology of sedative and analgesic agents
- Pharmacology of available antagonists
- Basic life support skills—present
- Advanced life support skills—within 5 min
- For deep sedation: Advanced life support skills in the procedure room
ASA Guidelines

7. Emergency Equipment
- Suction, appropriately sized airway equipment, means of positive-pressure ventilation, intravenous equipment, pharmacologic antagonists, and basic resuscitative medications
- Defibrillator immediately available for patients with cardiovascular disease
- *For deep sedation:* Defibrillator immediately available for all patients

8. Supplemental Oxygen
- Oxygen delivery equipment available
- Oxygen administered if hypoxemia occurs
- *For deep sedation:* Oxygen administered to all patients unless contraindicated
ASA Guidelines

9. Choice of Agents
- Sedatives to decrease anxiety, promote somnolence
- Analgesics to relieve pain

10. Dose Titration
- Medications given incrementally with sufficient time between doses to assess effects
- Appropriate dose reduction if both sedatives and analgesics used
- Repeat doses of oral medications not recommended

11. Use of anesthetic induction agents (methohexital, propofol)
- Regardless of route of administration and intended level of sedation, patients should receive care consistent with deep sedation, including ability to rescue from unintended general anesthesia

12. Intravenous Access
- Sedatives administered intravenously—maintain intravenous access
- Sedatives administered by other routes—case-by-case decision
- Individual with intravenous skills immediately available
ASA Guidelines

13. Reversal Agents
- Naloxone and flumazenil available whenever opioids or benzodiazepines administered

14. Recovery
- Observation until patients no longer at risk for cardiorespiratory depression
- Appropriate discharge criteria to minimize risk of respiratory or cardiovascular depression after discharge

15. Special Situations
- Severe underlying medical problems—consult with appropriate specialist if possible
- Risk of severe cardiovascular or respiratory compromise or need for complete unresponsiveness to obtain adequate operating conditions—consult anesthesiologist
ASA Discharge criteria

- Alert and oriented / baseline patient. (Car seat forward head rolling risk with peds)
- Stable vitals WNL
- May use scoring systems
- Sufficient time (up to 2 hrs) if reversal agents were used
- Outpatients discharged with responsible adult supervision
- Outpatients and escorts discharged with written instructions regarding diet, meds, activity, phone number.
AAP Discharge criteria

- Cardiovascular function and airway patency satisfactory and stable
- Easily arousable patient with protective reflexes intact
- Patient can talk and sit up unaided (if age appropriate) / baseline for child
- Adequate hydration status.
Pre-op complete

- ABP Content Specs
- Risks of sedation/analgesia
- Continuum of levels of sedation
- Guidelines for providing sedation/analgesia

Start counting backwards from 10…
Pharmacology

- Pharmacokinetics (What the body does to the drug)
  - Study of drug deposition over time
    - Absorption
    - Distribution
    - Metabolism
    - Elimination

- Pharmacodynamics (What the drug does to the body)
  - Relationship between the concentration of drug at the site of action and the physiologic response
Cytochrome P450 system

eg. codeine → morphine → morphine-3-glucuronide → morphine-6-glucuronide

Phase I
- Oxidation
- Hydroxylation
- Hydrolysis
- Reduction

Phase II
- Glucuronidation
- Glycosilation
- Sulphation
- Methylation
- Acetylation
- Glutathione
- Amino Acid
- Fatty acid

Metabolite I

Metabolite II
Managing Pain

- Definition of Pain: “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described terms of such damage”
  - International Association for the Study of Pain, late 1970s

Wong-Baker Scale
Physiology of Pain

- Nociception
- Peripheral $A_\delta$ and $C$ fibers send signals to spinal cord and brainstem which relays information to higher cortical centers
Do children deal with pain same as adults?

- All nerve pathways for conduction of painful stimuli and awareness of pain are formed by 24 weeks of gestation.

- Failure to manage painful stimuli increases pain for future events:
  - Pain in the newborn
  - Postoperative Pain
  - Chronic Pain
Acetaminophen

- Analgesic, antipyretic
- COX 3 inhibition
- 15 mg/kg every 4-6 hr PO, PR
- Onset of action: 30 minutes
- Ceiling effect
- Hepatotoxicity
NSAI Ds

- Ibuprofen
  - 10 mg/kg every 8 hr PO
- Ketorolac
  - 0.5 mg/kg every 6-8 hr for 3-5 days
- COX 1, COX 2 inhibitors
- GI irritation, platelet dysfunction
Opiates

- Activate CNS descending tracts
  - via $\mu_1$ - supraspinal analgesia
  - via $\mu_2$ - respiratory depression, GI effects
  - via $\kappa$ - analgesia, sedation, miosis, dysphoria
  - via $\delta$ - analgesia
- Reversal agent available
- PCA
Opiates

- Codeine
- Morphine
- Fentanyl
- Hydromorphone
- Hydrocodone
- Methadone
- Oxycodone
- Meperidine
**Fentanyl**

- Quick onset: < 1 min
- Duration: 30-45 min
- Considered most hemodynamically stable
- 0.5-1 mcg/kg IV
- 0.5-2 mcg/kg/hr IV
- Useful in BM biopsy, Chest tube placement, Fracture Reduction

- 100x more potent than morphine
- Highly lipophilic
- Liver (glucuronidation), renal excretion
- Rigid chest syndrome
  - At doses above 5 mcg/kg and with rapid titration
Morphine

- Onset: < 5 minutes
- Duration: 3-5 hrs
- 0.1 mg/kg IV
- IV:PO 1:3
- Metabolized by liver to M-6-G (active)

- In newborns and pts with dec GFR, watch for prolonged effect and resp depression
- Histamine release, bronchospasm
Hydromorphone

- Rapid onset
- Duration: 4-6 hrs
- Morphine derivative
- Morphine alternative

- 5-20 mcg/kg IV
- 3-5 mcg/kg hr IV
- Half-life: 3-4 hr
Methadone

- Long half life
- Long duration (days)
- Metabolized to morphine
- Withdrawal

- Useful for postoperative pain, intractable pain
- 0.1 mg/kg every 6-8 hr PO/IV
- Decent oral bioavailability
Levels of Sedation/Analgesia

- Minimal sedation
  - Anxiolysis
  - Conscious sedation

- Moderate sedation/analgesia
  - Responds purposefully to verbal commands
  - Maintenance

- Deep sedation/analgesia
  - Responds to pain
  - May require support

- General anesthesia
  - No response
  - Requires support
  - May be necessary

Response
- Responds normally to verbal commands
- Maintained
- Not needed

Airway
- Maintained
- Not needed
- May be needed

CV support
- Not needed
- May be necessary
Providing minimal sedation

- Minimal sedation (anxiolysis)
  - Peripheral nerve blocks
  - Local / topical anesthesia

- Interferes with impulse conduction of peripheral nerve fibers by inhibiting Na channels

- Lidocaine with or without epinephrine
  - No epinephrine at end arterial sites eg digits
  - Max dose 4.5 mg/kg (7 mg/kg with epi)

- Topical lidocaine/prilocaine cream
  - Apply with occlusive dressing 30-60 min prior to procedure
Providing Moderate Sedation

Are you prepared?

S - Suction
O - Oxygen
A - Airway equipment
P - Pharmacologic agents
M - Monitors
E - Equipment

<table>
<thead>
<tr>
<th>Table 2. Pharmacological agents used for sedation and their adverse events.</th>
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<tbody>
<tr>
<td>Drugs</td>
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<tr>
<td>------------------------</td>
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<tr>
<td>Propofol</td>
</tr>
<tr>
<td>Midazolam</td>
</tr>
<tr>
<td>Fentanyl</td>
</tr>
<tr>
<td>Ketamine</td>
</tr>
<tr>
<td>Chloral hydrate</td>
</tr>
<tr>
<td>Methohexital</td>
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<td>Pentobarbital</td>
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### Table 1: Ramsay Scale With the Response Variable Underlined

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patient awake—<strong>anxious and agitated, restless, or both</strong></td>
</tr>
<tr>
<td>2</td>
<td>Patient awake—<strong>cooperative, oriented, and tranquil</strong></td>
</tr>
<tr>
<td>3</td>
<td>Patient awake—<strong>responds to commands only</strong></td>
</tr>
<tr>
<td>4</td>
<td>Patient asleep—<strong>brisk</strong> response to light glabellar tap or loud auditory stimulus</td>
</tr>
<tr>
<td>5</td>
<td>Patient asleep—<strong>sluggish</strong> response to light glabellar tap or loud auditory stimulus</td>
</tr>
<tr>
<td>6</td>
<td>Patient asleep—<strong>no</strong> response to light glabellar tap or loud auditory stimulus</td>
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</table>
Sedatives

- Benzodiazepines
- Barbiturates
- Chloral Hydrate
- Propofol
- Ketamine
- $\alpha$-2 Agonists
Benzodiazepines

- Amnesia
- Anticonvulsant
- Sedative
- Hypnotic
- Skeletal muscle relaxant
- Augments GABA (brain) and glycine (brain stem and spinal cord) transmission

- Reduce cerebral metabolism and blood flow
- Combined with narcotics, respiratory depression and/or hemodynamic instability can occur
- Antagonist (flumazenil)
- Withdrawal after prolonged infusion
Benzodiazepines

- **Midazolam (Versed)**
  - Ultra short acting, potent sedative, anxiolytic and amnestic
  - NO analgesia
  - 0.05 mg/kg 1-2 hrs, IV, IM
  - Can be given PO, rectally or intranasally at higher doses
  - 0.5 mg/kg PO 20-30 minutes prior to procedure
  - CYT p450 metabolism in liver

- **Lorazepam (Ativan)**
  - 0.05-0.1 mg/kg q 4-6 hrs, IV, IM, PO
  - 0.05 mg/kg/hr, titrate to effect
Opiates + Benzodiazepines

Probably why the combination of opiates and benzodiazepines is used so frequently in critical care
Barbiturates

- GABA agonists, CNS depressant, provides sedation without analgesia
- Historically used pentobarbital, thiopental and secobarbital
- Pentobarbital has been used as premed for cardiac catheterization
  - IV onset 3-5 minutes, duration 30-60 minutes

- Significant disadvantages – Not much used anymore
  - Respiratory depression
  - Hypotension
  - Bronchospasm, pruritus due to histamine release
  - Can enhance pain perception
  - No reversal agent
Chloral Hydrate

- Hypnotic, Sedation, Anxiolysis, NO analgesia
- PO, PR administration
- 50-100 mg/kg
- Onset 15-30 minutes, can last up to 12 hours → longer monitoring!
- Useful in children less than 3 yrs for noninvasive procedures
- Disadvantages
  - Alcohol
  - No reversal agent
Ketamine

- Dissociative anesthetic - blocks association pathways, sometimes inducing dreamlike states of mind and hallucinations before it produces a sensory blockade.

- Ketamine produces both analgesia and sedation at moderate doses, while usually maintaining airway tone.

- Useful in Laceration repairs, Central line placement.

- Sympathomimetic effects → increase heart rate and blood pressure, secretions. Consider atropine or glycopyrrolate prior to ketamine administration.

- Emergence hallucinations: Midazolam can be administered in conjunction with ketamine to minimize severity.
Propofol

- Soy, Glycerol, Egg
- “Milk of Amnesia”
- Rapid onset and recovery
- $\text{GABA}_A$ receptor potentiates CNS inhibition

- Sedative, NOT analgesic
- 1-2 mg/kg IV push
- 1 mg/kg/hr or 50-150 mcg/kg/min
- Painful on IV injection
  - Can use lidocaine/ketamine
- Risk of bacterial contamination
Propofol

- Disadvantages
  - Respiratory depression
  - Hypotension (negative inotrope, potent vasodilator)
  - “Propofol Infusion Syndrome”
    - Fatal lactic acidosis
    - Use > 6 hours not recommended
α-2 Agonists

- Clonidine
- Dexmedetomidine
- Antihypertensive
- Sedative & Analgesia
Clonidine

- Binds $\alpha-2: \alpha-1$ receptors 200:1
- Acts on $\alpha-2$ receptors in locus ceruleus
- Prevents presynaptic release of NE
- Routes: PO, IV, SQ, PR, TD, IN (good bioavailability)
- Long half-life: 12-24hrs
Dexmedetomidine

- Binds $\alpha-2: \alpha-1$ receptors 1600:1
- Affects vasomotor center of medulla → Increases sympathetic tone
- Also acts on $\alpha-2$ receptors in locus ceruleus → Stimulating parasympathetic while decreasing sympathetic outflow
- Half-life: 1.5-3 hrs
- Approved in adults, not in children
- 1-2 mcg/kg slow load over 10 minutes
- Infusion runs 0.2-1 mcg/kg/hr
- Adverse effects include hypotension, bradycardia, hypertension
- Useful for MRI and other noninvasive procedures
**Neuromuscular Blockade**

- **Muscle relaxants**
  - **Depolarizing** (mimics action of acetylcholine)
    - Succinylcholine
  - **Nondepolarizing** (competitively blocks actions of acetylcholine)
    - Mivacurium
    - Vecuronium
    - Atracurium & cis-atracurium
    - Pancuronium
    - Rocuronium

- *NEVER muscle relax a patient without assuring adequate sedation/analgesia beforehand.*

- *ALWAYS confirm the patient is easily hand-bag-ventilated prior to paralyzing*
Final Thoughts

- Remember this:
  - Conscious sedation = moderate sedation/analgesia
  - Falls on a continuum from mild sedation to general anesthesia.
  - Must be prepared to rescue patient from deeper levels of sedation.
  - Be aware of NPO times and monitoring options.
  - Medication choices are dictated by the clinical situation.
References


References


- Poss WB. Analgesia and Sedation and the use of Neuromuscular Blocking Agents. SCCM Pediatric Multiprofessional Critical Care Review, 2008, ed. Shanley T.

- Olson, DaiWai BSN, RN; Thoyre, Suzanne PhD, RN; Auyong, David Perspectives on Sedation Assessment in Critical Care. AACN Advanced Critical Care. 18(4):380-395, October/December 2007.


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