Sedation Outside the Operating Rooms

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Educational Objectives

• Understand terminology, risks, and benefits of sedation
• Understand appropriate equipment, personnel, training, and documentation
• Be able to identify appropriate and inappropriate drugs and drug uses
• Be able to describe rescue procedures and recovery guidelines
Background Information

• Sedation is serious business:
• Patients expect or demand it for even minor procedures
• Patients further may expect absence of recall for even minor procedures
• Risks are involved
  – Deaths have occurred, especially in children
  – In New Jersey, 55 were reported in the 1990s, 18 from MRI procedures: led to legislation
# Definitions and Terminology

<table>
<thead>
<tr>
<th></th>
<th><strong>Minimal Sedation</strong></th>
<th><strong>Moderate Sedation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Responsiveness</strong></td>
<td>NI response to verbal stim.</td>
<td>Purposeful response</td>
</tr>
<tr>
<td><strong>Airway</strong></td>
<td>Unaffected</td>
<td>No intervention required</td>
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<tr>
<td><strong>Spontaneous Ventilation</strong></td>
<td>Unaffected</td>
<td>Adequate</td>
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<tr>
<td><strong>Cardiovascular Function</strong></td>
<td>Unaffected</td>
<td>Usually maintained</td>
</tr>
<tr>
<td>Definitions and Terminology</td>
<td>Deep Sedation</td>
<td>General Anesthesia</td>
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<td><strong>Responsiveness</strong></td>
<td>Purposeful after stimulation</td>
<td>Unarousable</td>
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<tr>
<td><strong>Airway</strong></td>
<td>Intervention may be required</td>
<td>Intervention often required</td>
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<tr>
<td><strong>Spontaneous Ventilation</strong></td>
<td>May be inadequate</td>
<td>Frequently inadequate</td>
</tr>
<tr>
<td><strong>Cardiovascular Function</strong></td>
<td>Usually maintained</td>
<td>May be impaired</td>
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</table>
Definitions and Terminology

• Reflex withdrawal from a painful stimulus is NOT a purposeful response
• Sedation is a continuum, hence practitioners seeking to provide any given depth of sedation must be qualified to rescue patients from at least one level deeper than the intended one
Note that the term “conscious sedation” is now discouraged in favor of “moderate sedation”
Indications and Contraindications

• There is *no standard list of procedures* for which sedation is indicated or contraindicated

• Common indications include dental procedures (overused by some dentists – source of New Jersey legislation), bronchoscopy, TEE, cardiac catheterization and interventions, GI endoscopy (upper and lower), and minor surgical procedures
Patients who may NOT be good candidates include

- Morbid obesity
- Sleep apnea
- Symptomatic gastro-esophageal reflux disease (probably OK if symptoms well controlled by medications)
- Pregnancy

- Neonates and infants
- Very elderly patients, but it’s a judgement call
- Advanced lung disease
- Advanced cardiac disease
- Severe liver or kidney disease
Pre-procedure Patient Assessment

• History and Physical Exam required by JCAHO if done in a hospital
• Requirements less rigorous or nonexistent in doctor’s office environments, but this has been a source of controversy because of serious adverse events
• Look for red flags (previous slide), seek consultation or clinical assistance from anesthesiology if red flags are present
Informed Consent Needed?

• JCAHO requires that *risks and options* be discussed with patients prior to sedation

• This doesn’t necessarily require a *separate consent form*, but many hospitals do require this

• Among other things, a consent form reminds patients that *sedation isn’t a trivial matter*
Informed Consent Common Error

- Patients want to “remember nothing”
- Success in achieving amnesia using midazolam has been such that many patients believe they had general anesthesia when all they had was moderate sedation
- Physicians and nurses like to please patients
- BUT PRACTITIONERS SHOULD NOT GUARANTEE AMNESIA DURING MODERATE OR EVEN DEEP SEDATION. Tell them it often does happen, but isn’t guaranteed.
Role of Anesthesiology Department

- JCAHO requires that Anesthesiology oversee local sedation policies
- *Political hot potato*:
  - Anesthesiology departments lack personnel to oversee all sedation, and often they can’t charge and collect $$ for it
  - Non-anesthesiologist physicians often view anesthesiology involvement as intrusive
Pre-op Sedation-specific History

• Familiarity with sedation-oriented aspects of Pt’s medical history:
• Aware of Pt’s previous sedation/analgesia experiences
• Drug allergies, current medications, potential drug interactions
• NPO status
• Tobacco, alcohol, substance abuse Hx
# Fasting Guidelines (from ASA)

<table>
<thead>
<tr>
<th>Ingested Material</th>
<th>Minimum Fasting Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear liquids</td>
<td>2 hrs</td>
</tr>
<tr>
<td>Breast milk</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Infant formula</td>
<td>6 hrs</td>
</tr>
<tr>
<td>Nonhuman milk</td>
<td>6 hrs</td>
</tr>
<tr>
<td>Light meal</td>
<td>6 hrs</td>
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Personnel Administering Sedation

• Need an individual other than the person performing the procedure itself
• This person’s primary responsibility is the administration and documentation of sedation (brief interruptions OK for moderate sedation)
• During deep sedation, this person should have NO other responsibilities
Training and Credentialing

• Not limited to physicians: CRNAs, CRNPs, PAs, and RNs can do it under the supervision of a physician

• Specific education and training in the pharmacology and airway management rescue maneuvers is optimal

• JCAHO typically accepts ACLS certification plus a (local) sedation teaching module as adequate credentialing for moderate sedation
Facility Requirements

- ECG
- Noninvasive BP
- Oxygen
- Ambu bag and airway adjunct equipment
- Equipment for tracheal intubation (Crash box typically)
- Suction
- Defibrillator
- IV equipment and solutions (IV typically required)
- Syringes, needles, etc.
- Emergency drugs
Typical Airway Equipment

- O₂, suction, nasal cannula, face masks, self-reinflating PPV apparatus (Ambu)
- Yankauer-type suction
- Oral and nasal airways, lubricant
- LMAs
- Laryngoscopes
- Endotracheal tubes and stylets
Typical Emergency Drugs

- Epinephrine
- Ephedrine
- Vasopressin
- Atropine
- Nitroglycerin
- Amiodarone
- Lidocaine
- 50% glucose
- Diphenhydramine
- IV glucocorticoid
- Midazolam or diazepam
- Naloxone
- Flumazenil
Patient Monitoring for Sedation

Moderate Sedation

- Level of consciousness
- Observation of ventilation
- Pulse oximetry
- ECG recommended
- Noninvasive BP, pulse
- VS q 5 min

Deep Sedation adds

- Consideration of capnography (via nasal cannula or face mask) and apnea monitoring
- ECG required
Supplemental Oxygen

- Available for moderate sedation and administered if hypoxemia occurs
- Often used routinely for moderate sedation
- Routinely administered for deep sedation
- Supplemental oxygen is good and bad:
  - **Good** because it reduces the chance for hypoxemia
  - **Bad** because it may increase the time to detect apnea if pulse oximetry is the only respiratory monitor (Pulse Ox. does NOT detect hypercapnia or apnea)
Patient Monitoring for Sedation

Alarms and audible signals

- Audible alarms desirable for ECG, BP, pulse oximeter
- Audible pitch-variable pulse oximetry signal is desirable
Documentation During Procedure

• Vital signs generally q 5 minutes
• Drug administration
• Other monitors used (pulse ox, ECG)
• Patient responsiveness (Ramsay Score sometimes used)
• Standardized form across all sedation sites is helpful (JCAHO likes this)
Ramsay Sedation Score
(others exist)

1. Patient anxious, agitated, or restless
2. Patient oriented but cooperative or tranquil
3. Patient responds to command only
   Patient does not respond to command, but in response to a brisk tap on the glabella he or she has a
Drugs - 1

• Benzodiazepines
  – Midazolam is king: (relatively) fast onset, titratability, intermediate duration (10-30 min)
  – Incremental doses: 0.5-1 mg most often

• Opioids
  – Morphine, meperidine, and fentanyl most often used
  – Fentanyl offers advantages of faster onset and offset, titrated in increments of 25-50 mcg
OPIOIDS (cont)

- Meperidine is the one with the highest incidence of nausea and vomiting in many reports.
- Remifentanil can be used also as a continuous infusion, but ideally left to one who practices anesthesia (CRNA, anesthesiologist).
Opioid/Benzodiazepine Interaction

- RESPIRATORY DEPRESSION: The total may exceed the sum of the parts
- If you can get away with midazolam plus excellent local anesthesia, it’s a good thing
  - Less nausea
  - Less airway obstruction and apnea
  - Better post-procedure analgesia
  - Often: faster recovery
Drugs – 3
What about propofol?

GOOD NEWS
• Titratable
• Fast on and off
• Potent amnestic agent
• Good antinauseant

BAD NEWS
• Potent respiratory depressant
• Potent circulatory depressant
• Painful on injection
• Fast onset (apnea can sneak up on you)
ASA Recommendations on Propofol for sedation (assuming Pt is not intubated)

- Involvement of an anesthesiologist is optimal
- Responsible physician should have rescue skills consistent with general anesthesia (mask positive pressure ventilation, airway devices, intubation, vasopressors)
- Practitioner monitoring the Pt should be present throughout and completely dedicated to this task
Propofol Package Insert
Says

“should be administered only by persons trained in the administration of general anesthesia and not involved in the conduct of the surgical/diagnostic procedure.”
Pediatric Considerations

• Very specialized area
• Different drugs and/or different routes (p.o often used)
• Low margin for error: leave it to an expert
• Legal system has a low tolerance for errors in kids
• Adult sedation clinical credentialing and privileges should be separate and distinct from pediatric sedation credentialing and privileging
Rescue drugs

- Key players are naloxone and flumazenil

- **Naloxone** first (typically 0.1 mg increments) if an opioid has been given and apnea or problematic respiratory depression (severe obstruction, low respiratory rate, decreasing SPO$_2$) develops

- **Flumazenil** (typically 0.2 mg increments) if isolated oversedation with a benzodiazepine occurs or if naloxone does not suffice and a benzo has been given
If you give a rescue drug

• Always be concerned about resedation after the rescue drug wears off
• Hence, minimum period for patient discharge after receiving naloxone or flumazenil is probably \textbf{2 hours}
Recovery Phase

- Dedicated area with dedicated personnel
- Rapid physician access
- VS / sedation level documentation
- Usual PACU equipment (Crash cart, ECG, NIBP, Pulse oximeter, suction, $O_2$)
- Standard discharge criteria (awake, stable, etc.)
- Pt needs an escort home and cannot drive
Organizing a Sedation Service

Some creative models have been used:

- Anesthesia department oversees most or all sedation directly or indirectly
  - Trains and credentials sedation nurses
  - Supervises sedation nurses with CRNAs or anesthesiologists typically in a high supervisory ratio
  - Anesthesiologist or CRNA remains in close physical proximity
  - Anesthesiologist or CRNA administers sedation in higher risk cases
Conclusions

• Sedation is a continuum
• Sedation has important hazards and requires careful education of practitioners, administration guidelines, and documentation standards
• Anesthesiologists can and should help as either consultants or providers of sedation
Principal Reference Sources

• Practice Guidelines for Sedation and Analgesia by Non-anesthesiologists, Anesthesiology 2002;96:1004-1017

• American Society of Anesthesiologists Statements on
  – Granting privileges for moderate sedation
  – Safe use of propofol
  – (can be found at www.asahq.org: clinical information: standards, guidelines, and statements)