Sedation

Dr Andy Tatman
Consultant Paediatric Anaesthetist
What is sedation?

Minimal sedation:
A drug-induced state during which patients are awake and calm, and respond normally to verbal commands.

Moderate sedation:
Drug-induced depression of consciousness during which patients are sleepy but respond purposefully to verbal commands.

Conscious sedation:
Drug-induced depression of consciousness, similar to moderate sedation, except that verbal contact is always maintained with the patient.
Deep sedation

Drug-induced depression of consciousness during which patients are asleep and cannot be easily roused but do respond purposefully to repeated or painful stimulation.

Deep sedation

Anaesthesia
How common is sedation?
How common is paediatric sedation?

Who is using sedation?

Pediatric Sedation Research Consortium

38 hospitals
Self selected
Well organized sedation services
131,752 sedation episodes

Pediatric Sedation Research Consortium

- Radiology: 62%
- haem / onc: 11%
- Others: 11%
- Bronchoscopy: 1%
- Endoscopy: 7%
- Minor surgery: 8%
How safe is sedation?
Scoping our practice

2002-2003
136,000 endoscopies
1818 deaths
55% under sedation
Frail, elderly population
Adverse Sedation Events in Pediatrics

- 1969 to 1996
- 90 adverse events
- 51 deaths

What are the recurring issues

- Failure to assess patient properly
- Drug issues
- Failure to monitor patient
- Inadequate resuscitation
- Failure to ensure adequate recovery
- Discharged home too early
Nurse led sedation for paediatric MRI

- Over 6000 episodes
- Chloral hydrate +/- IV midazolam
- No serious adverse events
- 5% failure rate
- Success put down to:
  - Deselection of unsuitable patients
  - Limited range of dose limited drugs
  - Training of nursing staff

Deep sedation for MRI

7839 sedation for MRI

- Pentobarbital
- Propofol infusion
- Pentobarbital + supplement/propofol

3% propofol group intubated

Pediatric Sedation using Propofol

49836 propofol sedations outside OR

• Anaesthetists 10%
• ED physicians 36%
• Intensivists 49%
  • No deaths
  • 2 cardiac arrests
  • 432 airway obstruction
  • 716 desaturation <90% for > 30 s

Procedural sedation emergency department

2297 IV sedation episodes

- Ketamine
- Ketamine / Midazolam
- Midazolam
- Fentanyl / Midazolam

- 19% ‘reminder to breathe’
- 1% positive pressure ventilation

Ketamine in the emergency department

ED physicians
4252 children

108 respiratory adverse events
34 (0.9%) serious adverse events
  - CPAP
  - Positive pressure ventilation
  - Intubation

Pediatric Sedation Research Consortium

122 major adverse events

- Cardiac arrest: 4%
- Emergency anesthesia consult: 9%
- Aspiration: 5%
- Unplanned admission: 82%
How safe is sedation?

Traditional sedative drugs

- V low adverse event rate
- 5-10% failure rate

Anaesthetic drugs

- V low failure rate
- 1-3% advanced airway intervention
Sedation guidelines
Sedation in children and young people

Sedation for diagnostic and therapeutic procedures in children and young people

Issued: December 2010

NICE clinical guideline 112
guidance.nice.org.uk/cg112
NICE guidelines
Preparation for sedation
During sedation
After sedation
Personnel and training
Preparation for sedation

Assessment of suitability
Consideration of alternatives
Starvation times
Informed consent
Choice of sedation technique
During sedation

Environment

Staffing

Physiological monitoring

Record keeping
After sedation

Observation until recovered

Discharge criteria

Alternatives if sedation fails
Personnel and training

Theoretical training
Practical training
  Sedation episode
  Equipment
  Resuscitation
Record keeping
Audit
Implementation of a local sedation policy
What is sedation used for?

Painless imaging
  MRI / CT
  Echocardiography
  Electroencephalography

Procedural sedation
  Burns dressings
  Renal biopsies
  Emergency department
  Lumbar puncture
  Hernia reduction
Identified areas of risk

Transfers
  Inadequate monitoring
  Inexperienced staff

Inappropriate sedation
  No assessment
  Unaware of contraindications to sedation
Implementation of guidelines

NICE guidelines
Sedation ‘Policy’ not guidelines
Theoretical training

Sedation champions
Inpatient sedation

Educate junior medical staff
Educate nursing staff
Resuscitation training
Audit
Day stay sedation

Nurse led sedation

Non medical prescribers
IV cannulation training
Resuscitation training
Consent training
Escalation protocol
Sedation Quick Start Guide

Levels of Sedation

Light/moderate sedation: Responds to voice or light touch i.e. the patient is conscious. Maintains protective reflexes and maintains a patent airway without assistance.

Deep sedation: Only responds to repeated stimulation. May lose protective reflexes and ability to maintain the airway, although this is not usual.

Sedation score
0 - Awake / Alert
1 - Takes/responds appropriately
2 - Reverses to light stimulus
3 - Reverses to painful stimulus
4 - Unresponsive

Equipment & Monitoring

Must be immediately available:
- Oxygen
- Suction
- Self-inflating bag, valve, mask
- Guided airways
- Equipment to establish IV access
- Standard B&H crash cart
- System to summon help

In all patients, monitor sedation level, respiration, heart rate, pain, coping and discomfort.

During deep sedation the patient must be continuously monitored with a pulse oximeter that has an audible tone and alarms.

For light/moderate sedation where there is no loss of verbal contact with the patient, pulse oximetry should normally be used.

Patient Selection & Assessment

Mild URTI are common in children. Symptoms of significant active infection include cough, fever, lack of appetite and persistent nasal discharge.

ASA grade 3 means severe systemic disease that limits activity but is not incapacitating.

Assess the following symptoms/conditions – see full policy for specific guidance:

1. Respiratory diseases
   - All sedative drugs can produce respiratory depression
   - Assess for abnormality
2. Cardiovascular conditions
3. Nephrotoxic liver disease
4. Neurology/Neurosurgical disorders
5. Severe behavioral problems
6. Renal disease
7. Gastro-intestinal conditions
8. Haematology conditions

Drug Interactions & History

Drugs with sedative properties (opioids, benzodiazepines etc.) – risk of over sedation
Previous sedation history
Allergies

Fasting

Before deep sedation the Trust’s fasting policy for general anaesthesia should be followed.

Before light/moderate sedation the patient does not need to be fasted.

Guideline on Calling for Help

- Significant staff concern for any reason
- Oxygen saturation of less than 96% (or fall of greater than 2% from baseline in cyanotic congenital heart disease) not immediately responsive to simple airway manoeuvres
- Airway obstruction not immediately responsive to simple airway manoeuvres
- Full level of sedation is responsive only to painful for light sedation or to unresponsive for deep sedation
- Change in respiratory rate of more than 6 breaths per minute from baseline
- Heart rate of less than 60 or more than 160 beats per minute

Call for help either from a skilled senior clinician within the department where the sedation is being performed, or by using the 2222 system to call the anaesthetic and RCU Spillon call the hospital cardiac arrest team.
**Sedation Record**

| Date: ............... Location ............... | Addressograph label |
| Weight: ............... kg | Name: |
| Age: years months | Date of birth: |
| Hospital Number: |

**Specific questions: (if yes, seek specialist advice):**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA grade 3 or above</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Infant or neonate</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Severe gastro-oesophageal reflux</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Oxygen dependent</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Cyanotic heart disease</td>
<td>Yes / No</td>
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<tr>
<td>Raised intracranial pressure</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Additional advice sought</td>
<td>Yes / No</td>
</tr>
</tbody>
</table>

**Nature of advice**

| Name of person giving advice |

**If not suitable for sedation, has the patient’s consultant been informed?** Yes / No

| Name of consultant: |

| Name of staff identified to monitor child: |

**Signed:**

| Position: | Date: |
Role for anaesthesia?

Unsuitable for sedation
Sedation fails
Rescue
Education
Support
Conclusion

Increasing demand for sedation services
NICE Guidelines
Sedation policy
Resources
Close anaesthetic links