Sedation in Pediatric Patients

Santhanam Suresh and Steven C. Hall

Children's Memorial Hospital, Northwestern University, Chicago, IL, USA

Abstract. Sedation is being used increasingly in children to allay anxiety and discomfort. Sedation can also increase the efficiency of performing both diagnostic and therapeutic procedures in children. There are a wide array of available sedation methods that are used by radiologists, gastroenterologists, hematologists/oncologists and emergency room physicians everyday. Indiscriminate use of sedatives has led to seizures, respiratory arrests and death in a variety of practice settings. With improved monitoring capability, more potent drugs and better understanding of the pharmacokinetics in children, it is possible to provide better care.

Key Words : Sedation; Monitors; Pharmacology of sedatives

Sedation is being used increasingly in children to allay anxiety and discomfort and increase co-operation and efficiency of performing diagnostic procedures in children. Sedation is commonly used by dentists, gastroenterologists, hematologists/oncologist and radiologists for invasive procedures as well as for non-invasive procedures that require patient cooperation (Table 1). There are a wide array of available sedation measures that are in use for various procedures. In 1992, the American Academy of Pediatrics published guidelines for the safe administration of sedation to children. These guidelines were influenced by the decrease in perioperative complications that followed adoption of routine monitoring guidelines in the anesthesia community. Indiscriminate use of sedatives had led to seizures, respiratory arrests, and death in a variety of practice settings. The sedation guidelines were developed to achieve the same goal of safe care for children in a non-operating room setting that is routinely used intraoperatively.

Definitions : Conscious vs Deep sedation

(1) Conscious sedation : A medically controlled state of depressed consciousness that (1) allows protective reflexes to be maintained, (2) retains the patient’s ability to maintain a patent airway independently and continuously and (3) permits appropriate response by the patient to physical stimulation or verbal command, e.g., “open your eyes.”

(2) Deep Sedation : A medically controlled state of depressed consciousness or unconsciousness from which the patient is not table 1. Sedation Outside the Operating Room

<table>
<thead>
<tr>
<th>Procedure</th>
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<tbody>
<tr>
<td>1. Emergency room : suturing lacerations</td>
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<td>2. Radiology : MRI; CT scan; angiography</td>
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<td>3. Gastroenterology : endoscopy</td>
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<td>4. Hematology/oncology : diagnostic procedures; therapeutic procedures</td>
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<td>5. Audiology : evoked potentials</td>
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Reprint requests: Dr. Santhanam Suresh, Attending Anesthesiologist, Children's Memorial Hospital, 2300 Children's Plaza, Chicago, IL 60614, USA.
TABLE 2. Presedation Protocol

1. Candidates for sedation: Eligibility criteria
2. Presedation physical examination: Medical problems identified
3. Risks & benefits of sedation: Informed consent?
4. NPO Guidelines:
   - 4 hrs for infants < 6 months for formula
   - 6 hrs for infants over 6 months for formula
   - 2 hrs for clear liquid at any age

Presedation Protocol

It is important to select the right candidates for sedation and evaluate the patient prior to instituting any sort of sedation protocol (Table 2). It is also the responsibility of the individual who is providing sedation to evaluate the patient thoroughly prior to administration of any drugs. A detailed history and physical examination, along with previous history of sedation gives important clues to management of the current sedation regimen. Careful selection of NPO guidelines as recommended by anesthesiologists provides reasonable precautions for the administration of sedatives. This decreases the potential problems of aspiration in the event of "over sedation" and the loss of protective reflexes. One of the controversial areas is providing sedation for the patient who has undergone trauma and requires a contrast study, CT scan, or suture of a laceration. The risk benefit-ratio has to be weighed prior to sedating the patient. Due to pain and anxiety, gastric emptying time could be increased with the resultant risk for aspiration. Two reasonable options would be (a) to wait for several hours, if possible, or; (b) to proceed with general anesthesia, with an endotracheal tube, as an emergent procedure.

Table 2a. Equipment necessary prior to administering sedatives

1. Positive pressure oxygen delivery system capable of delivering > 90% oxygen
2. Appropriate sizes masks and oral airways
3. Suction apparatus with catheters
4. Monitors
   - (i) Oxygenation: Pulse oximetry
   - (ii) Blood pressure
   - (iii) Heart rate (Pulse oximetry or Electrocardiogram)
   - (iv) Temperature (thermometer)
5. Emergency resuscitation cart or kit

Equipment

The American Academy of Pediatrics has suggested guidelines for monitoring of the sedated patient. These are guidelines based on the experience of several members including pediatricians and anesthesiologists. There are minimum equipment requirements for sedated patients. (Table 2a).