



## Pediatric Sedation for Office-Based Procedures

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Ophthalmologists are performing an increasing number of diagnostic and therapeutic procedures in office settings. While most of these are done under local anesthesia, some require sedation and analgesia both in order to accomplish the procedure and to ensure the comfort of the patient. There are important safety concerns when care traditionally rendered by anesthesiologists or CRNAs in hospitals with back-up emergency staff and equipment is provided by non-anesthesia personnel in offices. Using administration of chloral hydrate (CH) to pediatric patients as an example, this article will address some of the risks of office-based sedation and offer recommendations for reducing them.

**Q** The practice I joined administers chloral hydrate to pediatric patients in order to conduct examinations. Is CH considered safe?

**A** While CH is widely used “off label” for the sedation of infants and toddlers and has a reputation as a safe medication with minimal effects on respiration, an analysis of adverse pediatric sedation incidents found that 13 out of 60 cases resulting in death or permanent neurologic injury involved the use of chloral hydrate alone or in combination with other medications.<sup>1</sup> Factors contributing to the outcomes included overdosage, administration at home, administration by non-medically trained personnel (technicians), and premature discharge from medical observation. Unlike some opioid medications used for sedation, CH has no known reversal

agent, and a very long half-life in children (27.8 +/- 21.3 hours in newborns, 9.7 +/- 1.7 hours in toddlers). Without the stimulation of the examination, the sedating effect returned; children suffered respiratory compromise that went unnoticed by the parent, often during the car ride home.

**Q** Could the deeper level of sedation be prevented by giving the correct dose?

**A** Not necessarily, since some of the children who were injured had received the appropriate amount. As the American Society of Anesthesiologists’ “Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists” warns, sedation is a continuum. Four levels have been identified, based upon responsiveness, the airway, spontaneous ventilation, and cardiovascular function: minimal sedation (anxiolysis), moderate (formerly known as “conscious sedation”), deep sedation, and general anesthesia.<sup>2</sup> The Guidelines clarify that since it is not always possible to predict how an individual patient will respond, practitioners intending to produce a given level of sedation should be able to rescue patients whose level of sedation becomes deeper and causes hypoventilation, apnea, airway obstruction, or cardiopulmonary impairment.<sup>3</sup> Proper monitoring can detect these problems, but the training and expertise needed to recognize these complications and rescue the patient from them are usually not part of the skill set of most ophthalmic personnel. Accordingly, CH is usually administered only in the hospital setting. Increasingly, it is being replaced by reversible IV agents that also provide better pain relief.

**Q** What measures should I take to protect children receiving sedation?

**A** Ask the anesthesiology department of your local hospital to help you devise an office-based sedation protocol that addresses drug and patient selection criteria, dosing regimen based upon the child’s weight, NPO (nothing by mouth) guidelines, monitoring and discharge criteria, and rescue practices and equipment (see also the ASA and AAP guidelines referenced in the footnotes below). The order for the medication should include the child’s weight, the mg/kg dose, and the total dose to be administered. Never allow pre-procedure administration at home. After the procedure, observe the child in a quiet monitored area, even if he or she seems to be completely awake immediately after completion. This is especially important when using medications with long half-lives (chloral hydrate, promazine, promethazine, chlorpromazine, phenobarbital).<sup>1</sup> Use only qualified personnel whose training and competency include cardiopulmonary assessment, airway management, and resuscitation to monitor the child during and after the procedure and to determine if the child meets discharge criteria. Provide oral and written discharge instructions for the adult accompanying the child home that address expected behavior, eating, warning signs of complications, special instructions in case of an emergency, and how and when to contact you.<sup>2, 3</sup>

1. Cote, Charles J et al. “Adverse Sedation Events in Pediatrics: Analysis of Medications Used for Sedation.” *Pediatrics* 2000; 106; 633-644.
2. American Society of Anesthesiologists. “Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists,” approved 17 October 2001, available online at [www.asahq.org/publications/AndServices/sedation1017.pdf](http://www.asahq.org/publications/AndServices/sedation1017.pdf). See also the ASA “Sedation Model Policy” at [www.asahq.org/clinical/toolkit/sedmodelfinal.htm](http://www.asahq.org/clinical/toolkit/sedmodelfinal.htm).
3. American Academy of Pediatrics, Committee on Drugs. “Guidelines for Monitoring and Management of Pediatric Patients During and After Sedation for Diagnostic and Therapeutic Procedures.” *Pediatrics*, v. 89, n. 6, June 1992. See also American Academy of Pediatrics, Committee on Drugs, “Guidelines for Monitoring and Management of Pediatric Patients During and After Sedation for Diagnostic and Therapeutic Procedures: Addendum.” *Pediatrics*, v. 110, n. 4, October 2002.