

## **Dexmedetomidine for sedation during MRI/CT imaging in children**

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**Introduction:** In infants and children, sedation is frequently required during radiologic imaging studies including computed tomography and magnetic resonance imaging. Commonly used regimens include chloral hydrate, benzodiazepines, or barbiturates, either alone or in combination. Such regimens have been associated with sedation failures and adverse effects including respiratory depression. Sedation failures are particularly bothersome since rescheduling at another time using general anesthesia can be inconvenient and costly. Dexmedetomidine is an alpha-2 adrenergic agonist that is currently FDA approved for sedation for 24 hours in adults during mechanical ventilation. However, given its sedative properties with minimal effects on respiratory function, it may be a safe and effective agent for procedural sedation. The current report outlines our preliminary experience with dexmedetomidine as rescue sedation when other agents were ineffective or as the primary agent for sedation during radiologic imaging in children.

**Methods:** All patients were cared for by the pediatric sedation service. According to our usual policy, all patients were held *nil per os* for 4 hours prior to the procedure and were monitored according to ASA standards. Dexmedetomidine was used in pediatric patients undergoing diagnostic imaging studies who had failed sedation with chloral hydrate  $\pm$  midazolam ( $n = 8$ ) or as the primary agent ( $n = 17$ ). Dexmedetomidine was administered as a bolus of 0.5-1.0 mcg/kg over 5 minutes. If needed, the bolus was repeated to induce sleep. The bolus dosing was followed by a continuous infusion at 0.5-1.0 mcg/kg/hr. Vital signs, sedative effectiveness, recovery patterns, and complications were prospectively recorded.

**Results:** Twenty-five patients aged  $7.1 \pm 4.3$  yrs were sedated with dexmedetomidine. Eight had failed sedation with chloral hydrate and/or midazolam. Sedation induction was achieved with  $0.85 \pm 0.35$  mcg/kg over  $11 \pm 4.3$  minutes. Sedation was maintained with a mean infusion rate of  $0.54 \pm 0.33$  mcg/kg/hr. All studies were completed successfully. Although there was a statistically significant decrease in both heart rate and blood pressure following the administration of dexmedetomidine, no patient developed hypotension or bradycardia defined as less than the 5<sup>th</sup> percentile for age. Oxygen saturation remained  $\geq 94\%$  in all patients.  $ETCO_2$  was  $\geq 50$  mmHg in 6 of 196 measurements. The maximum  $ETCO_2$  value was 61 mmHg. Recovery was uneventful without agitation. Recovery time was longer in patients who had received dexmedetomidine after other sedation compared to those sedated with only dexmedetomidine ( $73 \pm 45$  minutes versus  $117 \pm 47$  minutes;  $p < 0.05$ ). There were no significant complications.

**Conclusions:** Dexmedetomidine provided safe and effective sedation for children undergoing non-invasive, radiologic imaging studies. It was effective in patients who had failed conventional sedation or as the primary, sole agent. Dexmedetomidine is an attractive alternative to general anesthesia in patients who require sedation during imaging studies. Future studies are needed to compare it directly with other agents.