

Hemodynamic Effects of Dexmedetomidine Sedation are Independent of Age in Children

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Introduction: Hemodynamic effects of dexmedetomidine in children have not been established. To date, there have been no large-scale studies in children to evaluate the effect of dexmedetomidine sedation on hemodynamics and electrocardiogram. This is the first study that uses prospectively collected data to evaluate the hemodynamic and electrocardiogram effects of dexmedetomidine in children.

Methods: At our institution, dexmedetomidine is administered per protocol as the standard of care for sedation for computerized tomography (CT) imaging. The protocol specifies that all children have a baseline set of vital signs prior to sedation which include MAP, oxygen saturation, heart rate and respiratory rate. An initial loading dose of 2 mcg/kg IV dexmedetomidine is administered over a 10 minute period. Patients are monitored initially with pulse oximetry. As the level of sedation increases, additional monitors are added in conjunction with the patient's tolerance. After the initial loading dose, the maintenance infusion of 1 mcg/kg/hr is initiated until completion of study. Detailed quality assurance (QA) data sheets document adverse events, hemodynamic and electrocardiogram data on each patient. After IRB approval, all QA data were accessed. There were no HIPAA identifiers.

Results: 222 patients with mean age 2.9 years (range 0.1 – 10.6 years) received dexmedetomidine. Data were analyzed for different age groups. Repeated-measures ANOVA revealed that the profiles for each age group demonstrated significant decreases in heart rate and blood pressure relative to pre-sedation values ($F = 189.38, P < 0.001$ and $F = 36.94, P < 0.001$, respectively), although the tests of slope of these changes were similar between age groups for heart rate ($F = 1.54, P = 0.15$) and blood pressure ($F = 1.65, P = 0.18$). No children were treated for hemodynamic instability and none exhibited hemodynamic changes outside of the age adjusted norms.

Discussion: Our study demonstrates that dexmedetomidine can cause fluctuations in heart rate and blood pressure; however, these changes are not dependent on age and are clinically nonsignificant for most children.