

Sedation in Children undergoing MRI: Risk Factors for Failed Sedation

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Introduction: Magnetic Resonance Imaging (MRI) requires the patient to be immobile in a noisy enclosed space for at least 30 minutes. Sedation or general anesthesia is frequently necessary for children to achieve the immobilization that is required for successful imaging. MRI alone poses minimal risk to the child but the addition of sedation especially deep sedation can add substantial risks with respiratory depression being the most significant. (1) Because sedation has risks and failed sedation causes wasted time in an already time-constrained MRI unit, it is important to develop screening guidelines and a sedation protocol that is safe for patients and adequate for scanning. A recent clinical study that attempted to identify risk factors for failed sedation found that children with inadequate sedation were older than children with adequate sedation. Children with ASA classifications of III or IV were also more likely to have failed sedation. (2) Other reports have indicated the importance of careful screening carried out by experienced nurses and physicians who identify risk factors and contraindications for each patient prior to sedation. (3) We conducted a retrospective review of all sedations for MRI examinations over a four-year period and identified patients who failed sedation. From this group we collected detailed information to identify risk factors for failure.

Methods: With approval from the Institutional Review Board, we initially reviewed the Quality Assurance records documented in the MRI unit from 1998 to 2001. From these records we collected data including gender, age, weight, type of sedation and dose, scan type and duration, diagnosis/reason for scan, history of failed sedation, presence of behavior disorder, presence of seizure disorder, success or failure for current sedation, and any adverse events. We cross-checked the QA records with the MRI scheduling books to make sure that we had records for all the sedations during that time period. Then we reviewed the medical records for all the failed sedations and collected more information regarding chronic medications, history of abnormal behavior, and history of other medical problems.

Results: 869 patients received sedation from 1998 to 2001 at our institution. 809 of these patients were 18 years old or younger. There were 74 failed attempts at sedation with 69 of those being less than 16 years of age and with the majority (n=46) being between the ages of 2 and 12 years of age. Several of these patients exhibited flailing and thrashing movements while sedated. 61 (82%) of the patients that failed sedation were less than 12 years old. 52 (70%) had a documented behavior or movement disorder. 5 patients had at least 2 repeat failed attempts at sedation. These patients had involuntary movement disorders such as head bobbing and winking phenomena.

Most of the children received chloralhydrate 75 mg/kg P.O. with supplemental I.V. midazolam. However 1 patient received a combination of Demerol 30 mg., Thorazine 15 mg and Phenergan 15 mg I.M. After discharge to home, this patient returned to the ER with severe somnolence and respiratory depression.

Discussion: Most sedations for pediatric patients in the MRI unit at MUHC are successful. When sedation fails, there is frequently a preexisting behavior or movement disorder. Patients with involuntary movement disorders will fail second attempts at sedation and need to be considered for general anesthesia. The combination of Demerol, Phenergan and Thorazine is a potentially dangerous sedative and is not currently recommended for use by the sedation protocols at our institution. Other investigators have also demonstrated adverse sedation events when combining three or more sedatives. (4)

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