Combination Intranasal Dexmedetomidine & Midazolam for Sedated MRI Scans in Children: A Retrospective Review

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Introduction: A growing number of pediatric sedation programs are utilizing intranasal sedative agents as a modality in providing sedation to children to complete non-invasive diagnostic procedures. Recent clinical studies show examination completion rates of 86% or greater with very favorable adverse event profiles. We report our retrospective experience with a non-invasive sedation regimen based upon the use of intranasal dexmedetomidine (IN-DEX) for the completion of MRI imaging in children.

Methods: After IRB approval, retrospective review was conducted of all children requiring sedation for MRI imaging over a 12-month period. The data set included patient demographics, sedation regimen, time posts (dosing, procedure start and end, and recovery times), level of sedation, outcomes, and sedation provider type. The data were analyzed with descriptive statistical techniques. Exclusion criteria included planned intravenous contrast, planned intravenous sedation, or the MRI imaging study was paired with other procedures.

Results: All patients (n=252) received IN-DEX, 95% received intranasal midazolam, 4% received re-dose IN-DEX, and 8% received inhaled N2O. 52% of the patients had developmental delay, a behavioral diagnosis, or seizure disorder. We observed a completed percentage of 90% without the need for PIV placement or IV sedation. Subgroup analysis showed no significant difference in terms of success rate. The mean recovery time was 33 minutes which is comparable to other series.

Discussion: The combination of intranasal dexmedetomidine and midazolam is efficacious and safe for the sedation of children undergoing MR imaging. The recovery times are not excessive and family satisfaction is improved with the avoidance of PIV placement. Those patients who failed IN-DEX and required intravenous sedatives use less intravenous agents than would otherwise be expected.

References:

1. Baier NM, et al. Paediatr Anaesth. 2016
2. Ibrahim M, et al. Anesth Essays Res. 2014
3. Reynolds J, et al. Hosp Pediatr. 2016
4. Tug A, et al. Pediatr Drugs. 2015

Table 1. Demographic Characteristics

Number of patients	252
Age, median (range)	31.9 months (2.9 to 188.2)
Age group, <36 mo/>36 mo	54%/46%
Gender, male/female	57%/43%
Weight, median (range)	13.4 kilograms (5.5 to 60.2)
Admission status	98% outpatients
Behavioral or Seizure Disorder	130 (52%) (overlapping diagnosis)
ADD/ADHD	13 (5%)
Autism/ASD	16 (6%)
Developmental Delay	84 (33%)
Global	55
Speech	15
Motor	14
Seizure Disorder	56 (22%)

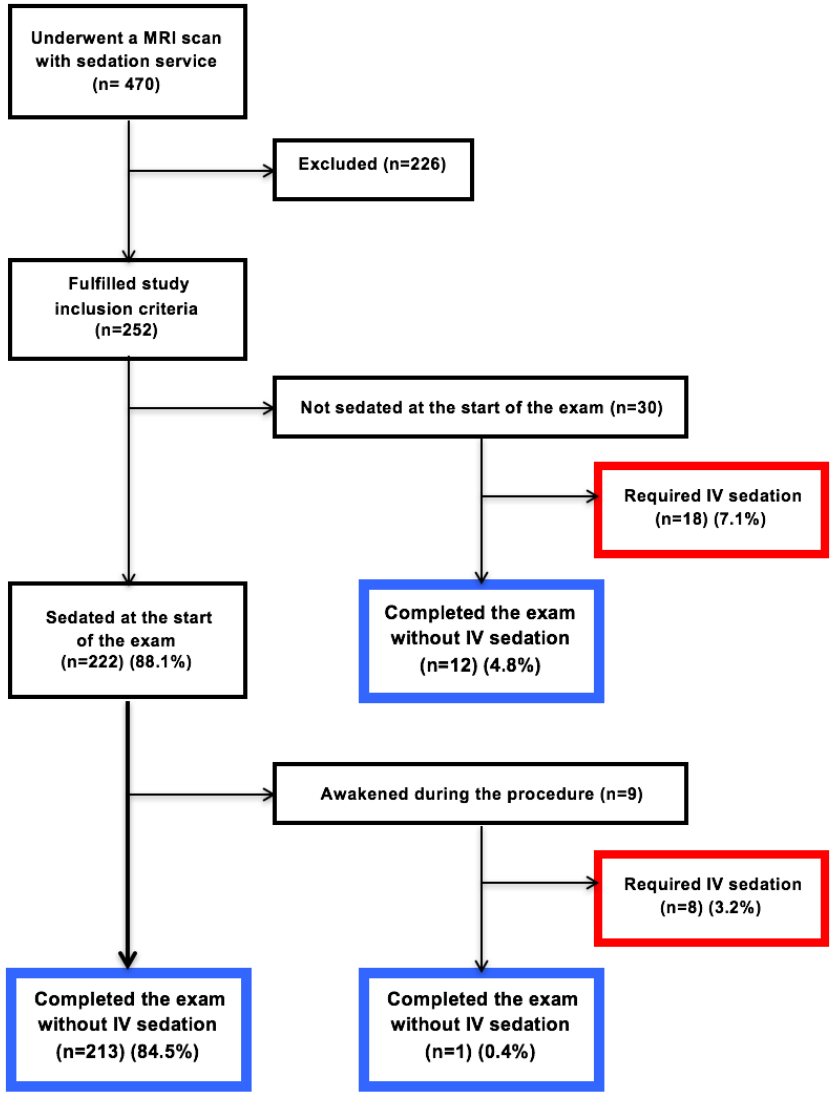
Table 2. All patients who received IN sedatives as their planned sedation regimen

	Successful Completion n (% success)	Required IV Sedation Rescue n (% failure)
All Study Patients	226 (90%)	26 (10%)
Provider Type		
FT sedation provider (>70% FTE)	104 (89%)	13 (11%)
PT sedation provider (<30% FTE)	122 (90%)	3 (10%)
Patient Gender		
Male	130 (91%)	13 (9%)
Female	96 (88%)	13 (12%)
Age Group		
Under 36 months of age	124 (91%)	12 (9%)
Over 36 months of age	102 (88%)	14 (12%)
Behavioral or Seizure Disorder	115 (88%)	15 (12%)
ADHD/ADD	12 (92%)	1 (8%)
Autism/ASD	15 (94%)	1 (6%)
Developmental Delay	74 (88%)	10 (12%)
Seizure Disorder	148 (86%)	8 (14%)

Table 3. Selected pharmacologic data for all patients.

Sedative Agent	Received therapy (%)	Median (range)
IN DEX Dose (mcg/kg)	252 (100%)	3.1 (0.8 – 4.8)
Adjunct IN MID & Dose (mg/kg)	239 (95%)	0.11 (0.4 - .27)
Re-dose IN DEX (mcg/kg)	11 (4%)	(1 – 2)
Adjunct Inhaled N_2O (%)	20 (8%)	(50% - 70%)

Figure 1.



Overall success rate for not requiring venous access nor intravenous sedative = 89.7%

Results

Table 4. Time durations and recovery time in minutes, mean (SD).

	All Study Patients n=252	Successful Completion n=226 (90%)	Required IV Sedation n=26 (10%)
Procedure Readiness	37 (10)	36 (8)	50 (15)
Procedure Duration	28 (17)	26 (13)	47 (32)
Duration of Sedation	61 (26)	59 (23)	82 (40)
PACU LOS	51 (19)	51 (18)	52 (22)
Recovery Time (I)	33 (21)	32 (21)	36 (24)
Recovery Time (M)	26 (21)	26 (21)	27 (23)
Discharge Readiness	101 (26)	102 (25)	97 (28)
IN Admin to Recovery	123 (27)	119 (23)	156 (33)