

Efficacy and Clinical Success of Midazolam in Combination with Hydromorphone Versus Meperidine for Oral Conscious Sedation in a Pediatric Population



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INTRODUCTION

- Narcotics, Anxiolytics and Sedative-Hypnotics have been used routinely in Pediatric Dentistry to aid in behavior management, and reduce pain and anxiety.
- Although having a long history of clinical practice, there is no evidence showing one or any combination of medication is more effective than others when implemented during oral conscious sedation.

PURPOSE

- The goal of this study was to compare the efficacy of Midazolam in combination with either Meperidine or Hydromorphone when administered with nitrous oxide in pediatric patients having dental treatment completed under oral moderate sedation at El Rio Community Health Center in Tucson, AZ.

METHODS

- A chart review was completed involving pediatric patients (n=157) who had received dental treatment under oral sedation with a drug regimen of either oral Midazolam and Meperidine or Midazolam and Hydromorphone.
- The subjects were under 6 years of age, less than 20 kilograms and were seen at El Rio Community Health Centers in Tucson, Arizona (affiliated with NYU Langone from July 2014 to December 2020).
- Treatment completion status, sedation level, overall effectiveness and behavior score were gathered from the patient sedation records and analyzed.

FIGURES

Demographic and Participant Characteristics (N=157)		Association between Medication Regimen and Covariates		
	N(%) or Mean(SD)	Medication Regimen N(%)		
		Midazolam/Hydromorphone	Midazolam/Meperidine	p-value^
Treatment complete				
Yes	77 (59.2)	53 (40.8)		0.89
No	15 (55.6)	12 (44.4)		
Sedation level				
Moderate	65 (60.7)	42 (39.3)		0.74
Mild	26 (54.2)	22 (45.8)		
None	1 (50.0)	1 (50.0)		
Behavior Score				
Excellent	22 (81.5)	5 (18.5)		0.04*
Good	30 (53.6)	26 (46.4)		
Fair	13 (43.3)	17 (56.7)		
Poor	22 (62.9)	13 (37.1)		
Prohibitive	5 (55.6)	4 (44.4)		
Overall effectiveness				
Ineffective	22 (64.7)	12 (35.3)		0.70
Effective	45 (57.7)	33 (42.3)		
Very effective	25 (55.5)	20 (44.4)		
Duration of Sedation (min), mean		65.2	63.8	0.45, t-test
^Chi-square or Fisher's exact test, unless otherwise indicated.				
*p < 0.05				

Demographic and Participant Characteristics (N=157)	
	N(%) or Mean(SD)
Gender	
Male	70 (44.6)
Female	87 (55.4)
Age (yrs)	4 (0.7)
Weight (kg)	17 (1.7)
Medication Regimen	
Midazolam/Hydromorphone	92 (58.6)
Midazolam/Meperidine	65 (41.4)
Treatment complete	
Yes	130 (82.8)
No	27 (17.2)
Sedation level	
Moderate	107 (68.2)
Mild	48 (30.6)
None	2 (1.3)
Behavior Score	
Excellent	27 (17.2)
Good	56 (35.7)
Fair	30 (19.1)
Poor	35 (22.3)
Prohibitive	9 (5.7)
Overall effectiveness	
Ineffective	34 (21.7)
Effective	78 (49.7)
Very effective	45 (28.7)
Midaz Dose (mg)	16.2 (2.4)
Hydromorphone Dose (mg)	0.5 (0.1)
Meperidine Dose (mg)	24 (6.0)
Duration of Sedation (min)	64.6 (12.0)

RESULTS

- No significant differences were observed when comparing the two drug regimens with respect to treatment completion (P=.89), sedation level (P=.74), and overall effectiveness (P=.70).
- There was a statistical significance regarding behavior rating with improved behavior in the Midazolam and Hydromorphone group (P=.04). The results showed that the combination of Midazolam and Hydromorphone may provide an effective alternative to Midazolam and Meperidine when used for dental treatment under oral sedation.

CONCLUSIONS

- Based on this study's results, the following conclusion can be made:
 - Midazolam and Hydromorphone may provide an effective alternative to Midazolam and Meperidine when used for dental treatment under oral sedation.

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