Pediatric Dental Post-Sedation Discharge Events and Proper Discharge Timing

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PURPOSE

The goal of this study was to determine the validity and reliability of the Modified Aldrete Score (MAS) and the Vancouver Recovery Score (VRS) and to compare the post-discharge effects of commonly used moderate sedation drugs in pediatric dental sedations.

BACKGROUND

- Sedation dentistry is an advanced behavior guidance technique that uses medications to combat a patient's dental fear and anxiety to aid in successful treatment
- The goal of pediatric dental treatment is enhanced patient outcomes, while prioritizing safety not only during the treatment, but also ensuring a safe and timely discharge after sedation
- Sedation drugs are administered through a variety of routes such as oral, nasal, intramuscular, intravenous, subcutaneous, and inhalational routes
- Some commonly used medications include midazolam, hydroxyzine, dexmedetomidine, ketamine, and chloral hydrate[1]
- Post-sedation discharge events can include prolonged sleepiness, motor imbalance, delayed time to return to normal activity and agitation, which may include crying, hallucinations, or physical combativeness.[2,3,4,5,6]
- Current AAPD guidelines recommended discharge criteria focuses on patient consciousness and stability of airway, and may lead to a variability in discharge times due to observer interpretation and bias.[7]
- MAS is commonly used in pediatric dental sedation and compares post-operative physiologic factors to the patient's pre-procedure score, but does not measure a detailed level of alertness.[8]
- VRS is commonly used in medicine and identifies 12 distinct items that encompass three categories of alertness indicators. It has shown excellent internal consistency and reliability in medicine.[9]

Criteria	Characteristics	Points
Activity	Able to move 4 extremities	2
	Able to move 2 extremities	1
	Unable to move extremities	0
Respiration	Able to breathe deeply and cough freely	2
	Dyspnea or limited breathing	1
	Apneic	0
Circulation	BP ± 20% of pre-anesthetic level	2
	BP ± 20-49% of pre-anesthetic level	1
	BP ± 50% of pre-anesthetic level	0
Consciousness	Fully awake	2
	Arousable on calling	1
	Not responding	0
Oxygen saturation	Able to maintain O_2 saturation >92% on room air	2
	Needs oxygen to maintain O_2 saturation >90%	1
	O_2 saturation <90% even with supplemental oxygen	0

Figure 1: Modified Aldrete Score

Criteria	Characteristics	Points
Response		
(A)	Awake/alert	4
	Awake/drowsy	3
	Asleep/easily aroused	2
	Asleep/difficult to arouse	1
	Asleep/unable to arouse	0
(B)	Responds fully to stimuli in an age-appropriate manner	2
	Delayed response to stimuli	1
	Absent response to stimuli	0
(C)	"Alert" facial expression	1
	"Flat" facial expression	0
Eyes		
(D)	Bright eyes	1
	Dull eyes, glazed	0
(E)	Looks "at you"	1
	Looks "through you"	0
(F)	Accommodates	1
	Does not accommodate	0
(G)	Recognition of stimulus	1
	Limited or no recognition of stimulus	0
(H)	Purposeful and spontaneous eye movement	1
	Little or no spontaneous or purposeful eye movement	0
Criteria	Characteristics	Points
Movement		
(I)	Spontaneous and varied central acitivity	4
	Spontaneous and varied peripheral activit	3
	Central activity in response to stimuli	2
	Peripheral activity in response to simuli	1
	No movement	0
(J)	Abscense of tremor or ataxia	2
	Minor ataxia or tremor	1
	Major ataxia or tremor	0
(K)	Coordinated spontaneous movement	2
	Weak/coarse spontaneous movement	1
	No purposeful spontaneous movement	0
(L)	Shows age-appropriate manual dexterity	2
	Awkward or clumsy hand movements	1
	No fine hand movement	0

Figure 2: Vancouver Recovery Score

1. **Did your child fall asleep on the ride home?**
   a. Yes
   b. No
2. **How would you rate your child's alertness after he/she returned home?**
   a. Asleep
   b. Asleep but easy to awaken
   c. Awake but drowsy
   d. Awake and alert
3. **How would you rate your child's behavior after he/she returned home?**
   a. Normal
   b. Agitated (feeling or appearing troubled or nervous)
   c. Restless (unable to rest or relax)
   d. Withdrawn (not wanting to communicate with other people)
4. **How would you rate your child's activity level after he/she returned home?**
   a. Less active than usual
   b. Same as usual
   c. Hyperactive
5. **Time to return to normal activity after returning home?**
   a. 0 hours
   b. Less than 2 hours
   c. 2-4 hours
   d. 4-6 hours
   e. Greater than 6 hours
6. **Did your child have any breathing difficulties?**
   a. Yes
   b. No

Figure 3: Parent Survey

METHODS

- A prospective cohort study of 100 children, 1/5/2022-2/26/2025
- Inclusion criteria: 3-6 years old, ASA I or II, and English speaking
- Children scheduled for dental treatment with in-office moderate sedation were given one of the following medicaments
  - PO or IN Midazolam
  - PO Midazolam/PO Hydroxyzine
  - IN Dexmedetomidine (Dex)
  - PO Midazolam /IN Dex
  - PO Triazolam
- Recovery scales were used 5-, 10-, 15-, and 20-minutes post operatively (Figure 1 and 2)
- Parental survey was given to assess how patients recovered at home after treatment (Figure 3)

DATA ANALYSIS

- Descriptive statistics were completed
- Categorical data are presented as frequency count (%)
- Data were analyzed with SAS v9.4.

RESULTS

- The residents' and nurses' VRS scores post-operatively agreed for 73% of cases and MAS scores agreed 94%
- Both the VRS and MAS measure alertness adequately pre-operatively and post-operatively
- 44% of patients were awake but drowsy when home, 44% were agitated, 56% were less active than usual, 66% returned to normal activity between 2-6 hours after returning home

CONCLUSIONS

- The VRS and MAS are global scales that are both acceptable for the discharge of patients after pediatric dental sedation

LIMITATIONS

- Parent compliance with survey
- Uneven distribution of drug regimen used

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