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COMPARISON OF INTRANASAL AND ORAL MIDAZOLAM FOR PREMEDICATION IN CHILDREN: A PROSPECTIVE RANDOMIZED STUDY

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Abstract

Background: Midazolam is a widely used premedicant in pediatric anesthesia to reduce anxiety and facilitate smooth induction. While both oral and intranasal routes are non-invasive, their onset time, efficacy, and tolerability differ.

Objective: To compare the efficacy, onset of sedation, ease of parental separation, and side effect profile of intranasal midazolam versus oral midazolam in children undergoing elective surgery.

Methods: This prospective, randomized clinical study enrolled 60 children aged 2–8 years, ASA I–II, scheduled for elective surgery under general anesthesia. Participants were randomly assigned to receive intranasal midazolam (0.2 mg/kg) or oral midazolam (0.5 mg/kg) 30 min before induction. Sedation scores, parental separation scores, mask acceptance, and side effects were recorded.

Results: Intranasal midazolam produced a significantly faster onset of sedation (mean: 8.2 ± 2.1 min) compared to oral midazolam (22.5 ± 3.8 min, $p < 0.001$). At 10 min, adequate sedation was achieved in 86.7% of the intranasal group versus 23.3% of the oral group ($p < 0.001$). Parental separation scores were superior in the intranasal group. Side effects included mild nasal irritation (20%) in the intranasal group and occasional vomiting (10%) in the oral group. Recovery times were comparable.

Conclusion: Intranasal midazolam provides faster and more effective early sedation than oral midazolam, making it preferable when induction is required soon after premedication. Oral midazolam remains a suitable alternative when there is adequate waiting time and greater focus on patient comfort.

INTRODUCTION

Preoperative anxiety in children can result in poor cooperation, increased anesthetic requirements, and emergence delirium. Midazolam, a short-acting benzodiazepine with anxiolytic, sedative, and amnestic properties, is widely used as a premedicant in pediatric anesthesia.

While the oral route is simple and well-tolerated, it has slower onset due to first-pass metabolism. The intranasal route bypasses the gastrointestinal tract, resulting in faster onset but with potential nasal discomfort. This study was designed to compare the efficacy, onset, and tolerability of intranasal versus oral midazolam in children.

MATERIALS AND METHODS

Study Design: Prospective, randomized, controlled trial.
Setting: Tertiary care teaching hospital.
Duration: [Insert study period].
Ethical Approval: Obtained from the Institutional Ethics Committee. Written informed consent was obtained from parents/guardians.
Participants:
Inclusion criteria: Children aged 2–8 years, ASA I–II, scheduled for elective surgery under general anesthesia.

Exclusion criteria: Allergy to benzodiazepines, nasal pathology, respiratory infection, developmental delay, or refusal by parents.
Randomization: Computer-generated random numbers, allocation concealment with sealed envelopes.
Interventions:
Group IN: Intranasal midazolam 0.2 mg/kg (max 10 mg) administered via mucosal atomizer.
Group OR: Oral midazolam 0.5 mg/kg (max 20 mg) mixed with flavored syrup.
Assessments:
Sedation score (Modified Ramsay Sedation Scale) at baseline, 5, 10, 15, 20, and 30 min.
Parental separation score (4-point scale).
Mask acceptance score (4-point scale).
Adverse effects: nasal irritation, coughing, vomiting, desaturation.
Recovery time measured from end of surgery to Aldrete score ≥9.
Statistical Analysis: Data analyzed with SPSS v26. Continuous variables compared with unpaired t-test, categorical with Chi-square test. $p < 0.05$ considered significant.

RESULTS

Participant Flow: 60 children completed the study (30 per group). No dropouts.

Parameter	Intranasal Group (n=30)	Oral Group (n=30)	p-value
Age (years)	5.1 ± 1.7	5.4 ± 1.5	0.48
Onset of sedation (min)	8.2 ± 2.1	22.5 ± 3.8	<0.001
Adequate sedation at 10 min (%)	86.7	23.3	<0.001
Parental separation score (good/excellent %)	90	66.7	0.03
Mask acceptance score (good/excellent %)	86.7	70	0.09
Recovery time (min)	34.2 ± 5.3	35.8 ± 5.6	0.31

Adverse Effects:
Intranasal: nasal irritation (20%), coughing (10%), mild tearing (6.7%).
Oral: vomiting (10%), unpleasant taste complaints (13.3%).
No episodes of desaturation or serious adverse events.

DISCUSSION

Our study confirms that intranasal midazolam achieves a faster onset of sedation compared to oral midazolam, consistent with previous reports by Wilton et al. and Karl et al. The bypassing of hepatic first-pass metabolism explains the higher bioavailability and quicker effect of the intranasal route.
Parental separation and early sedation scores were superior in the intranasal group, making it advantageous for short waiting times. However, the nasal route was associated with mild irritation in 1 out of 5 children. The oral route, though slower, remains well accepted, especially when a longer preoperative period is available.
Recovery profiles were similar, suggesting that the route of administration does not significantly impact postoperative recovery when equipotent doses are used.

CONCLUSION

Intranasal midazolam provides faster and more effective preoperative sedation in children compared to oral midazolam, with similar recovery and safety profiles. It is particularly useful when early induction is required. Oral midazolam remains appropriate when longer preparation time is available and better patient acceptance is desired.

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