RESEARCH

Intranasal Dexmedetomidine and Oral Midazolam in Pediatric Dental Patients as Premedication Under General Anaesthesia

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Abstract: Background: The study aims to compare intranasal Dexmedetomidine and Oral Midazolam in pediatric dental patients as premedication under general anaesthesia. **Materials and Methods:** One hundred two children age ranged 4-7 years of either gender with American Society of Anesthesiologists (ASA) grade I were selected for the study. We divided patients into 2 groups. Group I patients were administered intranasally with 2 µg/kg dexmedetomidine hydrochloride injection half an hour before the induction of anaesthesia. Group II patients were administered with oral 0.5 mg/kg midazolam half an hour before the induction of anaesthesia. Parameters such as heart rate, oxygen saturation (SpO2) and respiratory rate in both groups were monitored at baseline, 10 min (T1), 20 min (T2), and 30 min (T3) after administration. Ramsay sedation score (RSS), parental separation anxiety scale (PSAS) and mask acceptance scale (MAS) was recorded. **Results:** There were 24 males in group I and 26 in group II and 27 females in group I and 25 in group II. Age group 4-5 years comprised of 31 patients in group I and 25 in group II and 6-7 years had 20 in group I and 26 in group II. The mean weight in group I patients was 16.5 Kgs and 15.7 kgs in group II. Duration of operation was 2.54 hours in group I and 2.32 hours in group II. Duration of anaesthesia was 2.80 hours in group I and 2.74 hours in group II. The results showed that there was non- significant difference in measurement of SpO2, respiratory rate and heart rate (P> 0.05). Mask acceptance score was satisfactory in 92% and unsatisfactory in 8% in group I and II each. Successful parental separation was observed in 94% in group I and 93% in group IV. Emergence delirium was present in 15% in group II. **Conclusion:** Both premedication agent under general anaesthesia found to be equally effective in pediatric dental patients.

INTRODUCTION

Management of pediatric population for surgery is great task. Children need anxiety free environment in operation room in order to complete the procedure[1]. Premedication with sedative agent in children is one of the ways to promote smooth induction of anaesthesia[2]. Various agents are used as premedication drug[3]. Among these, midazolam has been proved promising. It has been found to be more efficient as compared to parental presence during procedure in reducing anxiety and refining compliance[4]. It provides adequate sedation, acts as anxiolytic agent and decreases chances of postoperative vomiting. It also provides hemodynamic instability, decreases metabolic side effects and post-operative pain. Route of administration of premedication drug should be favourable with minimum side effects[5,6].

Apart from midazolam, other useful agent which acts as premedication drug is dexmedetomidine[7,8]. It is a newer 2-agonist having more selective action on the 2-adrenoceptor. It possesses shorter half-life with 81.8% bioavailability when buccal mucosa is the key route of administration. Its sedative and analgesic properties are equivalent to midazolam[9,10]. There is less or no respiratory depression with dexmedetomidine. Its sympatholytic action decreases hemodynamic stress response. Hence, it is also useful anesthetic pre-medication agent[11-13]. A study by Cox et al., confirmed that 0.5 mg/kg oral midazolam when used in children decreased induction anxiety and parent separation[14]. Recovery time was not hampered. It proved to be acceptable in approximately 70%. Hence, we attempted this study in which we compared intranasal Dexmedetomidine and Oral Midazolam in pediatric dental patients as premedication under general anaesthesia.

MATERIAL and METHODS

A sum total of one hundred two children age ranged 4-7 years of either gender with American

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Society of Anesthesiologists (ASA) grade I were selected for the study. Children with allergy to midazolam, dexmedetomidine and propofol and those with respiratory diseases were excluded from the study. Parental written consent was obtained before we started the study. Ethical approval was sorted from institutional clearance and review board.

We divided patients into 2 groups based on the agent used using random stratified sampling technique. Group I patients were administered intranasally with 2 µg/kg dexmedetomidine hydrochloride injection half an hour before the induction of anaesthesia. Group II patients were administered with oral 0.5 mg/kg midazolam half an hour before the induction of anaesthesia.

8- 9 hours fasting was maintained in patients before surgery. Based on age of patient, dose of drugs was adjusted. Parameters such as heart rate, oxygen saturation (SpO2) and respiratory rate in both groups were monitored. The HR, RR, and SpO2 was recorded at 10 min (T1), 20 min (T2), and 30 min (T3) after administration.

Ramsay sedation score (RSS), parental separation anxiety scale (PSAS) and mask acceptance scale (MAS) was recorded. Results were expressed as mean, frequency and percentage. The level of significance was 0.05. Kruskal Wallis test was applied for comparison of respiratory rate, heart rate and oxygen saturation.

RESULTS

Age group 4-5 years comprised of 31 patients in group I and 25 in group II and 6-7 years had 20 in group I and 26 in group II (Table 1, Figure 1).

There were 24 males in group I and 26 in group II and 27 females in group I and 25 in group II (Table 2).

The mean weight in group I patients was 16.5 Kgs and 15.7 kgs in group II. Duration of operation was 2.54 hours in group I and 2.32 hours in group II. Duration of anaesthesia was 2.80 hours in group I and 2.74 hours in group II. On comparison with Kruskal Wallis test between both groups, a non- significant difference was found (P> 0.05) (Table 3, Figure 2).

The results showed that there was non- significant difference in measurement of SpO2, respiratory rate and heart rate (P> 0.05) (Table 4, Figure 3).

Mask acceptance score was satisfactory in 92% and unsatisfactory in 8% in group I and II each. Successful parental separation was observed in 94% in group I and 93% in group IV. Emergence delirium was present in 15% in group II. A non- significant difference was observed (P> 0.05) (Table 5, Figure 5).

Table 1: Age wise distribution

Age Group (years)	Group I	Group II	Total
4-5	31	25	56
6-7	20	26	46

Table 2: Gender wise distribution

Gender	Group I	Group II
Male	24	26
Female	27	25

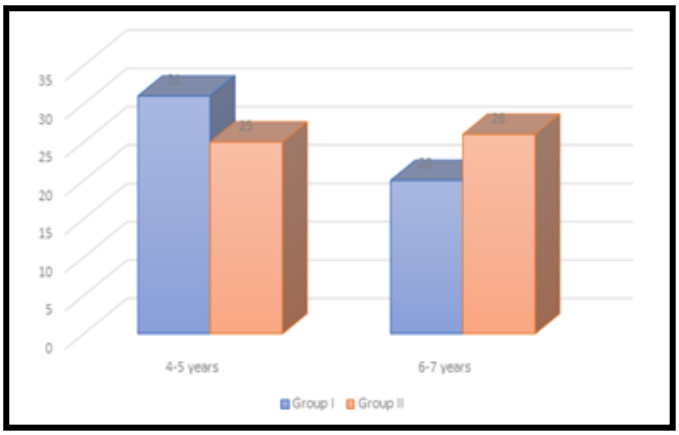

Fig 1: ?

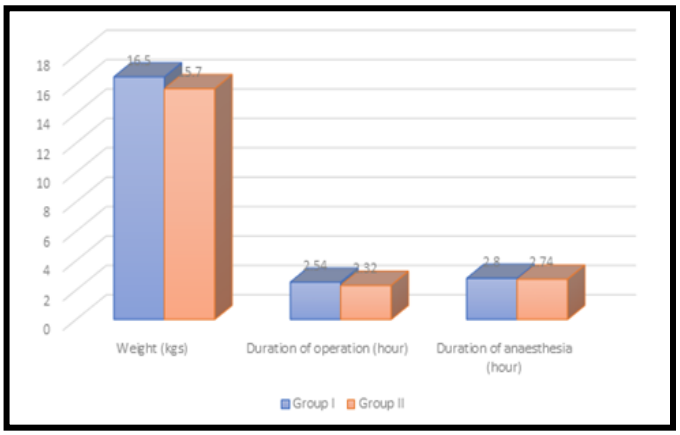

Fig 2: ?

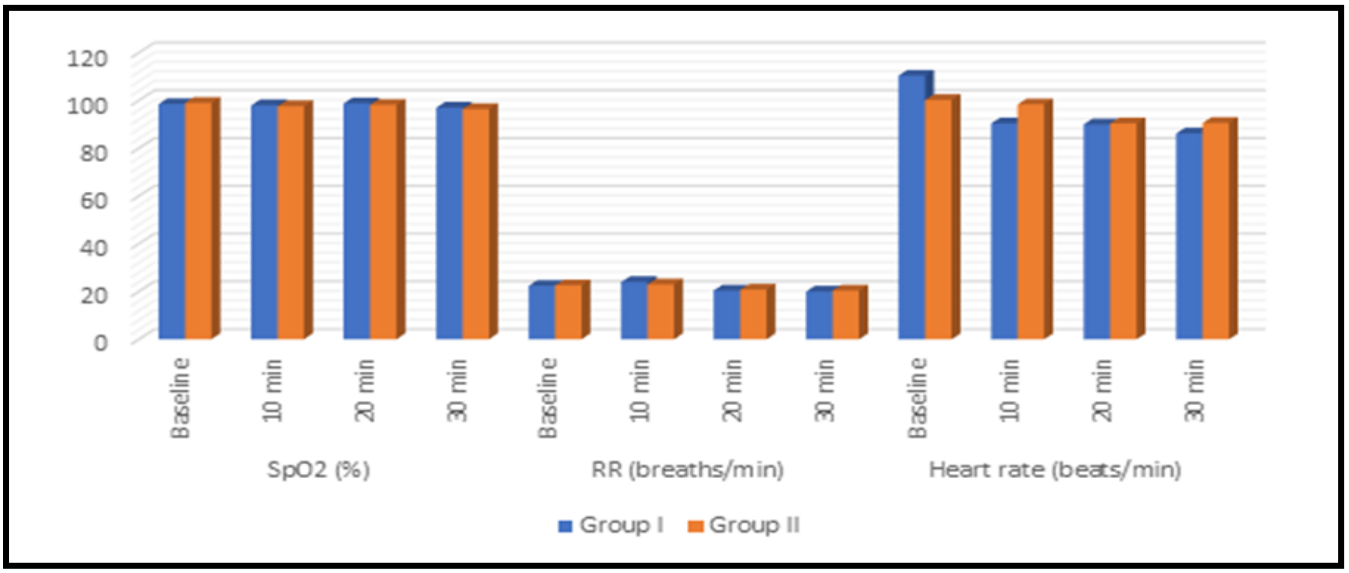

Fig 3: ?

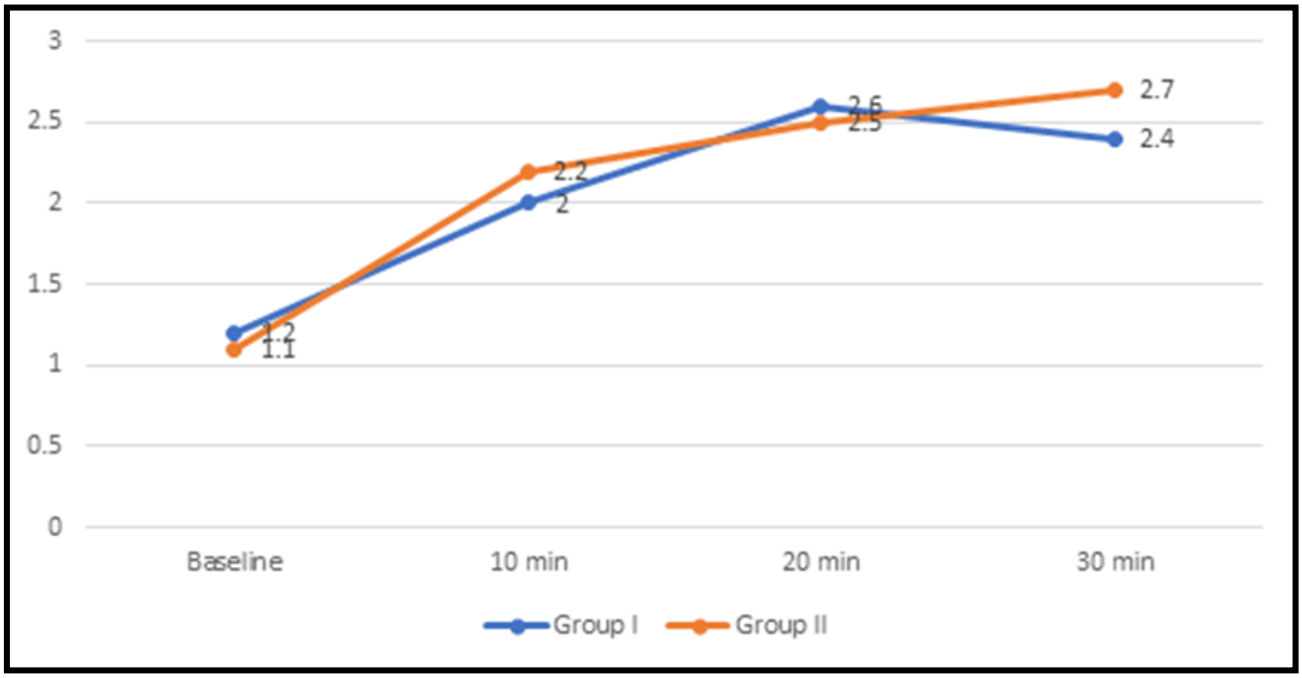

Fig 4: Comparison of Ramsay score

Table 3: Comparison of demographics

Parameters	Group I	Group II	P value
Weight (kgs)	16.5	15.7	>0.05
Duration of operation (hour)	2.54	2.32	>0.05
Duration of anaesthesia (hour)	2.80	2.74	>0.05

Table 4: Comparison of haemodynamic data

Parameter	Variable	Group I	Group II	P value
SpO_2 (%)	Baseline	98.5	99.0	>0.05
	10 min	98.0	97.6	
	20 min	98.8	98.2	
	30 min	97.0	96.4	
RR (breaths/min)	Baseline	22.4	22.6	>0.05
	10 min	24.0	23.0	
	20 min	20.4	20.8	
	30 min	20.0	20.4	
Heart rate (beats/min)	Baseline	110.4	100.2	>0.05
	10 min	90.4	98.4	
	20 min	90.0	90.4	
	30 min	86.2	90.6	

Table 5: Comparison of scores in both groups

Parameter	Variable	Group I	Group II	P value
Mask acceptance	Satisfactory	92%	92%	>0.05
	Unsatisfactory	8%	8%	
Successful parental separation	Yes	94%	93%	>0.05
	No	6%	7%	
Emergence delirium	Present	0%	15%	<0.05
	Absent	100%	85%	

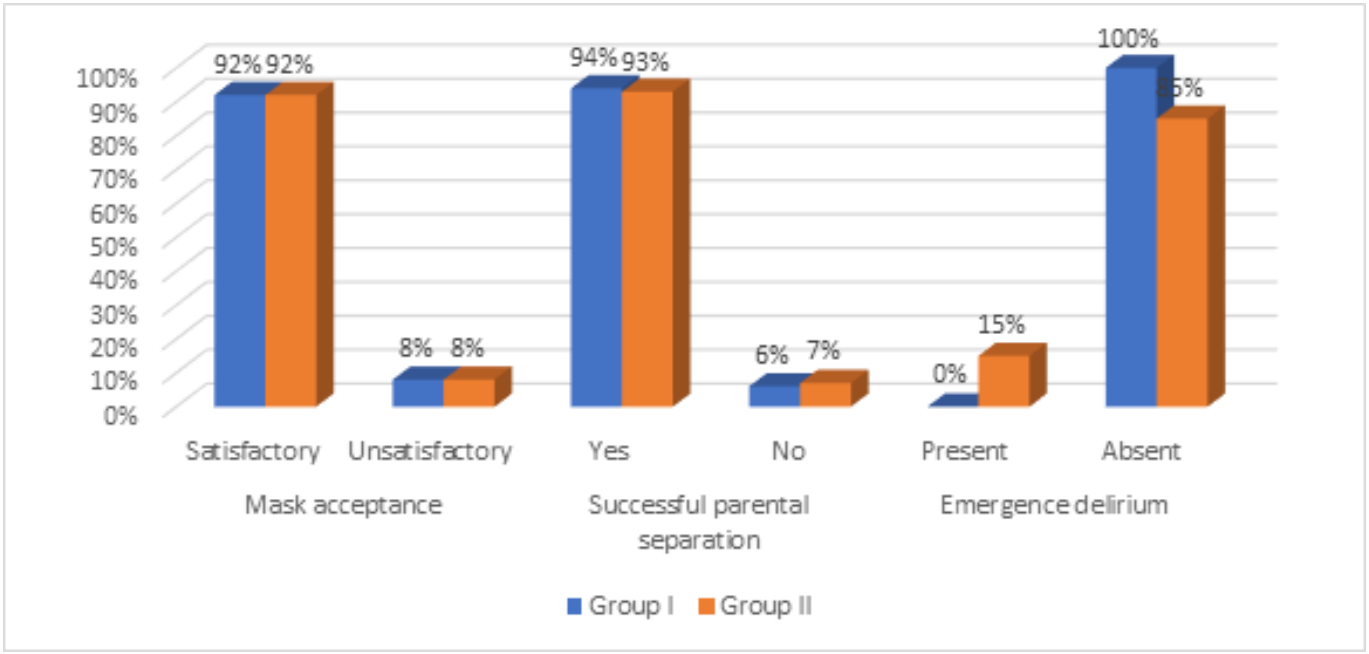

Fig 5: Comparison of scores in both groups

DISCUSSION

Our study was an attempt to compare intranasal Dexmedetomidine and Oral Midazolam in pediatric dental patients as premedication under general anaesthesia. In our study age group 4-5 years comprised of 31 patients in group I and 25 in group II and 6-7 years had 20 in group I and 26 in group II. A study by Yuen et al., included 96 patients which were divided into 3 groups of 32 each15. Group M received midazolam, group D0.5 received 0.5 µg/kg Dexmedetomidine and group D1 received 1 µg/kg Dexmedetomidine. The mean age was 6.4 years, 6.4 years and 6.1 years respectively. In their study there were 30 male and 2 female in first group, 29 male and 3 female in second group and 30 male and 2 female in third group where as in our study there were 24 males in group I and 26 in group II and 27 female in group I and 25 in group II. Saad et al., included 48 subjects divided into Dexmedetomidine (24) and midazolam (24) group[16]. Group I had 15 female and 9 female and group II had 14 male and 10 female. The mean age was 5.04 years in group I and 5.13 years in group II. A study by Wang et al[17], included 60 patients assigned into 2 groups of 30 each receiving Dexmedetomidine and midazolam. The mean age was 4.56 years and 4.79 years. The weight was 15.q2 kgs and 14.87 respectively.

The mean weight in group I patients was 16.5 Kgs and 15.7 kgs in group II. Duration of operation was 2.54 hours in group I and 2.32 hours in group II. Duration of anaesthesia was 2.80 hours in group I and 2.74 hours in group II. Yuen et al., found mean weight of 24.1 Kgs, 25.5 kgs and 21.6 kgs in group I, II and III respectively[15]. Time from premedication to induction (min) was 70.5, 61.7 and 68.0 respectively.

Our results showed that there was non- significant difference in measurement of SpO2, respiratory rate and heart rate. Wang et al., also observed non- significant difference in measurement of SpO2, respiratory rate and heart rate recorded at baseline[17], 10 minutes, 20 minutes and 30 minutes after induction. Mask acceptance score was satisfactory in 92% and unsatisfactory in 8% in group I and II each. Successful parental separation was observed in 94% in group I and 93% in group IV. Emergence delirium was present in 15% in group II. Wang et al., found satisfactory mask acceptance score in 93.3% in their both groups[17], with successful parental separation observed in 96.5% and 93.3% in both groups respectively. Successful parental separation as in study by Yuen et al., found in 96.9%[15], 93.7% and 100% in their groups respectively.

Studies suggested that preoperative anxiety in pediatric population should be minimized not only for the improvement of preoperative cooperation but also for the prognosis of patients.

CONCLUSION

Both premedication agent under general anaesthesia found to be equally effective in pediatric dental patients.

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