ORIGINAL RESEARCH

A comparative analysis of intranasal Dexmedetomidine and Oral Midazolam in pediatric dental patients as premedication

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ABSTRACT

Background: Managing the surgical population of children is a challenging task. For children to finish the process, the operating room must be a stress-free place. This study compared intranasal Dexmedetomidine and Oral Midazolam in Paediatric dental patients as premedication. **Materials &Methods:** 80 children age ranged 4-9 years of either gender with American Society of Anesthesiologists (ASA) grade Iwere divided into 2 groups of 40 each. 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. The HR, RR, and SpO2 was recorded at 10 min (T1), 20 min (T2), and 30 min (T3) after administration. Parental separation anxiety scale (PSAS) and mask acceptance scale (MAS) was recorded. **Results:** There age group 4-6 years comprised of 21 patients in group I and 22 in group II and 7-9 years had 19 in group I and 18 in group II.RR (breaths/min) at baseline, 10 minutes, 20 minutes and 30 minutes in group I and group II was 22.8 and 22.6, 24.1 and 23.4, 20.7 and 20.9 and 20.2 and 20.5 respectively. The mean heart rate (beats/min) at baseline was 113.4 and 104.2, at 10 min was 94.4 and 97.4, at 20 min was 91.0 and 92.4 and 30 minwas 88.2 and 91.6 respectively. The mean SpO2 (%) at baseline was 98.9 and 99.2, at 10 min was 98.2 and 97.1, at 20 min was 98.5 and 98.4 and at 30 min was 97.2 and 96.6 respectively. There was non- significant difference (P> 0.05). Successful parental separation was observed in 95% in group I and 92% in group II. Emergence delirium was present in 18% in group II. Mask acceptance score was satisfactory in 94% in group I and II each. A non-significant difference was observed (P> 0.05). **Conclusion:** In Pediatric dentistry patients, both premedication agents were found to be equally efficacious when administered under general anesthesia.

Keywords: Dexmedetomidine, Midazolam, Pediatric

INTRODUCTION

Managing the surgical population of children is a challenging task. For children to finish the process, the operating room must be a stress-free place.[1] One strategy to facilitate a smooth induction of anesthesia in youngsters is to premedication with a sedative drug. A variety of substances are utilized as premedication medications. Midazolam has shown promise among these.[2] It has been shown to be more effective in lowering anxiety and improving compliance during procedures than parental presence. It reduces the likelihood of postoperative vomiting, functions as an anxiolysis drug, and provides sufficient sedation.[3] Additionally, it reduces post-operative discomfort, metabolic adverse effects, and hemodynamic instability. The premedication drug's route of administration should be advantageous and have few adverse effects.[4]

Dexmedetomidine is another helpful substance that functions as a premedication medication in addition to midazolam. It is a more recent 2-agonist that acts on the 2-adrenoceptor with greater selectivity.[5] With 81.8% bioavailability, it has a shorter half-life when administered primarily through the buccal mucosa.[6,7] It has the same sedative and analgesic effects as midazolam. Dexmedetomidine reduces or eliminates respiratory depression. It reduces the hemodynamic stress response by sympatholysis. As such, it is also a good pre-medication anesthetic. When given to children, 0.5 mg/kg oral midazolam reduced induction anxiety and parent separation, according to a research by Cox et al.[8] Time to recovery was unaffected. About 70% of people found it satisfactory. This study compared intranasal Dexmedetomidine and Oral Midazolam in Paediatric dental patients as premedication under general anaesthesia.

MATERIALS &METHODS

This study comprised of 80 children age ranged 4-9 years of either gender with American Society of Anesthesiologists (ASA) grade I. Parental written consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 40 each. 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. The HR, RR, and SpO2 was recorded at 10 min (T1), 20 min (T2), and 30 min (T3) after administration.Parental separation anxiety scale (PSAS) and mask acceptance scale (MAS) was recorded. Results were expressed as mean, frequency and percentage. Results were statistically analysed. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Group I	Group II
4-6	21	22
7-9	19	18

Table I shows that age group 4-6 years comprised of 21 patients in group I and 22 in group II and 7-9 years had 19 in group I and 18 in group II.

Table II Comparison of parameters

Parameter	Variable	Group I	Group II	P value
RR (breaths/min)	Baseline	22.8	22.6	0.78
	10 min	24.1	23.4	
	20 min	20.7	20.9	
	30 min	20.2	20.5	
Heart rate (beats/min)	Baseline	113.4	104.2	0.45
	10 min	94.4	97.4	
	20 min	91.0	92.4	
	30 min	88.2	91.6	
SpO_2 (%)	Baseline	98.9	99.2	0.53
	10 min	98.2	97.1	
	20 min	98.5	98.4	
	30 min	97.2	96.6	

Table II, graph I shows that RR(breaths/min) at baseline, 10 minutes, 20 minutes and 30 minutes in group I and group II was 22.8 and 22.6, 24.1 and 23.4, 20.7 and 20.9 and 20.2 and 20.5 respectively. The mean heart rate (beats/min) at baseline was 113.4 and 104.2, at 10 min was 94.4 and 97.4, at 20 min was 91.0 and 92.4 and 30 min was 88.2 and 91.6respectively. The mean SpO2 (%) at baselinewas98.9 and 99.2, at 10 min was 98.2 and 97.1, at 20 min was 98.5 and 98.4 and at 30 min was 97.2 and 96.6respectively. There was non- significant difference (P> 0.05).

Graph I Comparison of parameters

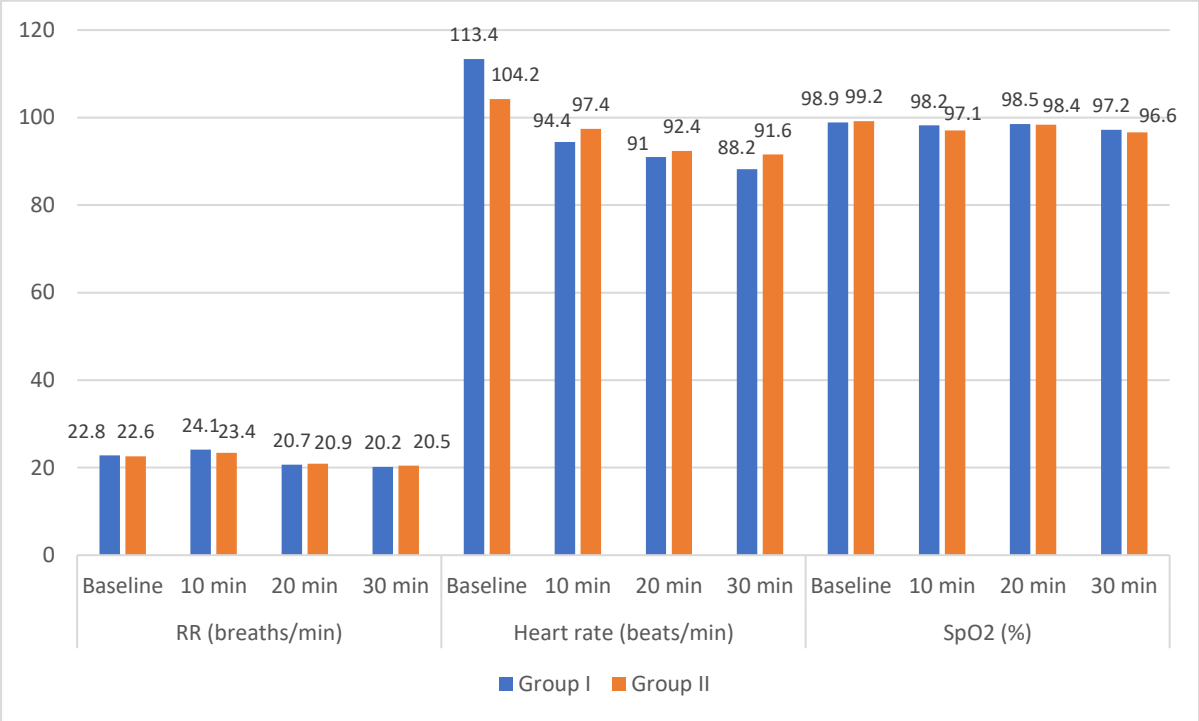

Table III Comparison of scores

Parameter	Variable	Group I	Group II	P value
Successful parental separation	Yes	95%	92%	0.95
	No	5%	8%	
Emergence delirium	Present	0%	18%	0.60
	Absent	100%	82%	
Mask acceptance	Satisfactory	94%	94%	0.08
	Unsatisfactory	6%	6%	

Table III shows that successful parental separation was observed in 95% in group I and 92% in group II. Emergence delirium was present in 18% in group II. Mask acceptance score was satisfactory in 94% in group I and II each. A non- significant difference was observed (P> 0.05).

DISCUSSION

General anesthesia (GA) is an advanced behavioral management technique frequently used by dentists to provide quality dental care for young children who are unable to tolerate dentistry in a routine clinical setting.[9,10]Pediatric patients are usually uncooperative, fearful, anxious, or physically resistant, especially during times of parental separation, venepuncture, or mask application.[11,12] Premedication is the most common way to minimize distress for children entering the operating room and to facilitate the smooth induction of anesthesia and is accomplished using various sedative drugs before they are being transferred to an operating room.[13,14,15]This study compared intranasal Dexmedetomidine and Oral Midazolam in Paediatric dental patients as premedication under general anaesthesia.

We found that age group 4-6 years comprised of 21 patients in group I and 22 in group II and 7-9 years had 19 in group I and 18 in group II.We found that RR (breaths/min) at baseline, 10 minutes, 20 minutes and 30 minutes in group I and group II was 22.8 and 22.6, 24.1 and 23.4, 20.7 and 20.9 and 20.2 and 20.5 respectively. The mean heart rate (beats/min) at baseline was 113.4 and 104.2, at 10 min was 94.4 and 97.4, at 20 min was 91.0 and 92.4 and 30 minwas 88.2 and 91.6 respectively. The mean SpO2 (%) at baseline was 98.9 and 99.2, at 10 min was 98.2 and 97.1, at 20 min was 98.5 and 98.4 and at 30 min was 97.2 and 96.6 respectively. McMillan et al[16] in their study the safety, efficacy and feasibility of oral midazolam premedication in children were evaluated. Eighty unmedicated children (ASA PS I or II, ages 1-6 yr) were randomly assigned to one of four groups receiving midazolam 0.5, 0.75, or 1.0 mg.kg-1 or a placebo 30 min before separation from parents. Heart rate, systolic blood pressure, arterial oxygen saturation, respiratory rate, sedation and anxiolysis scores were recorded before premedication, every five minutes for 30 min and then during induction of anaesthesia and recovery. They found that heart rate, systolic blood pressure, arterial oxygen saturation and respiratory rate were unchanged during the study. Sedation and anxiolysis scores in the midazolam-

treated groups were greater than those in the placebo group and that anxiolysis at the time of separation from the parents was judged excellent in 80-90% of the children who received midazolam. However, sedation and anxiolysis did not differ among the three midazolam groups. Mean times to discharge from hospital were similar for all four groups. The side effects, loss of balance and head control, blurred vision and dysphoric reactions were observed only in the 0.75 and 1.0 mg.kg-1 midazolam groups.

We found that successful parental separation was observed in 95% in group I and 92% in group II. Emergence delirium was present in 18% in group II. Mask acceptance score was satisfactory in 94% in group I and II each. Kales et al[17]compared the effect of oral dexmedetomidine (DEX) and oral midazolam (MID) on preoperative cooperation and emergence delirium (ED) among children who underwent dental procedures. The medical records of 52 children, who were American Society of Anesthesiologists I, aged between 3 and 7 years, and who underwent full-mouth dental rehabilitation under general anesthesia (GA), were evaluated. Twenty-six patients were given 2 μg/kg of DEX, while another 26 patients were given 0.5 mg/kg of MID in apple juice as premedication agents. The patients' scores on the Ramsay Sedation Scale (RSS), Parental Separation Anxiety Scale (PSAS), Mask Acceptance Scale, Pediatric Anesthesia Emergence Delirium Scale (PAEDS), and hemodynamic parameters were recorded from patients' files. The level of sedation of children had been observed just before premedication and at 15, 30, and 45 min after premedication. The Mask Acceptance Scale and PSAS scores and RSS scores at 15, 30, and 45 min after premedication were not statistically different (p>0.05) in both groups, whereas the PAEDS scores were significantly lower in the DEX group (p<0.05).

CONCLUSION

Authors found that in pediatric dentistry patients, both premedication agents were found to be equally efficacious when administered under general anesthesia.

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