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Original Research Paper

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COMPARATIVE STUDY OF INTRANASAL DEXMEDETOMIDINE WITH INTRANASAL MIDAZOLAM FOR PREMEDICATION IN CLEFT PALATE SURGERIES

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ABSTRACT **Background and aim:** Perioperative anxiety is associated with adverse clinical outcomes with emergence delirium,increased analgesic required and negative postoperative behavioral changes which includes separation anxiety,eating problems,and new onset enuresis.Predictors of preoperative anxiety have been identified, and these include, among other factors, the age and temperament of the child Premedication helps to produce a anxiety free and relaxed state which helps reduce the stress of separation from the parents and helps to tolerate and cooperate with the procedure.Our study aims to compare between 0.5mcg/kg dexmedetomidine and 0.1mg/kg midazolam given intranasally for children posted for palatoplasty as premedication

KEYWORDS : Intranasal dexmedetomidine, intranasal midazolam,pediatrics, premedication

INTRODUCTION

Premedication in the pediatric population helps to produce a relaxed state with reduced anxiety and increased and rapid onset of action due to the high vascularization of the nasal mucosa. A γ-amino-butyric acid (GABA) receptor inhibitor, Midazolam has been widely used as a sedative drug in children as a premedication. It helps in providing effective sedation, anxiolytic effect, and of antero-grade amnesia of varying degrees. A recent clinical study shows that a dose of 0.1 mg/kg midazolam is effective in reducing both induction anxiety and separation from parent, with no effect on recovery time.

A newer alpha 2-agonist, Dexmedetomidine has more selective action on the alpha 2-adrenoceptor and has a shorter half-life. The bioavailability is around 80% when given via the nasal mucosa.Dexmedetomidine is used in the pediatric population as a preanesthetic because of its huge safety profile. We in our study wanted to show that dexmedetomidine can be used as an alternative to midazolam for intranasal premedication in children.This prospective randomized double-blind study was conducted to compare the efficacy of dexmedetomidine and midazolam as intranasal premedication in children undergoing Palatoplasty. The primary objective is to compare the preoperative sedation,response of child to parental separation, mask induction,and the incidence and severity of postoperative agitation between these two drugs .Secondary objectives was to study hemodynamic stability of both the drugs

AIMS:

Aim of the study is to compare intranasal dexmedetomidine with intranasal midazolam for premedication in cleft palate surgeries

OBJECTIVES:

1. The primary objective of the present study is to compare the of child to parental separation and mask induction
2. Secondary objectives was to study hemodynamic stability of both the drugs

MATERIALS & METHODS:

This study was carried out in the department of anaesthesiology after IEC approval and written informed consent of the parents of children posted for surgery .

Sixty children belonging to ASA I and II in the age group 10-12 months were enrolled in this randomized double blinded studyThe children were randomly assigned using simple randomization procedure (random numbers generated by computer) to one of two treatments into Group D (Dexmedetomidine) or Group M(Midazolam)through .

Intranasal study medication was given 30 min before inducing anesthesia to all the children.Patient in group M (30) received 0.1mg/kg of midazolam administered intranasally as nasal drop using 1ml insulin syringe and similarly group D (30) received 0.5μg/kg of dexmedetomidine administered intranasally as nasal drops using 1ml insulin syringe.An investigator who doesn't have role in the giving anaesthesia was made to prepare the drug mixture.

Anaesthesiologists attending the patients and the observers were blinded.A blinded observer was made to assess the sedation status once in 10 min with a six- point sedation scale as shown inTable and every 10 min the level of anxiety was evaluated using a four – point scale as shown in Table .All patients received general anaesthesia induced nasally by nitrous oxide, oxygen (50:50) and sevoflurane 2% via primed face mask. The degree of mask acceptance was assesed using a three-point Mask Induction score . Standard ASA monitors (NIBP, ECG, SPO2) were connected.

Selection Criteria:

Inclusion criteria:

1. Study population includes patients of Either sex
2. ASA Grade I and II patients.
3. Age group 10-12months

Exclusion criteria:

1. Refusal to give consent
2. Patient diagnosed with any congenital heart disease, recent upper respiratory tract infection/ lower respiratory tract infection, mental retardation and other genetic disorders

3. Allergy to dexmedetomidine, midazolam or an other drug

Table 1: Modifi ed Ramsey sedation score

Sedation Score	Response
1	Anxious and agitated or restless or both
2	Co-operative, oriented and tranquil
3	Responding to commands only
4	Brisk response to subxiphoid and suprasternal TTE probe placement
5	Sluggish response to subxiphoid and suprasternal TTE probe placement
6	No response to stimulus

Table 2: Anxiolysis score

Score	Criteria
1	Calm and cooperative;
2	Anxious but could be reassured;
3	Anxious and could not be reassured
4	Crying or resisting

Table 3:Mask induction score

1. Calm, cooperative or asleep
2. Moderate fear of the mask, cooperative with reassurance
3. Combative, crying

RESULTS:

The program SPSS for windows 13 were used for statistical analysis.

Primary Outcome:

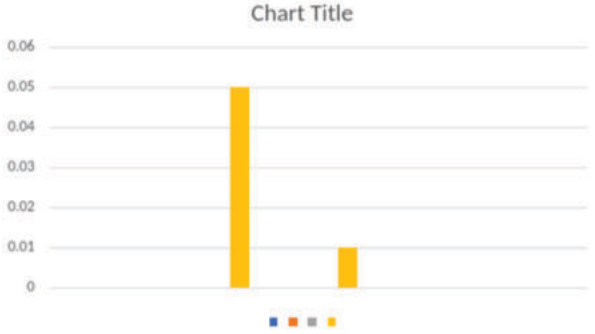
Ramsay Sedation score was significantly lower in the dexmedetomidine group when compared to midazolam group (*Pvalue* < 0.001) at , 10, 20, and 30 min after drug administration Fig 4 In Group D, anxiety score was significantly lower than Group M ($P = 0.001$) at 10, 20, and 30 min after administration of drug.Group D has better effectiveness in terms of achieving satisfactory sedation throughout mask induction (p value 0.024)

Secondary Outcome:

HR was found to be statistically significant (<0.001) until 30 min of drug administration [fig8]. There was no significant difference of SBP and DBP between groups was found at any interval of time

Table 4 shows Ramsay sedation score of group M and group D and their pvalues

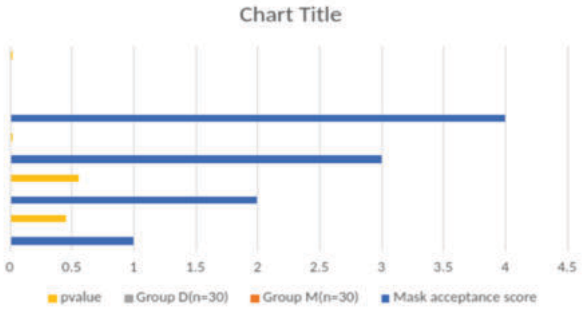
Time	Group M	Group D	pvalue
baseline	1(1-1)	1(1-1)	0.05
10mins	1(1-1)	2(1-2)	.01
20mins	1(1-1)	2(2-2)	<.01
30mins	1(1-1)	2(2-2)	<.001



Graph 1 shows the graphical representation of ramsay sedation score of group D and group M and their p value

Mask acceptance score	Group M(n=30)	Group D(n=30)	pvalue
1	3(10.0)	0	0.45
2	3(10.0)	0	0.56
3	14(46.7)	11(36.7)	0.02
4	10(33.3)	19(63.3)	0.01
Satisfactory(3-4)	30(100)	24(80.0)	0.024

Fig 6 shows comparison of Mask acceptance score of Group D and Group M



Graph 2 shows comparison of Mask acceptance score of Group D and Group M

Variables	Mean±SD		P value
	Group D	Group M	
BS baseline	3.47±0.629	3.53±0.507	0.653
BS 5 min	1.30±0.535	2.07±0.828	<0.001
BS 10 min	1.20±0.551	1.87±0.900	0.001
BS 15 min	1.17±0.461	1.83±0.928	0.001
BS 20 min	1.17±0.461	1.80±0.925	0.001
BS 25 min	1.17±0.461	1.80±0.925	0.001
BS 30 min	1.13±0.434	1.80±0.925	0.00

Fig 7 shows anxiety score comparison between group D and group M and their respective p values

Time interval	Mean±SD		P
	Group D	Group M	
HR baseline	108.77±20.686	109.50±22.551	0.896
HR 5 min	95.20±20.679	109.70±22.890	0.013
HR 10 min	89.87±17.577	109.50±22.604	<0.001
HR 15 min	85.77±15.409	107.53±22.104	<0.001
HR 30 min	84.00±14.047	109.13±20.382	<0.001

Figure 8 shows heart rate between group D and Group M and their respective p values

DISCUSSION

Pediatric anesthesia is presented with a unique challenge as it deals with biologically vulnerable age groups. Even though repeatedly reassured by parents, surgeons, and anesthetists, a large number of children still remain anxious preoperatively and an equal number of children suffer from postoperative maladaptive behaviors even a weeks after surgical experience[3].Hence, premedication is required to alleviate anxiety and fear, allow smooth separation from parents, and allow easy acceptance of needle prick for i.v. cannulation and anesthesia induction. Our study, intends to compare the effects of intranasal dexmedetomidine and midazolam on mask induction and reduction of anxiety upon separation from parents in children undergoing cleft palate surgeries.It was found that premedication with 0.5μg/kg of intranasal dexmedetomidine was superior to 0.1 mg/kg of intranasal midazolam in decreasing anxiety at parenteral separation. Intranasal dexmedetomidine has better effectiveness in terms of achieving satisfactory sedation throughout mask induction as stated by Malinovsky JM Et Al[2]

HR between two groups was found to be statistically significant ($P < 0.001$) and decrease of HR was more in Group D than Group M. This can be explained by the fact that

dexmedetomidine is known to cause decrease in sympathetic outflow and circulating catecholamine levels and would therefore be expected to cause a decrease in HR, and our study was supported by similar result of Sundaram and Mathian Et al[1]Yuen et al. study shows that the maximum sedative action of intranasal dexmedetomidine is observed after 45–60 min.

L Kumar Et Al[4] in 2017 has compared nasal instillation of Dexmedetomidine with oral Midazolam in various types of paediatric surgeries and has shown that both are effective premedication in paediatric practice[4]We found that there were no clear differences among both the groups with relevance to adverse effects, emergence from anaesthesia, or follow-up respiratory and hemodynamic Effects . There was no clinical significant effects of the study drugs on oxygen saturation and no child had a reduction of Spo2 to below 95% during the observation period after premedication.

CONCLUSION

Intranasal dexmedetomidine was associated with lower sedation levels, lower anxiety levels, and easier parent separation at the time of transferring patients to the OR without significant side effects than children who received intranasal midazolam.

Conflicts of Interest: There is no conflict of interest

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