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Original Research Article

TO STUDY THE EFFECT OF DEXMEDETOMIDINE IN CONTROLLING POSTOPERATIVE EMERGENCE AGITATION IN CHILDREN UNDER SEVOFLURANE ANESTHESIA

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Abstract

Background & Methods: The aim of the study is to study the Effect of Dexmedetomidine in Controlling Postoperative Emergence Agitation in Children under Sevoflurane Anesthesia. Six hours before the surgery, patients did not receive any solid food or milk; if necessary, they only consumed filtered liquids up to 2 hours before the surgery. None of the patients received premedication, and once patients arrived in the operating room, they were evaluated and scored in terms of agitation using the four-point scale method. 0en they were subjected to routine monitoring such as electrocardiography, pulse oximetry, and noninvasive sphygmomanometer.

Results: We found Calm (69%) & not calm (29%), the chi-square statistic is 1.9232. The *p*-value is .041551. The result is significant at $p < .05$. We found Bradycardia (6.25%) & Hypotension (2.5%) & Vomiting (1.25%), the chi-square statistic is 4.6667. The *p*-value is .030754. The result is significant at $p < .05$.

Conclusion: Dexmedetomidine decreases the incidence of postoperative emergence agitation in children under sevoflurane anesthesia. Our analysis also indicated that dexmedetomidine can decrease the incidence of postoperative pain, prolong emergence time, and extubation time. We propose that dexmedetomidine is a promising agent to prevent EA in children under sevoflurane anaesthesia. More studies are required to evaluate the effect of dexmedetomidine on the prevention of PONV.

Keywords: Dexmedetomidine, Postoperative, Emergence, Sevoflurane & Anaesthesia.
Study Design: Observational Study.

1. INTRODUCTION

Sevoflurane is a commonly used inhalational anaesthetic agent in the paediatric population due to its non-pungency, smooth and rapid induction properties[1]. Its low blood gas partition coefficient ensures prompt induction and recovery following sevoflurane discontinuation. Sevoflurane also induces bronchodilation and causes the least airway irritation among currently available volatile anaesthetics.

Sevoflurane is a widely used inhalational anaesthetic for pediatric anaesthesia because of its low pungency, low blood–gas partition coefficient, rapid onset, fast recovery properties, minimal cardiac depressive effect, and low toxicity [2]. However, sevoflurane anesthesia is associated with a high incidence (10%–80%) of emergence agitation (EA) in children [3]. The etiology of EA derives from numerous factors including rapid awakening, pain,

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preoperative anxiety, surgery type, personality, and anaesthetic administered. EA is also associated with complications such as self-harm, anxiety, and increased costs for additional medical care[4].

Drugs such as the Alfa -2-adrenoceptor agonist dexmedetomidine may improve EA after sevoflurane anesthesia. Dexmedetomidine is highly specific for the Alfa -2-adrenoceptor and has an 8-fold higher affinity than clonidine [5]. It has sedative, analgesic, and anxiolytic properties with few adverse effects. Several clinical trials have shown that intravenous dexmedetomidine significantly reduces the incidence of EA in children under sevoflurane anaesthesia [6].

Dexmedetomidine is a selective α-2 agonist with 1600 times more affinity to α-2 than α-1. It possesses sedative, anxiolytic, and analgesic properties due to its central sympatholytic effects, making it suitable for use in intensive care and operating room settings [7].

2. MATERIAL AND METHODS

Present study was conducted at GMC, Bhopal, M.P. for 01 Year. Parents were sufficiently explained by the Anaesthesiologist about the procedure and performing the trial, and then parents signed the consent form. 80 children between 2 and 7 years with ASA class I who were candidates for elective adenoidectomy surgery, tonsillectomy, or both were selected by an easy and available sampling method.

Inclusion Criteria: The inclusion criteria were patients (male and female) aged 2 to 7, ASA classes I (American Society of Anaesthesiology), and candidates for elective adenoidectomy surgery, tonsillectomy, or both.

Exclusion Criteria: Exclusion criteria were intellectual or developmental disability (IDD) or presence of neurological diseases; upper airway abnormality; children with comorbid cardiovascular systemic diseases or ongoing allergies to the study drug; history of asthma or other lung diseases; and presence of lung infections in the last four weeks. Moreover, children with special conditions during the operation such as severe hypotension, malignant arrhythmia, significantly prolonged operation time for other reasons, parents who refused to participate in the study, and children who consumed chronic painkillers were excluded.

3. RESULT

Table No. 1: Gender Distribution

S. No.	Gender	No.	Percentage	BMI	P Value
1	Male	51	63.75	13.46±1.39	.532876
2	Female	29	36.25	12.91±2.77	

We found 63.75% males & 36.25 % females, the chi-square statistic is 1.86732. The *p*-value is .532876. The result is significant at $p < .05$.

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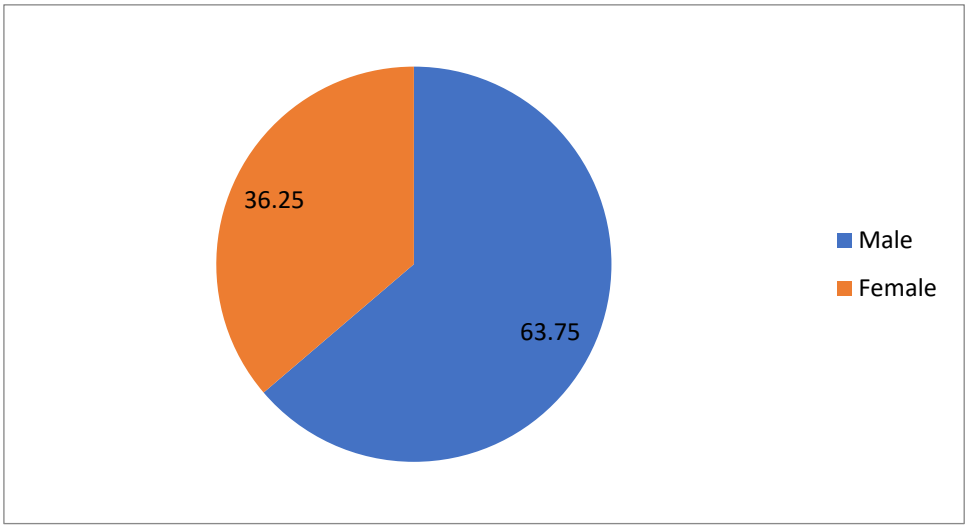

Table No. 2: Demographic Profile

S. No.	Gender	Mean	SD	P Value
1	Duration of anesthesia (min)	23.01	3.72	0.431
2	Duration of surgery (min)	31.88	1.38	0.624
3	Emergence from anesthesia (min)	9.14	4.93	0.001

We found mean of Duration of anaesthesia 23.01, Duration of surgery 31.88, Emergence from anaesthesia 9.14.

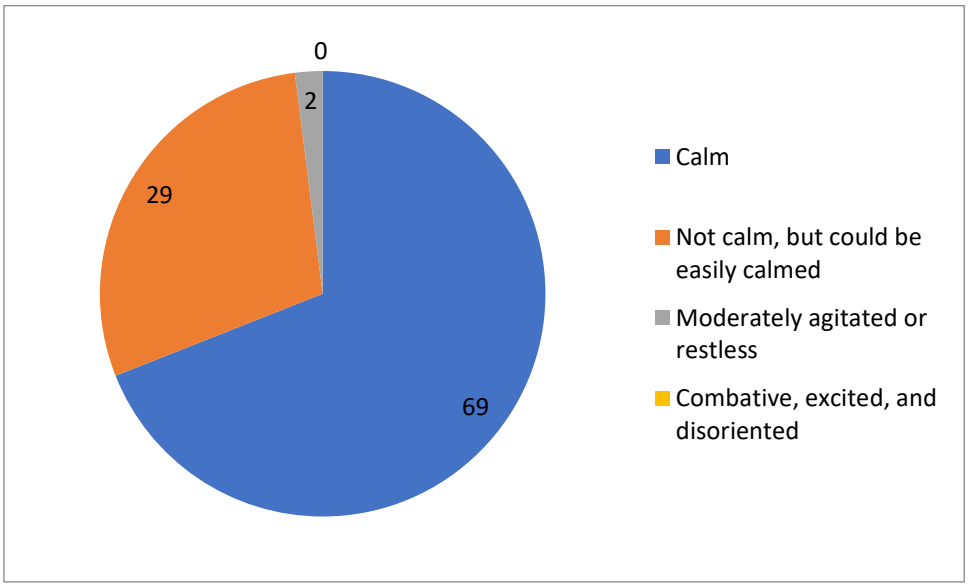

Table No. 3: Level of preoperative agitation

S. No.	Level of preoperative agitation	No.	Percentage	P Value
1	Calm	56	69	.041551
2	Not calm, but could be easily calmed	23	29	
3	Moderately agitated or restless	01	02	
4	Combative, excited, and disoriented	00	00	

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We found Calm (69%) & not calm (29%), the chi-square statistic is 1.9232. The *p*-value is .041551. The result is significant at $p < .05$.

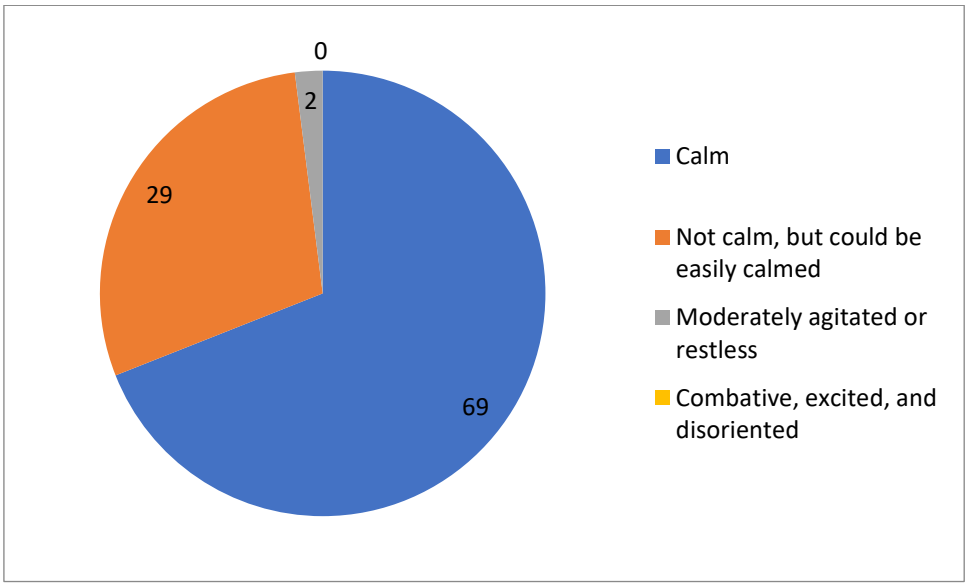
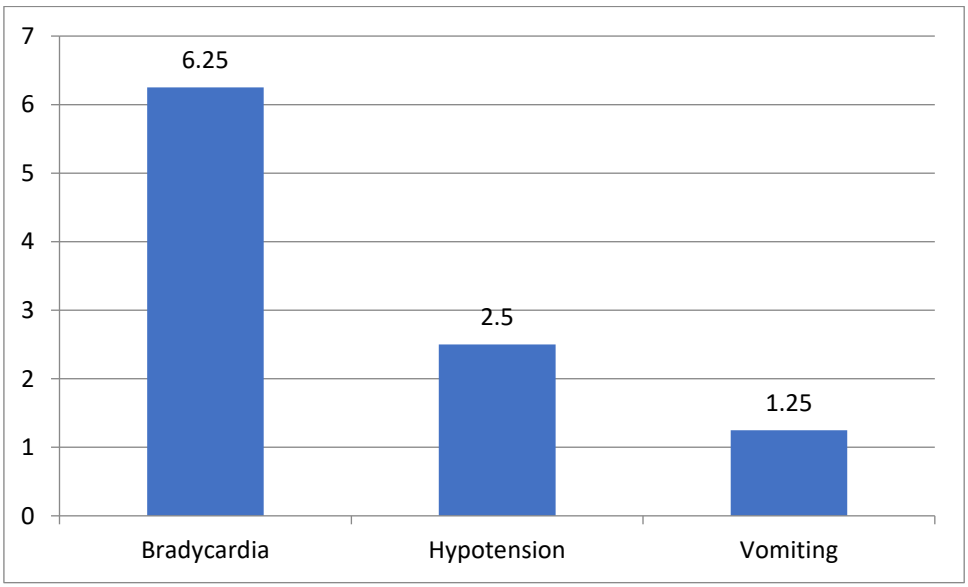


Table No. 4: Side Effects

S. No.	Side Effects	No.	Percentage	P Value
1	**Bradycardia**	**05**	**6.25**	.030754
2	**Hypotension**	**02**	**2.5**	
3	**Vomiting**	**01**	**1.25**	

We found Bradycardia (6.25%) & Hypotension (2.5%) & Vomiting (1.25%), the chi-square statistic is 4.6667. The *p*-value is .030754. The result is significant at $p < .05$.



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4. DISCUSSION

The incidence and severity of EA were lower in the group that received dexmedetomidine compared to patients who received propofol. The difference in the incidence of EA in the initial 30 minutes in the PACU between the two groups was statistically significant (p-value <0.05), with the dexmedetomidine group exhibiting a lower incidence. group SD showed an increasing trend in the incidence of EA during the first 30 minutes in the PACU. This result in group SD contrasted with the study conducted by Ali MA and Abdellatif AA []. This difference may be attributed to the fact that their study population included children undergoing adenotonsillectomy, a surgery known for a high propensity for EA. group SD showed the highest incidence of EA at 25 and 30 minutes (14.2%). group SP exhibited the highest incidence within the first 15 minutes in the PACU, with the peak incidence (62.8%) occurring at five minutes in the PACU. This result reported in group SP in present study was consistent with the findings of the study by Ali MA and Abdellatif AA []. They observed that the incidence and severity of EA were high within the first 15 minutes in the control group, propofol group, and dexmedetomidine group in the PACU. The control group displayed a higher incidence of EA compared to the other two groups. The dexmedetomidine group exhibited the lowest incidence of EA compared to propofol, which aligns with our results.

The time of extubation between the two groups was statistically significant, with group SD having lower extubation times (p-value <0.001). The side-effects and duration of PACU stay between the two groups were comparable (p-values 0.595 and 0.382, respectively). These results were consistent with the study report by Ali MA and Abdellatif AA (p-value ≥0.05) []. Wu et al., found lower extubation times (11.35±3.17) with propofol 2 mg/kg i.v. compared to saline placebo (21.41±4.62) (p-value <0.001) given towards the end of surgery. They correlated this positively with lower PAED scores in the propofol group [].

Dexmedetomidine, as a highly selective Alfa-2 adrenergic receptor agonist, can produce pharmacological effects of antianxiety, sedation, and analgesia without overt respiratory and circulatory inhibition in a routine dose. Meanwhile, dexmedetomidine can improve the cognitive function in children during recovery from general anaesthesia and contributes to dose-dependent inhibition of EA or ED after medical procedures. The optimal dose of dexmedetomidine for preventing EA was 0.30 μg/kg (95% CI: 0.21–1.00 μg/kg). An animal experiment demonstrated that dexmedetomidine could enhance spatial learning and memory in neonatal rats under physiological conditions through promoting hippocampal neurogenesis.

5. CONCLUSION

Dexmedetomidine decreases the incidence of postoperative emergence agitation in children under sevoflurane anesthesia. Our analysis also indicated that dexmedetomidine can decrease the incidence of postoperative pain, prolong emergence time, and extubation time. We propose that dexmedetomidine is a promising agent to prevent EA in children under sevoflurane anaesthesia. More studies are required to evaluate the effect of dexmedetomidine on the prevention of PONV.

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ISSN: 0975-3583, 0976-2833 VOL15, ISSUE6, 2024

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