Original Research

CLINICAL ASSESSMENT OF DEXMEDETOMIDINEASAN INTRAOPERATIVE ADJUVANT IN REDUCING EMERGENCE AGITATION AFTER ORAL AND NASAL SURGERY

Dr . Jayakumar[1], Dr. Vijay Balan P[2*]
[1]Junior Resident, Department of Anaesthesia, Sreemookambika Institute of Medical Scienceskanyakumari, Tamilnadu, India.
[2*]Professor, Department of Anaesthesia, Sreemookambika, Institute of Medical Sciences, Kanyakumari, Tamilnadu, India.
Corresponding Author: Dr. Vijay Balan P
Junior Resident, Department of Anaesthesia, Sreemookambika Institute of Medical Sciences, Kanyakumari, Tamilnadu, India.

ABSTRACT

Background: Emergence agitation (EA) is a postoperative complication characterized by confusion, disorientation, and restlessness during recovery from general anaesthesia. It is more commonly observed in ENT surgeries, particularly oral and nasal procedures, due to airway discomfort and rapid emergence from volatile anaesthetics. Dexmedetomidine, an alpha-2 adrenergic agonist, has been widely studied for its sedative, anxiolytic, and sympatholytic properties in reducing EA.

Methodology: This prospective randomized comparative study was conducted in the Department ofAnaesthesiology, Sree Mookambika Institute of Medical Sciences, Kulasekharam, from February 2025 to January 2026. A total of 100 patients aged 20–60 years, ASA I–II, undergoing elective oral and nasal surgeries under general anaesthesia were included and randomly allocated into two groups of 50 each. Group D received dexmedetomidine intraoperatively, while Group C received standard anaesthetic management. Demographic variables, haemodynamic parameters, and incidence of emergence agitation were recorded and analysed using appropriate statistical tests.

Both groups were comparable in age and gender distribution ($p>0.05$). Group D showed better haemodynamic stability and significantly reduced emergence agitation compared to Group C. Patients receiving dexmedetomidine had smoother extubation, improved sedation profiles, and lower postoperative agitation scores without significant respiratory depression.

Conclusion: Dexmedetomidine is an effective intraoperative adjuvant in reducing emergence agitation and improving recovery quality in patients undergoing oral and nasal surgeries under general anaesthesia.

Keywords: Dexmedetomidine, Emergence Agitation, General Anaesthesia, Oral Surgery, Nasal Surgery, Postoperative Recovery.

INTRODUCTION

Emergence agitation (EA) is a well-recognized phenomenon occurring during recovery from general anaesthesia and is characterized by confusion, disorientation, restlessness, and violent behaviour during the early post-anaesthetic period.[1] It is a transient state of altered consciousness in which the patient may appear awake but exhibits impaired cognition and psychomotor agitation. The condition usually develops immediately after discontinuation of anaesthesia and lasts for Approximately 5–15 minutes.2 Emergence agitation is clinically important because it may result in self-extubation, accidental removal of intravenous lines or surgical dressings, bleeding, injury to the patient or healthcare personnel, delayed recovery, and increased postoperative morbidity.3

The incidence of emergence agitation is reported to be higher in paediatric patients compared to adults. In adults, the reported incidence ranges from 3.7% to 22.2%, whereas in paediatric patients it may reach up to 43.2%.4 Although the exact pathophysiology of EA remains unclear, several precipitating factors have been identified. These include rapid emergence from anaesthesia, postoperative pain, preoperative anxiety, younger age, male gender, duration and type of surgery, and the use of volatile inhalational anaesthetic agents with low blood–gas solubility.5

Ear, nose, and throat (ENT) surgeries are associated with a particularly high incidence of emergence agitation in both adults and children.6 Patients undergoing oral and nasal surgeries frequently experience discomfort due to throat packs, nasal packing, airway irritation, postoperative pain, and a sensation of suffocation during recovery from anaesthesia.7 Nasal surgeries especially predispose patients to EA because nasal packing may obstruct normal breathing, creating anxiety and restlessness during emergence from anaesthesia. This sensation of airway compromise may contribute significantly to

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agitation and confusion in the postoperative period.8

Among inhalational anaesthetic agents, desflurane has gained popularity because of its rapid onset and recovery characteristics. Desflurane is a volatile ether anaesthetic agentwith a very low blood–gas partition coefficient, which allows quick emergence and rapid restoration of airway reflexes.9 These properties make it particularly useful for ambulatory and short-duration surgeries as well as in elderly patients where rapid recovery is desirable.[10] However, rapid awakening associated with desflurane may also predispose patients to emergence agitation due to abrupt return of consciousness before complete restoration of orientation and cognition.[11]

Dexmedetomidine is a highly selective alpha-2 adrenergic receptor agonist possessing sedative, anxiolytic, sympatholytic, and analgesic properties.[12] Unlike many sedative agents, dexmedetomidine produces sedation resembling natural sleep without causing significant respiratory depression.[13] It acts on alpha-2 receptors in the locus coeruleus and spinal cord, thereby reducing sympathetic activity and attenuating stress responses during emergence from anaesthesia. Previous studies have demonstrated that dexmedetomidine effectively reduces the incidence and severity of emergence agitation, decreases postoperative analgesic requirement, and provides smoother recovery profiles in patients undergoing ENT surgeries.[14]

Because oral and nasal surgeries are associated with a higher incidence of emergence agitation, identifying effective preventive strategies is of great clinical importance. Dexmedetomidine, when used intraoperatively as an adjunct to general anaesthesia, may attenuate emergence agitation and improve the quality of recovery without causingsignificant respiratory compromise. Therefore, the present study was undertaken to evaluate the efficacy of dexmedetomidine in reducing emergence agitation in patients undergoing oral and nasal surgeries under general anaesthesia.

Aim

To determine the efficacy of intraoperative dexmedetomidine as an adjunct in attenuating emergence agitation in patients undergoing oral and nasal surgeries under general anaesthesia

Objectives

1. To evaluate the incidence and severity of emergence agitation in patients receiving intraoperative dexmedetomidine.
2. To compare haemodynamic parameters such as heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure during emergence and recovery.
3. To assess the quality of recovery and smoothness of extubation following administration of dexmedetomidine.

MATERIALS AND METHODS

This prospective randomized comparative study was conducted in the Department ofAnaesthesiology at Sree Mookambika Institute of Medical Sciences, Kulasekharam, from February 2025 to January 2026 after obtaining approval from the Institutional Ethics Committee and written informed consent from all patients. The study included patients of both sexes aged between 20 and 60 years belonging to American Society ofAnesthesiologists (ASA) physical status I and II who were scheduled for elective oral and nasal surgical procedures under general anaesthesia. Only procedures with an expected duration between 60 and 240 minutes were included in the study.

Patients who refused participation, those belonging to ASA physical status III and above, patients receiving monoamine oxidase (MAO) inhibitors or beta-adrenergic blocking drugs, and patients with suspected allergy to alpha-2 adrenergic agonists or non-steroidal anti- inflammatory drugs (NSAIDs) were excluded from the study. Patients with severe bradyarrhythmias secondary to atrioventricular block, ischemic heart disease, valvular heart disease, cognitive impairment, or psychiatric illness were also excluded.All patients underwent detailed pre-anaesthetic evaluation including clinical history, physical examination, airway assessment, and routine laboratory investigations. Patients were kept nil per oral according to standard fasting guidelines. On arrival to the operating theatre, standard monitoring including electrocardiography (ECG), non-invasive blood pressure (NIBP), pulse oximetry (SpO_2), and heart rate monitoring was instituted. Baseline haemodynamic parameters including heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, respiratory rate, and oxygen saturation were recorded. Intravenous access was secured and patients were preloaded with intravenous crystalloids before induction of anaesthesia.

Patients were randomly allocated into study groups using a computer-generated randomization method. General anaesthesia was administered according to standard institutional protocol. Dexmedetomidine was administered intraoperatively as an adjunct according to the study design. Intraoperative haemodynamic parameters including heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, and oxygen saturation were monitored at regular intervals throughout the procedure and during emergence from anaesthesia.

Emergence agitation was assessed in the post-anaesthesia care unit (PACU) using a standardized agitation scoring scale. Sedation levels,

postoperative pain scores, extubation quality, recovery characteristics, and requirement for rescue analgesics were also evaluated.

Adverse effects such as bradycardia, hypotension, respiratory depression, nausea, vomiting, and excessive sedation were recorded and managed appropriately.

The collected data were entered into Microsoft Excel and analysed using Statistical Package for Social Sciences (SPSS) software version 25.0. Quantitative variables were expressed as mean ± standard deviation, while qualitative variables were expressed as frequency and percentage. Independent Student's t-test was used for comparison of continuous variables between groups, and Chi-square test or Fisher's exact test was applied for categorical variables. Repeated measures analysis of variance (ANOVA) was used for comparison of haemodynamic variables measured at different time intervals. A p-value of less than 0.05 was considered statistically significant.

RESULT

Table 1: Descriptive analysis of the study group in the study population (N=100)

Study group	Frequency	Percentages
Group C	50	50.00%
Group D	50	50.00%

Among the study population, 50(50%) were in group C, and the remaining 50(50%) were in group D. (Table 1 & Figure 1).

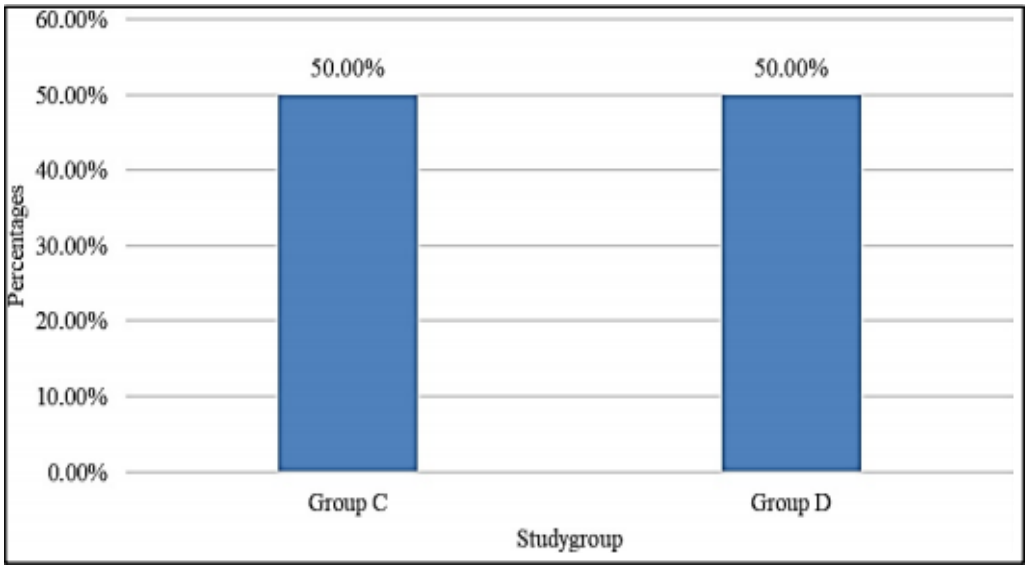

Fig 1: Bar chart of the study group in the study population (N=100)

Table 2: Comparison of mean age between study groups (N=100)

Parameter	Age (Mean± SD)	Mean differen ce	95% CI		P value
			Low er	Upp er	
Group C (N=50)	41.46 ± 12.3	0.24	-4.58	5.06	0.922
Group D (N=50)	41.22 ± 12.01				

The mean age in group C was 41.46 ± 12.3 years, it was 41.22 ± 12.01 in group D. The difference in age between two groups was statistically not significant (P value 0.922) (Table 2)

Table 3: Comparison of gender between study group (N=100)

Gend er	Study group		Chi square	P-value
	Group C (N=50)	Group D (N=50)		
Male	32 (64%)	26 (52%)	1.478	0.224
Fema le	18 (36%)	24 (48%)		

Among group C 32 (64%) participants were male, 18 (36%) participants were female. Among group D 26 (52%) participants were male and 24 (48%) participants were female. The difference in the proportion of gender between the two groups was statistically not significant (P value 0.224). (Table 3 & Figure 2).

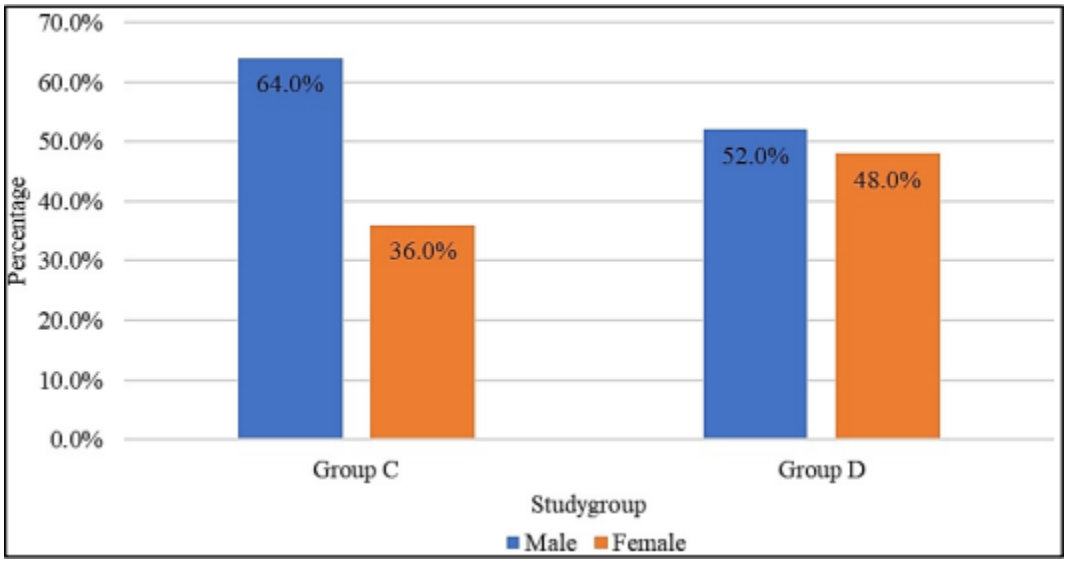

Fig 2: Cluster bar graph for comparison of gender between study group (N=100)

DISCUSSION

The present study was conducted to compare the efficacy of dexmedetomidine (Group D) and control/standard treatment group (Group C) in attenuation of emergence agitation in patients undergoing oral and nasal surgeries under general anaesthesia. A total of 100 patients were included in the final analysis with equal distribution between the two groups, ensuring balanced comparison and reducing selection bias.

In the present study, both groups were comparable with respect to demographic variables. The mean age in Group C was 41.46 ± 12.3 years, while in Group D it was 41.22 ± 12.01 years, with no statistically significant difference (p = 0.922). Similarly, gender distribution was also comparable between the groups, with 64% males in Group C and 52% males in Group D (p = 0.224). This homogeneity between groups is essential in clinical research to ensure that differences in outcomes are attributable to the intervention rather than confounding demographic variables. Comparable findings have been reported in previous studies where baseline characteristics were similar across study groups assessing dexmedetomidine for emergence agitation control.I5

Emergence agitation remains a significant postoperative concern, particularly following ENT surgeries, where airway-related discomfort, nasal packing, and rapid recovery from inhalational anaesthetics contribute to its occurrence.I6 The incidence of emergence agitation varies widely depending on patient population, type of surgery, and anaesthetic technique. In adults, reported incidence ranges between 3.7% and 22.2%, whereas higher rates have been documented in paediatric populations.I7 In the present study design, random allocation and comparable baseline characteristics strengthen the validity of subsequent outcome comparisons.

Dexmedetomidine has been extensively studied as an agent capable of reducing emergence agitation due to its sedative and anxiolytic properties mediated through central alpha-2 adrenergic receptor agonism.I8 It reduces sympathetic outflow, blunts stress response to extubation, and promotes a smoother transition from anaesthesia to wakefulness. Additionally, it provides analgesia, thereby addressing postoperative pain—a major contributor to agitation.I9 These pharmacological properties make dexmedetomidine particularly suitable for ENT procedures, where airway irritation and pain are prominent triggers for agitation.

Previous literature has demonstrated that intraoperative dexmedetomidine significantly reduces the incidence and severity of emergence agitation and improves overall recovery quality. Guler et al. reported smoother extubation and reduced agitation in patients receiving dexmedetomidine during adenotonsillectomy.20 Similarly, Kim et al. observed improved recovery profiles and reduced agitation scores in nasal surgery patients receiving dexmedetomidine compared to placebo.2I These findings are consistent with the expected pharmacodynamic profile of the drug and support its role as an effective adjunct in general anaesthesia.

The present study's balanced demographic profile enhances the reliability of outcome interpretation. Since both age and gender are known to influence emergence behaviour, comparable distribution ensures that observed differences in agitation or recovery characteristics are more likely attributable to the intervention rather than patient variability. Furthermore, the equal sample size in both groups improves statistical power and strengthens comparative analysis.

Overall, the baseline comparability observed in this study provides a strong foundation for evaluating the true effect of dexmedetomidine on emergence agitation. The subsequent analysis of haemodynamic stability, sedation, recovery characteristics, and agitation scores will further clarify its clinical advantage over standard management in oral and nasal surgical procedures.

CONCLUSION

The present study demonstrated that dexmedetomidine is an effective intraoperative adjunct in reducing emergence agitation in patients undergoing oral and nasal surgeries under general anaesthesia. Patients receiving dexmedetomidine showed better haemodynamic stability, improved sedation, smoother extubation, and reduced postoperative agitation compared to the control group. It also contributed to improved overall recovery quality without significant adverse effects. Hence, dexmedetomidine can be considered a useful and safe adjuvant for attenuation of emergence agitation in oral and nasal surgical procedures, leading to smoother recovery and improved patient outcomes.

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