

ORIGINAL ARTICLE

Assessment of role of dexmedetomidine infusion as anaesthetic adjuvant during middle ear surgery

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ABSTRACT:

Background: Middle ear surgery under general anaesthesia is revolutionised with the introduction of hypotensive anaesthesia that provides a relatively bloodless field while using an operating microscope. The present study was conducted to assess the role of dexmedetomidine infusion as anaesthetic adjuvant during middle ear surgery. **Materials & Methods:** 70 adult patients aged ranged 18-58 years of American Society of Anaesthesiologists (ASA) physical status I and II of both genders selected for elective middle ear surgery. Group I patients received infusion of dexmedetomidine 0.5 µg/kg/hour and group II patients received placebo infusion of normal saline during middle ear surgery after induction of anaesthesia till 20 minutes before completion of surgery. All patients were assessed intra-operatively for bleeding at surgical field and haemodynamic changes. **Results:** The mean surgical time in group I was 96.2 minutes and in group II was 105.4 minutes, heart rate (beats/min) was at baseline in group I was 94.1 and in group II was 92.8, after induction was 73.3 in group I and 72.0 in group II, after intubation 5 min was 77.6 in group I and 75.4 in group II, 30 min was 73.6 in group I and 78.8 in group II, at 60 min was 68.7 in group I and 87.2 in group II and after extubation was 84.5 in group I and 97.3 in group II. There was mean percentage of isoflurane requirement of 0.81% in group I and 1.52 % in group II. The difference was significant (P < 0.05). **Conclusion:** Dexmedetomidine infusion was safe to provide oligoemic surgical field for better visualisation for middle ear surgery under operating microscope.

Key words: Dexmedetomidine, Isoflurane, Middle ear surgery

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INTRODUCTION

Middle ear surgery under general anaesthesia is revolutionised with the introduction of hypotensive anaesthesia that provides a relatively bloodless field while using an operating microscope.¹ The primary methods to minimise blood loss during middle ear surgery included mild head elevation of 15°, and infiltration or topical application of epinephrine (1: 50,000 or 1: 200,000). Currently, many inhalational or intravenous anaesthesia techniques were evaluated to offer ideal intra-operative conditions for middle ear surgery with their advantages and disadvantages.²

Tympanoplasty can be done both under local or general anesthesia. Some surgeons prefer using local anesthesia for middle ear surgery owing to various advantages such as less bleeding and being able to test hearing during the surgery itself.³ However, local anesthesia alone has been reported to be associated with anxiety, dizziness, claustrophobia, and earache; hence, there is always a quest to find out an anesthetic drug, which can be used with local anesthetic block with maximum benefit and with minimum associated disadvantages.⁴ A variety of drugs are being used viz., propofol, benzodiazepines and opioids have been used for hypnosis, sedation and analgesia in the middle ear surgery in order to enhance the patient and surgical comfort; however, none has been completely complication free. Among

various complications reported are - over-sedation, respiratory depression, disorientation and hampered patient's cooperation during surgery.⁵

Dexmedetomidine (dexM), is a centrally acting α-2 receptor agonist with analgesic and conscious sedative effect without respiratory depression.⁶ It has been reported to significantly reduce the opioid requirements both during and after surgery. It is valuable because of its anaesthetic and analgesic-sparing effects with predictable and dose-dependent haemodynamic effects.⁷ The present study was conducted to assess the role of dexmedetomidine infusion as anaesthetic adjuvant during middle ear surgery.

MATERIALS & METHODS

The present study comprised of 70 adult patients aged ranged 18-58 years of American Society of Anaesthesiologists (ASA) physical status I and II of both genders selected for elective middle ear surgery., were enrolled for this prospective double-blind placebo controlled randomised study. All were enrolled once they provided their written consent.

Data such as name, age, gender etc. was recorded. Patients were randomly divided into two groups of 35 patients each. Group I patients received infusion of dexmedetomidine 0.5 µg/kg/hour and group II patients received placebo infusion of normal saline

during middle ear surgery after induction of anaesthesia till 20 minutes before completion of surgery. All patients were assessed intra-operatively for bleeding at surgical field, haemodynamic changes,

awakening time and post-operative recovery. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Agent	Dexmedetomidine	Placebo
M:F	15:20	16:19

Table I shows that group I had 15 males and 20 females and group II had 16 males and 19 females.

Table II Comparison of parameters

Parameters	Variables	Group I	Group II	P value
Surgical time (minutes)	Surgical time (minutes)	96.2	105.4	0.03
Heart rate (beats/min)	Heart rate (beats/min) Baseline	94.1	92.8	0.02
	After induction	73.3	72.0	
	After intubation 5 min	77.6	75.4	
	30 min	73.6	78.8	
	60 min	68.7	87.2	
	After extubation	84.5	97.3	
Intra- operative bleeding	Intra- operative bleeding 0	0	0	0.04
	1	28	4	
	2	7	23	
	3	0	8	

Table II, graph I shows that mean surgical time in group I was 96.2 minutes and in group II was 105.4 minutes, heart rate (beats/min) was at baseline in group I was 94.1 and in group II was 92.8, after induction was 73.3 in group I and 72.0 in group II, after intubation 5 min was 77.6 in group I and 75.4 in group II, 30 min was 73.6 in group I and 78.8 in group II, at 60 min was 68.7 in group I and 87.2 in group II and after extubation was 84.5 in group I and 97.3 in group II. The difference was significant (P< 0.05).

Graph I Comparison of parameters

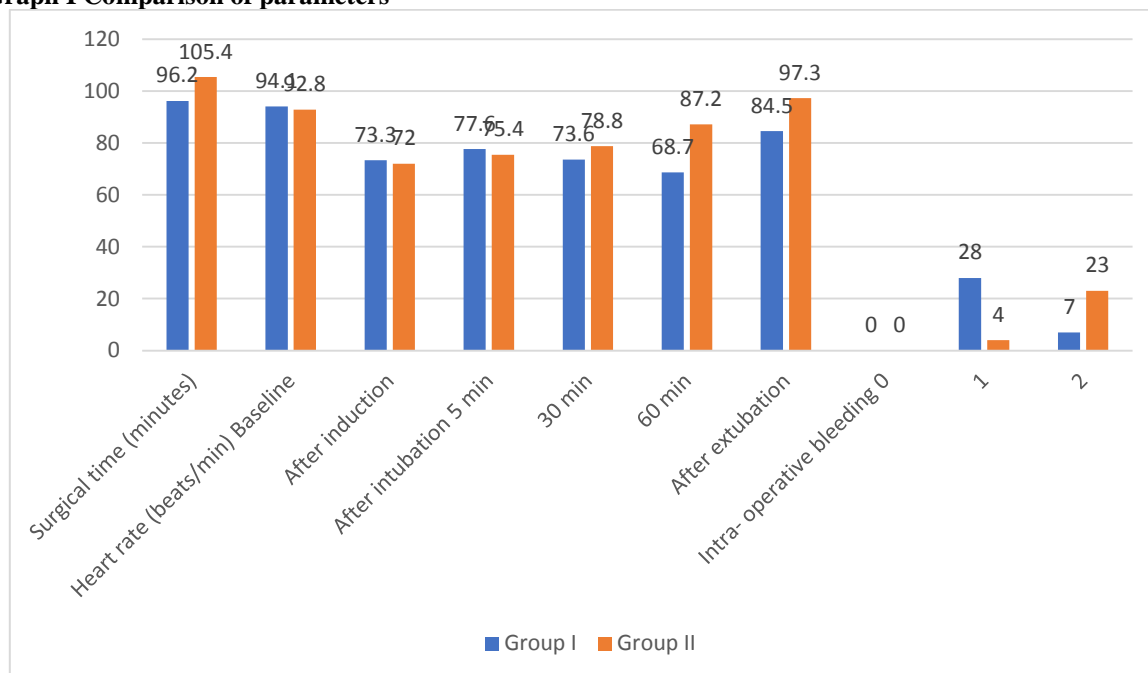


Table III Mean percentage of isoflurane requirement

Groups	Mean	P value
Group I	0.81	0.01
Group II	1.52	

Table III shows that there was mean percentage of isoflurane requirement of 0.81% in group I and 1.52 % in group II. The difference was significant ($P < 0.05$).

DISCUSSION

There have been several reports on the successful use of dexM as the primary sedative drug for orthopedic, ophthalmic, dental, and plastic surgery, and for diagnostic procedures.⁸ Due to its analgesic properties, cooperative sedation and lack of respiratory depression, dexM is increasingly being used as a sedative for monitored anesthesia care, dexM has a sympatholytic effect that can attenuate the stress response to surgery (tachycardia and hypertension) and maintains hemodynamic stability.⁹ As dexM inhibits the central sympathetic outflow and inhibits the norepinephrine release by stimulation of α -2 adrenoceptor, it is expected to decrease MAP.¹⁰ The present study was conducted to assess the role of dexmedetomidine infusion as anaesthetic adjuvant during middle ear surgery.

In present study, group I had 15 males and 20 females and group II had 16 males and 19 females. Gupta et al¹¹ conducted a study on sixty- four adult patients aged 18-58 years, American Society of Anaesthesiologists Grades I and II, of both gender which were randomised into two comparable equal groups of 32 patients each for middle ear surgery under general anaesthesia with standard anaesthetic technique. After induction of general anaesthesia, patients of Group I were given dexmedetomidine infusion of 0.5 μ g/kg/h and patients of Group II were given placebo infusion of normal saline. Isoflurane concentration was titrated to achieve a systolic blood pressure 30% below the baseline value. Statistically significant reduction was observed in the required percentage of isoflurane ($0.8 \pm 0.6\%$) to maintain the systolic blood pressure 30% below the baseline values in patients receiving dexmedetomidine infusion when compared to those receiving placebo infusion ($1.6 \pm 0.7\%$). Patients receiving dexmedetomidine infusion had statistically significant lesser bleeding at surgical field ($P < 0.05$). The mean awakening time and recovery from anaesthesia did not show any significant difference between the groups.

We found that mean surgical time in group I was 96.2 minutes and in group II was 105.4 minutes, heart rate (beats/min) was at baseline in group I was 94.1 and in group II was 92.8, after induction was 73.3 in group I and 72.0 in group II, after intubation 5 min was 77.6 in group I and 75.4 in group II, 30 min was 73.6 in group I and 78.8 in group II, at 60 min was 68.7 in group I and 87.2 in group II and after extubation was 84.5 in group I and 97.3 in group II. Verma et al¹² assessed efficacy and safety of intravenous dexmedetomidine in comparison to propofol. Eighty

patients were randomly allocated to receive either dexmedetomidine or propofol as intravenous bolus followed by the same in infusion supplemented with local anaesthesia for tympanoplasty. Dexmedetomidine and propofol provides adequate sedation but the use of propofol is associated with more requirements of rescue analgesia and poor patient and surgeon satisfaction.

We found that there was mean percentage of isoflurane requirement of 0.81% in group I and 1.52 % in group II. In the study of Bekker et al¹³ patients received an initial loading dose of 1 μ g/kg of dexmedetomidine over 10 min, followed by a continuous infusion of 0.5 μ g/kg/h and they determined that intra-operative dexmedetomidine infusion was effective for blunting the perioperative haemodynamic responses with no incidence of hypotension or bradycardia.

Ear surgery may cause post-operative dizziness (vertigo), nausea and vomiting as inner ear is intimately involved with a sense of balance. Induction with propofol decreases the post-operative nausea and vomiting in patients undergoing middle ear surgery. Prophylaxis with palonosetron, a 5-hydroxytryptamine 3 receptor blocker in premedication may be considered.¹⁴

CONCLUSION

Authors found that dexmedetomidine infusion was safe to provide oligoemic surgical field for better visualisation for middle ear surgery under operating microscope.

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