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PROSPECTIVE RANDOMISED CONTROL STUDY OF DEXMEDETOMIDINE FOR CONTROLLED HYPOTENSION IN FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS)

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ABSTRACT

Back ground : To evaluate the effect of Dexmedetomidine infusion on the requirement of Isoflurane for controlled hypotension(MAP of 60-70mmHg), quality of bloodless surgical field, duration of surgery and the awakening time in patients undergoing FESS.

Study design : A prospective ,randomised control study in 50 adult patients of either sex between 18 - 60 years of age . Patients are randomised and compared based on MAP, requirement of isoflurane percentage, duration of surgery,quality of operating field, awakening time into 2 groups ,Group D - Dexmedetomidine and Group C - control . The duration of surgery,awakening time and intraoperative isoflurane requirement was statistically low in Group D compared to group C .

Conclusion : Dexmedetomidine infusion helps in achieving a targeted reduction in MAP, reduced intraoperative Isoflurane requirement, better blood less field, and faster awakening in patients undergoing FESS.

KEYWORDS : Mean arterial pressure (MAP),Functional endoscopic sinus surgery (FESS)

INTRODUCTION

Impairment of intra operative visibility due to bleeding is problem during otorhinolaryngologic surgeries especially in endoscopic surgeries like FESS. Bleeding in the surgical field can lead to incomplete surgical procedure which increases further bleeding and increased risk of complications due to non visualization of important structures. During these surgeries a slightest bleeding at the surgical area would look larger due to magnifying effect of the microscope which could upset surgical comfort. Controlled hypotension is one of the anaesthetic techniques used to reduce bleeding during endoscopic surgeries. There are varieties of methods and medications used to obtained deliberate hypotension.

The ideal hypotensive agent should be non toxic, maintain cerebro vascular auto regulation, no change in cardiac function, have short term effect and be easily titrated[1, 2]. Alpha 2 agonists like clonidine augment hypotensive action and therefore reduce bleeding[3,4,5]. Dexmedetomidine another highly selective Alpha 2 agonist acts by central mechanism and reduces bleeding. I have chosen this study to evaluate the effect of dexmedetomidine on the intraoperative isoflurane requirement to maintain mean arterial pressure of 60-70mmHg, quality of surgical field and awakening time in patients undergoing FESS.

MATERIALS AND METHODS

This was a prospective randomised control study . After obtaining patients written informed consent and institutional ethical Committee clearance the study was carried out in the ENT theatre. The study was conducted in a 50 ASA 50 ASA I Patients age 18-60 years diagnosed having chronic sinusitis scheduled for FESS under general anesthesia **Exclusion Criteria** Hypertensive patients, H/o Cerebro-vascular accident / Transient ischaemic attack,IHD, Poor respiratory reserve.Patients were randomised into two groups. Group D: Received 10-15 min prior to induction of anaesthesia 1 µg/ kg iv bolus Dexmedetomidine followed by an infusion of 0.5 µg/ kg/ hr. Group C: Received 10-15 min before induction of anaesthesia a normal saline rate similar to group D. Following a uniform premedication all patients were induced with inj .propofol and relaxed with inj. vecuronium bromide. After successful tracheal intubation, anesthesia was maintained with 66% nitrous oxide + 33% oxygen + isoflurane titrated to achieve a mean arterial pressure [MAP] of 60-70mmHg. Isoflurane and dexmedetomidine/saline infusion was stopped 10-15 minute prior to end of surgery. The residual neuromuscular blockade was reversed with neostigmine and glycopyrrolate. If at any stage heart rate was found to be less than 50 beats/ min, 0.3atropine was administered every 2-3 min till it reached above 60 beats/ min. Concentration of isoflurane was recorded in percentage every 5 min in the intraoperative period. This was averaged for analysis. Intraoperative surgical field was assessed by using 6 point Fromme-Boezaart scale. Awakening time in min [clearly telling his/her name] from the end of tracheal extubation was also recorded. Student "t" test was used to analyze the data statistically. P<0.05 was considered significant.

DISCUSSION

To achieve controlled hypotension in functional endoscopic sinus surgeries either inhalation technique or intravenous technique are used routinely. If inhalational agents were used to provide hypotensive anaesthesia large inspired concentration of the anaesthetics was used than that required to produce surgical anaesthesia .By stimulating the pre synaptic alpha 2-adrenoceptors dexmedetomidine decreases the nor epinephrine release and causes fall in blood pressure & heart rate .It also has an added advantage of analgesic property thus reducing peri operative analgesic requirement. Hence this study was designed to evaluate the effect of dexmedetomidine on isoflurane requirement in achieving MAP of 60-70mmHg.Intra operative mean arterial pressure was maintained around 60-70mmHg by titrating isoflurane percentage. The group C needed more isoflurane(1.7±0.211) than group D(0.387±0. 102) This was statistically significant(p-<0.001). This finding concurred with the results of the study by **Mohammad Maroof, et al[06],** in their study on 'Dexmedetomidine is a Useful Hypotensive Adjunct during Middle Ear Surgery under General Anesthesia The intra operative heart rate was found to be lower in group D. This finding concurred with the results of the study by **Guldem Turan, et al[08]** and **Durmus M, et al[07]** They found that the heart rate was lower in D group .This finding also concurred with the results of **Hilal Ayoglu, et al [09]** showed Dexmedetomidine will not cause reflex tachycardia peri operatively. The average intra operative systolic blood pressure , diastolic blood pressure , mean arterial pressure were significantly lower in D group compared to control group, there was statistically significant difference in duration of surgery (p-.004) The mean duration of surgery in group D was (76.84±14.174) In group C was (94.1±25.083).

The awakening time in min (time required to tell clearly their name from the end of tracheal extubation) was lower in group D(5.12±1.691) compared to group C(9.72±1.100)It was statistically significance(p-0.001).It concurred with the result of **Mohammad Maroof, et al [06].** They found that the mean awakening time in Dex group was 9.1±2.7 min and in NS group was 12.8±.2min.The intraoperative isoflurane consumption was comparatively more than our study (in group D- 1.3Vs0.38, in group C(3.1VS 1.7).This may be the reason the awakening time was prolonged in both the group in their study.Regarding the hemodynamic stability after extubation both group returned to their baseline values.There was no significant difference in the postoperative sedation score in both the groups.

SUMMARY

Thus Dexmedetomidine was significantly effective in producing low

requirement of Isoflurane when compared to normal saline .to maintain a MAP of 60-70mmHg, providing bloodless surgical field, minimizing duration of surgery and awakening time in patients undergoing FESS under general anaesthesia .

CONCLUSION:

Dexmedetomidine infusion thus helps in a targeted reduction in MAP and achieving a controlled hypotensive anesthesia technique.

Data Management and Analysis

The variables were entered into SPSS, version 15, statistical software for analysis. Statistical analysis was done by using descriptive statistics and cross tabulation. Mean and standard deviation were used to assess changes within and between the two groups. The difference in proportions is tested for statistical significance using non parametric chi-square test for variables measured on nominal scale. For variables measured on a continuous scale, student "t" Test was used. A p value of <0.05 was considered to be statistically significant.

OBSERVATION AND RESULTS

Intraoperative Isoflurane requirement
Student "t"test

	Group D	Group C	p-value
No. of cases	25	25	<0.001*
Mean	0.387	1.783	
S.D	0.102	0.211	
Range	0.2-1.4	1-2.5	

*Statistically Significant

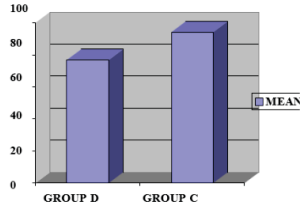
Intraoperative hemodynamic parameters
Student "t"test

Parameter	Group D	Group C	p-value
Heart Rate			
Pre Induction	75.92±5.787	79.24±8.695	0.119
Post Induction	71.68±6.830	76.48±9.417	0.045*
Post Intubation	75.12±5.761	88.04±7.618	0.001*
Avg. Intraop	58.44±2.873	75.84±6.472	0.001*
Post Extubation	72.88±5.231	79.04±11.681	0.020*
SBP			
Pre Induction	122.28±8.532	121.28±8.824	0.639
Post Induction	105.96±10.597	114.88±13.486	0.012*
Post Intubation	100.84±12.701	117.56±12.145	0.001*
Avg. Intraop	91.16±1.864	93.40±3.440	0.006*
Post Extubation	116.88±9.528	124.00±10.194	0.014*
DBP			
Pre Induction	81.36±6.376	78.72±7.220	0.177
Post Induction	69.44±7.896	71.60±11.365	0.439
Post Intubation	65.04±8.039	78.40±11.236	0.001*
Avg. Intraop	58.80±1.581	61.08±2.499	0.001*
Post Extubation	77.24±8.686	80.76±9.701	0.183
MAP			
Pre Induction	95.00±6.333	92.85±7.270	0.271
Post Induction	81.61±8.058	86.03±11.064	0.113
Post Intubation	76.97±9.217	91.45±11.066	0001*
Avg. Intraop	69.72±1.400	71.80±2.566	0.001*
Post Extubation	90.45±8.654	95.17±9.385	0.071

*Statistically Significant

The average intra operative isoflurane requirement was low in group D(0.387) Compared to group C(1.783).This was statistically significant (p- <0.001)

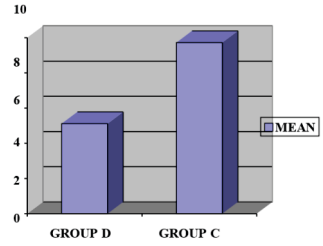
Effect of Study drug on duration of surgery



All patients underwent the same type of surgery. The duration of surgery was less with group D when compared to group C which is statistically significant (P= 0.004)

Awakening Time

statistically significant



The awakening time was low in group D compared to C group which was statistically significant.(p-0.001)

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