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A Comparative Study on the Effects of Oral Premedication with Clonidine and Metoprolol on Intraoperative Hemodynamics and Surgical Conditions During Functional Endoscopic Sinus Surgery in a Tertiary Care Hospital

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Abstract
Normal sinus function and ventilation are the aims of functional endoscopic sinus surgery, or FESS. A small amount of bleeding could obstruct the surgical field and cause further problems. According to earlier research, intravenous clonidine helps patients undergoing FESS achieve controlled hypotension by minimising intraoperative blood loss, lowering the need for additional hypotensive medications, enhancing the surgical field and providing good analgesia with negligible side effects. In a tertiary care hospital, the purpose of this study is to evaluate the effects of metoprolol and clonidine on intraoperative hemodynamics and surgical conditions during functional endoscopic sinus surgery. 50 patients, both male and female, between the ages of 18 and 60, who met the ASA I and II criteria and who had undergone FESS at the Government Medical College and Hospital in Dindigul's ENT department and were willing to take part in the study were included. Two groups of twenty-five patients each-Group C and Group M-were assigned to the patients. Two hours prior to surgery, patients in Group M and Group C received premedication via a closed-envelop method (T. metoprolol 25 mg and T. clonidine 150mcg, respectively). The category scale was used to assign grades to the surgical field. The reduction in HR and MAP was statistically significant. Patients in Group C displayed a lower category scale than those in Group M. From this study we can conclude that T. Clonidine 150mcg, 2 hours prior to surgery provided a better surgical field than T. Metoprolol 25mg given at the same time prior to surgery.

INTRODUCTION

Functional endoscopic sinus surgery (FESS) is one of the most innovative surgical treatments for sinusitis and nasal polyps in recent times. Nevertheless, the endoscope's ability to see the surgical field clearly is critical to the procedure's success[1,2]. A minimally invasive procedure called functional endoscopic sinus surgery (FESS) opens the sinus ostia and sinus air cells under direct visual inspection. Restoring normal function and sinus ventilation is the aim of this procedure. With little discomfort to the patient, this procedure can be done as an outpatient under GA or LA. The surgical field may become obscured by even small bleeding, which could result in further surgical complications[3].Many variables affect the surgical field, including the patient's overall health, coexisting conditions like hypertension and bleeding disorders, medication intake (antiplatelets and anticoagulants), and any pre-existing vascular disorders or coagulation abnormalities.

Vasoconstrictive agents have side effects when applied topically. Anaesthesia hypotensive has disadvantages of its own. By creating a bloodless space for FESS, controlled hypotension that doesn't compromise the target perfusion pressure of essential organs can enhance the surgical site with relative ease[4]. According to prior research, intravenous clonidine reduces intraoperative blood loss, lowers the need for additional hypotensive medications, enhances the surgical field and provides good analgesia with minimal side effects in patients undergoing FESS. Metoprolol, on the other hand, significantly improves hemodynamics and visual clarity during FESS[5].

In a tertiary care hospital, the purpose of this study is to evaluate the effects of metoprolol and clonidine on intraoperative hemodynamics and surgical conditions during functional endoscopic sinus surgery.

MATERIALS AND METHODS

This randomized, comparative, double blind, controlled study was conducted at Government Medical College and Hospital, Dindigul after obtaining approval from the Instituitional ethical committee. Informed written consent was obtained from all the participants who were willing to participate in this study.

The 50 patients were divided into two groups of 25, each, called Group C and Group M. Two hours prior to surgery, patients in Group M and Group C received premedication via a closed-envelop method (T. metoprolol 25mg and T. clonidine 150mcg, respectively).

According to ASA standard[6], standard protocols were adhered to when administering anaesthesia to these 50 patients. The patient's signature for a controlled hypotensive anaesthesia study was not made clear to the primary anesthesiologist. In the premedication, induction and maintenance phases of anaesthesia, uniformity is adhered to.

Patients in both groups received premedication the day before surgery, starting with 10mg of Diazepam and continuing with sips of water and either clonidine or metoprolol two hours beforehand. All common monitors were attached once the patient was positioned on the operating table and baseline measurements including temperature, heart rate, blood pressure and oxygen saturation with room air were taken. Intravenous cannulation with a large bore was done.

Patients were induced with standardised protocols[7,8] for both groups-analgesics (Inj. Fentanyl 2mcg/kg and Inj.Propofol 2mg/kg) and Non depolarising muscle relaxant Inj. Vecuronium 0.1mg/kg were used to facilitate direct laryngoscopy and oral intubation was done with cuffed endotracheal tube.

Patients were connected to a closed circuit and mechanically ventilated to maintain an ETCO2 of 40 mmHg after the bilateral air entry and five points of auscultation were confirmed. 66% N2O, 33% O2 and 1% sevoflurane were the standard doses used to maintain anaesthesia. For the first hour after surgery, each patient received roughly 10 ml/Kg/hr and then 5 ml/Kg/hourly. Before induction and then every 15 minutes for the next two hours, the blood pressure and heart rate were measured and recorded.

All 50 patients received a topical application of 4ml of 2% Lignocaine with 1: 200,000 adrenalines on well soaked roller gauze for nasal packing applied for 10 minutes. After removal of the nasal pack, surgeon infiltrated 1ml of 2%Inj. Lignocaine with Inj. Adrenaline in a dilution of 1: 200,000, submucosally into the medial infundibular wall. The heart rate and the blood pressure were monitored. If the Mean arterial pressure decreased to less than 50 mm Hg, Inj. Ephedrine in increments of 3mg was given and the patient was excluded from the study. The surgical field was graded using the Fromme-Boezaart category scale[9], which grades the surgical field as follows.

Statistical Analysis: SPSS software of Version 11.0 was used to analyse the data. The continuous data was entered using descriptive statistical tools like mean, and the categorical data was represented by percentage. Analysis of variance was used to examine differences within the groups and a post-hoc test was employed to examine differences between groups. A chi-square test was employed to determine whether categorical variables were related. P less than 0.05 was regarded as statistically significant.

RESULTS AND DISCUSSION

Patients in both groups were distributed similarly in terms of ASA distribution, sex and demographics. A Fromme Boezaart category score of 1 or 2 indicates surgical ease and is considered acceptable in the hands of skilled surgeons[10]. A comparison of the category scale between the groups at pre-induction showed no difference between them ($p = 0.95$)., however, a

Table 1:The obtained results are tabulated as below.

Category Scale at pre-induction	Group C	Group M	p-value	Category Scale at 15min	Group C	Group M	p-value	Category Scale at 30 min	Group c	Group M	p-value
0	25	25	0.95	0	1	0	0.032	0	1	0	0.014
1				1	14	6	1	12	3		
2				2	4	9	2	5	11		
3				3	1	5	3	2	6		
4				4	0	0	4	0	0		
5				5	0	0	5	0	0		

Table 2:Comparison of mean arterial pressure between groups

Time	Clonidine	Metoprolol	p-value
Preinduction	86.2	87.4	0.64
15 min	77.6	76	0.5
30 min	77.4	70.5	0.01
45 min	75.8	76.5	0.78
60 min	77.4	73.1	0.14
75 min	79.1	73.1	0.04
90 min	76.3	74.2	0.46
105 min	78.7	74.1	0.15
120 min	75	76.2	0.5

Table 3: Comparison of mean Heart Rate

Time	Clonidine	Metoprolol	p-value
Preinduction	81.3	68.2	0
15 min	72.6	65.1	0.01
30 min	74	63.6	0
45 min	72	62	0
60 min	74	65	0
75 min	70	66	0.04
90 min	68	64	0.05
105 min	68	64	0.06
120 min	68	68	0.99

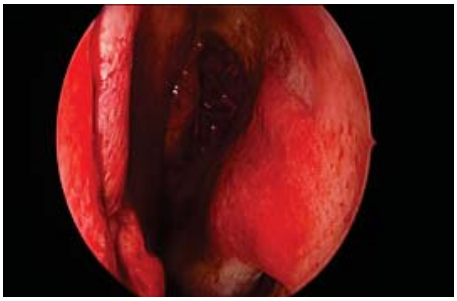

Fig. 1: Endoscopic view of instrumentation of nasal septum Group M (Image captured during FESS at the place of study)

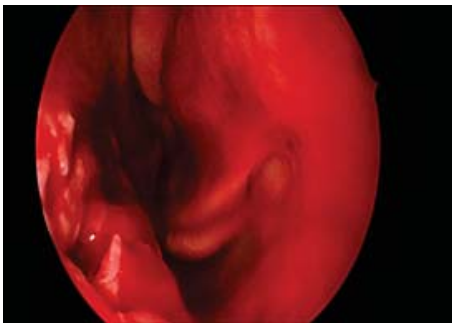

Fig. 2:Endoscopic view of instrumentation of nasal septum Group C (Image captured during FESS at the place of study)

comparison of the category scale at 15 minutes showed a significant difference (p = 0.032) between the groups. Patients in Group C displayed a lower category scale than those in Group M. The same thing was noted after 30, 45 and 60 minutes. After that, though, there was no discernible difference between groups C and M at 75, 90, 105 and 120 minutes.

Instead of using the 300 mcg and 50mg regular doses of T. Clonidine and T.Metoprolol that were used in earlier studies, we attempted to evaluate the lowest effective dose of each drug in this study using 150mcg and 25mg, respectively. The benefit is obtaining the greatest surgical field clearances with the least amount of effective doses while avoiding any side effects like bardycardia and hypotension. Although group M's heart rate differed significantly, it did not correspond with the category scale. Significant hypotension did not occur in any of the patients in either group. Three patients experienced mild hypotension that improved after receiving IV fluids. Not a single patient in either group required blood transfusions during or after surgery due to blood loss.

Cardioselective beta blocker metoprolol decreases myocardial contractility, induces bardycardia and has an indirect effect on myocardial potential. Additionally, the unopposed adrenergic effects of endogenous catecholamines are supposed to vasoconstrict the mucous membrane of arterioles, improving the surgical field's clarity. Metoprolol has been demonstrated by Ahmed A. Sadek *et al.* to significantly improve hemodynamics and visual clarity during FESS[3]. According to Sadek *et al.*'s study, metoprolol dramatically improves hemodynamics and visual clarity during FESS[5]. Even during our study, patients in the metoprolol group showed slightly better visual clarity than those in the clonidine group.

Prostaglandin E1 and clonidine both reduced blood loss during paranasal sinus surgery without lowering blood pressure, according to Okuyama *et al*.[11,12]. Clonidine reduces blood flow to the nasal mucous membrane by narrowing peripheral blood vessels. Patients in the clonidine group also had significantly

better (lower) surgical grades than those in group M in our study, which increased surgeon satisfaction. The results have also been validated by research conducted by Mohseni *et al*.[13]. Haemorrhages were less common in the group receiving clonidine.

CONCLUSION

From this study we can conclude that T. Clonidine 150mcg, 2 hours prior to surgery provided a better surgical field than T.Metoprolol 25mg given at the same time prior to surgery.

Limitations: Operator differences existed as many surgeons are involved, but in this study the number of operating surgeons was kept to the minimal as possible.

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