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A comparison of effect of oral premedication with clonidine and Metoprolol on intraoperative hemodynamics and surgical conditions during functional endoscopic sinus surgery

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Abstract
AIM: The present study was done to compare the effect of oral premedication with clonidine and Metoprolol on intraoperative hemodynamics and surgical conditions during Functional endoscopic sinus surgery**.**
Material and Methods: 42 patients of ASA I & II 18-60 years posted for FESS were randomly divided into two groups of 21 each. All patients received tab. diazepam 10 mg and clonidine 300 µg in group A and tab. diazepam 10 mg and metoprolol 50 mg in group B 2 hour before induction. HR, BP recorded intra & postoperatively. The quality of surgical field was assessed and graded by surgeon according to the ACS. Total blood loss, duration of surgery and adverse effect were noted.
Results: Bleeding severity score were lower in group A than group B. There was less bleeding volume in group A (156.9±33.71) than in group B (179.3±33.63). The HR decreases significantly from pre induction to up to 90 minutes in group B as compared to group A (p<0.001). After 30 minutes of induction SBP was significantly lower in group A compared to group B till extubation.
Conclusion: Premedication with clonidine provides less bleeding, better quality of surgical field and stable hemodynamics in patients undergoing FESS.

Keywords: premedication, clonidine, metoprolol, fess

Introduction
Functional endoscopic sinus surgery (FESS) has been a major advancement in the management of a chronic sinusitis and other sino-nasal diseases [1] There are some limiting factors in this surgery and the main consideration is blood loss because mucosal bleeding often interferes with the optimal visualization of the intranasal anatomy [2]. There are several pharmacological and non-pharmacological techniques for an appropriate control of intraoperative bleeding. The non-pharmacological (mechanical) methods for deliberate hypotension include positioning the patient and IPPV to control venous return. The various pharmacological interventions include volatile anaesthetics, direct acting vasodilator drugs, ganglion blocking drugs, alpha blockers, beta blockers, combined alpha and beta blockers, calcium channel blockers, Propofol, magnesium sulphate, alpha-2 agonists, prostaglandins, Tranexamic acid [3].
Therefore this study was conducted to compare the effect of oral clonidine and oral metoprolol as premedication to reduce the blood loss and improve surgical field during fess.

Materials and Methods
After institutional ethical committee approval and written informed consent from the patients, 42 ASA I-II patients aged 18-60 years scheduled for fess under general anaesthesia were randomly allocated for this prospective controlled study. Randomization was done using a computer generated random number tables.
Those patients who had h/o asthma, hypertension, psychiatric illness, ASA III & higher, refusal to participate in study, already on B blocker & clonidine were excluded from study. The number of the patient was determined by power analysis to find the quality of surgical field between the groups. In group A, patients received oral Tab. Diazepam 10 mg & clonidine 300 µg and in group B Tab. Diazepam 10 mg & metoprolol 50 mg orally 2 hours before induction of anaesthesia. All the patients were given Inj. Glycopyrrolate 6 - 10 µg/kg i.m. half an hour before the surgery.
All the patients were pre oxygenated with 100% oxygen for 3 minutes. Induction was done with Inj. Fentanyl 2 µg/kg + inj. Propofol 2 mg/kg + inj. Vecuronium 0.1 mg/kg IV. Then laryngoscopy was performed and trachea was intubated after 3 minutes of mask ventilation in all patient. Anaesthesia maintained in a mixture of nitrous oxide (50%) in oxygen (50%) and inj. Vecuronium. In both the groups endotracheal intubation with appropriate number of cuffed endotracheal tube was done. Maintenance was done with O_2+ N_2O+ Isoflurane (%) + inj. Vecuronium 0.02 mg/kg IV+ IPPV. Pulse Rate, Mean arterial pressure, Arterial oxygen saturation were recorded before induction and then every 15 minutes till the end of surgery.
Intraoperatively, surgeon assessed Quality of surgical field and graded according to the average category scale (ACS) proposed by Fromm and Boezaart. Surgical field was graded as Good --- ACS 0 or 1, Fair --- ACS 2 or 3, Poor --- 4 or 5. At the end of surgery, administration of anaesthetic agent was discontinued and reversal of neuromuscular blockage was done using Inj. Glycopyrrolate (0.008mg/kg) IV + Inj. neostigmine (0.05mg/kg) IV Endotracheal extubation was done after the return of adequate muscle tone, power, protective reflex (cough) and when the breathing pattern of patient was smooth. Total blood loss during surgery was calculated from the fluid volume of the suction canister. The volume of irrigating fluid was subtracted from the total volume of fluid collected in the suction bottle. A fully soaked cotton strip was estimated to contain 5 ml of blood

and partially soaked one to contain 2-3 ml of blood. Total Duration of surgery was recorded.

Patients were observed every 15 minutes till 2 hours for Spo2, pulse rate, blood pressure, sedation score, visual analogue scale (pain), nausea and vomiting, complication, adverse effects if any were recorded.

During the intraoperative period and postoperative period the occurrence of side effects like hypotension and bradycardia were noted. Hypotension defined as 30% decrease in systolic blood pressure as compared with baseline control value was noted. Bradycardia was considered when heart rate less than 55/minute, if occurred treated appropriately.

At the end of study statistical analysis was done. This study included Quantitative data. Quantitative data presented as mean and SD and to compare the mean at two groups, applied independent t- test at 95% level of significance, data analysis was done by Microsoft excel and SPSS 18 software.

Results

There was no statistically significant difference between groups with regard to age, sex and duration of surgery as shown in Table 1.

Table 1: Demographic distribution

	Group A (Mean±SD)	Group B (Mean±SD)	P value
Age (years)	33 ±10	34 ±15	>0.05
Weight (kg)	64±4.3	63±6	>0.05
Sex(F:M)	10:11	11:10	>0.05
Duration of surgery (mins)	148.6±34.83	151.4±30.71	>0.05

Table 2: total blood loss during surgery

	Group A (Mean±SD)	Group B (Mean±SD)	P value
Total Blood Loss (Ml)	156.9±33.71	179.3±33.63	<0.05

Table 3: Quality of surgical field

ACS Grade	Good	Fair	Poor
Group A	12(57.14%)	7(33.33%)	2(9.52%)
Group B	2(9.52%)	10(47.61%)	9(42.85%)

Hemodynamically systolic blood pressure was significantly lower in group A as compared to group B from after 30 minutes of induction to up till extubation ($p<0.01$) (fig. 1). There was no significant difference noted in diastolic blood pressure in between the two groups. While comparing mean heart rates between the two groups, before induction to 90 minutes after induction it decreases from 76.48±1.887 to 67.9±0.436 per minutes in group A and 67.43±1.121 to 64.19±1.078 per minutes in group B ($p<0.01$). Up till extubation, there was no significant difference in mean heart rate in between the groups observed ($p>0.05$) (fig 2).

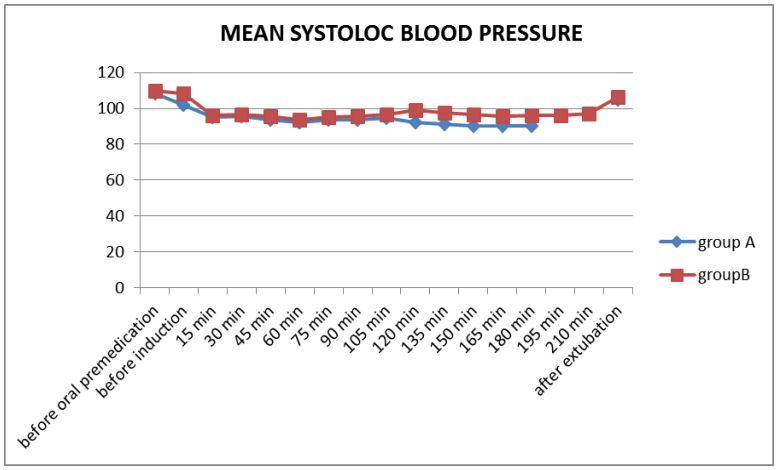

Fig 1

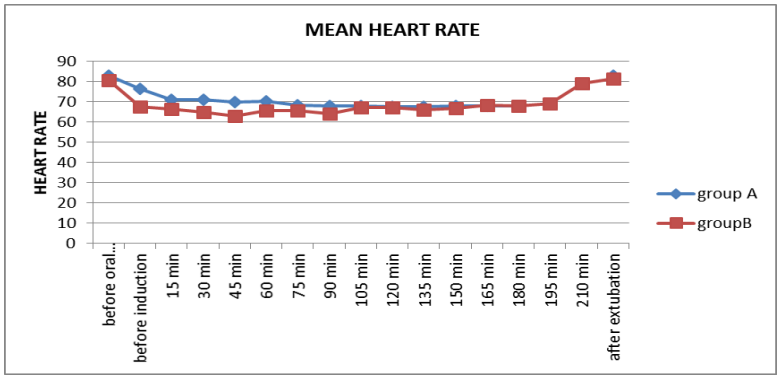

Fig 2

Grade	Bleeding
0	No bleeding.
1	Slight bleeding –no blood suctioning required
2	Slight bleeding – occasional suctioning required
3	Slight bleeding- frequent suctioning required. Field is visible some seconds after evacuation
4	Moderate bleeding –frequent suctioning required. Field is only visible immediately after evacuation.
5	Severe bleeding-constant suctioning required. Bleeding appears faster than can be removed by suction. Surgical field severly threatened and surgery not possible.

Total blood loss was 156.9±33.71 ml and 179.3±33.63 ml in group A and B respectively. Blood loss seen at the end of surgery was significantly less in group A, this provided better quality of surgical field in clonidine as compared to metoprolol group (table 3).

Quality of surgical field was compared in both the groups. In group A 12 patients had good surgical field, 7 patients had fair and 2 patients had poor surgical field. In group B 2 patients had good surgical field, 10 patients had fair and 9 patients had poor quality of surgical field. So group A (clonidine) patients had better quality of surgical field as compared to group B (metoprolol).

Discussion

Several methods have been designed to reduce bleeding during surgery. The basic method to reduce bleeding from the nasal mucous membrane operated on is to constrict the capillaries of the area involved. This can be accomplished by local anemization of the mucosa with vasoconstrictors, preoperative use of steroids, positioning the patient in the anti-Trendelenburg position, pharmacological cardiodepression, heart rate stabilization within lower physiological limits and the reduction in mean arterial pressure [4].

Various studies have shown reduced heart rate and mean blood pressure with either metoprolol or clonidine, but in all these studies multiple other drugs were used perioperatively to reduce blood pressure to a desired level of MAP [5]. Premedication with oral clonidine reduced intraoperative bleeding and decreased Isoflurane, fentanyl, requirement for achieving controlled hypotension in patients undergoing middle ear surgery [6].

With clonidine premedication in spine surgery intra-operative blood loss was found to be less as compared to placebo group even at the same level of MAP. It implies that the decreased bleeding and improved surgical field is not just limited hypotensive action of clonidine. Thus, it is possible that clonidine produces the same effect even at higher blood pressure, which can reduce the need for hypotensive anesthesia [7].

Similar results were shown in a study done by Marchal JM *et al* in 2001 where clonidine had been used as premedication in middle ear surgery. The patients in clonidine group had less bleeding score (0.75±0.3) as compared to control group (1.1±0.4) ($p<0.05$) [8].

In 2012 Poupak R *et al* studied the effect of metoprolol in nasal surgeries Patients who received a double-dose of metoprolol showed the lowest heart rate while patients who did not receive metoprolol showed the highest heart rates [9].

Both these drugs produced stable haemodynamics and reduced bleeding thus leading to optimal surgical field. Although in other studies optimal surgical field was due to induced hypotension. But in our study the mechanism could be due to reduction and attenuation of the excitatory effect of sudden increased catecholamine/sympathetic stimulation during surgery [9].

Conclusion

Thus to conclude, both clonidine and metoprolol were effective and safe, in terms of stable haemodynamic profile and reducing intraoperative bleeding; when given orally to patients as premedication in patients undergoing functional endoscopic sinus surgery. However, out of the two drugs clonidine appeared to be better in terms of reduction of blood loss and providing good quality of surgical field when compared to metoprolol.

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