A Comparative Study of Oral Atenolol and Oral Clonidine as Premedication for Hypotensive Anaesthesia in Patients Undergoing Functional Endoscopic Sinus Surgery under General Anaesthesia - A Randomized, Double Blinded Study in a Tertiary Care Hospital, Tirupati

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ABSTRACT

BACKGROUND

Bleeding during functional endoscopy sinus surgery (FESS) remains a main consideration. Even a small amount of blood may disturb the endoscopic view, increasing the likelihood of complications. So, we decided to compare the effects of clonidine and atenolol as oral premedication for hypotensive anaesthesia in patients undergoing FESS under general anaesthesia. The purpose of this study was to analyse and compare the efficacy of oral atenolol versus oral clonidine as premedication under general anaesthesia for induced hypotension in patients undergoing a functional endoscopic sinus surgery.

METHODS

The study included total 100 patients of age (18 – 60 years) [American Society of Anaesthesiologists (ASA grade I and II)] who were randomly divided into two groups of 50 each. Group - A (n = 50), a non-labelled clonidine tablet PO was given to the patients in the clonidine group in the dose of 2 mcg/kg at 7 pm the day before surgery and 4 mcg/kg two hours before surgery. Group - B (n = 50), a non-labelled atenolol 25 mg tablet was given PO to the patients in the atenolol group at 7 pm the day before surgery and also 2 hours before surgery. Induction and maintenance of general anaesthesia was performed by the same standard protocol for both groups. Hemodynamic effects [heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), quality of surgical field, intraoperative complications, and post anaesthetic discharge score system (PADSS)] were recorded and statistically analysed.

RESULTS

The hemodynamic stability and good quality surgical field was obtained in both the groups. The lesser incidence of intraoperative complications recorded with atenolol gives it a more favourable profile when compared to clonidine.

CONCLUSIONS

We conclude that both oral clonidine and atenolol premedication provides superior and predictable perioperative hemodynamic control, reduces the requirement of hypotensive agents, and produces acceptable recovery characteristics. The lesser incidence of intraoperative complications recorded with atenolol gives it a more favourable profile when compared to clonidine.

KEYWORDS

Atenolol, Clonidine, Functional Endoscopic Sinus Surgery (FESS)

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BACKGROUND

Controlled hypotensive and balanced anaesthesia for functional endoscopic sinus surgery is a challenging job for the anaesthetist. Functional endoscopic sinus surgery is now a standard surgical procedure in the otorhinolaryngology specialty. It is currently associated with a high rate of success for symptomatic improvement in patients with medically refractory chronic rhinosinusitis.[1]

Excessive blood in the surgical field decreases the visibility of the surgical area during the FESS procedure and it is directly related to the risk of vascular, orbital and intracranial complications as well as procedure failure.[2,3] So it is of vital importance to the surgeon as well as anaesthetists to minimize surgical bleeding for this operation. Fortunately, bleeding from the capillary circulation may be significantly reduced by decreasing the patient's mean arterial pressure and by local vasoconstriction. Deliberate hypotensive anaesthesia is a commonly used technique to lower mean arterial pressure under general anaesthesia for FESS procedures.[4,5]

A good premedication with an antihypertensive agent through pharmacological therapy can help to reduce the concentration of inhalational agents and vasodilators used to induce hypotension, challenge of keeping the operating field free of blood, thereby ensuring much hemodynamic stability and speedy recovery from general anaesthesia for FESS procedure. Hence, we have planned to study and compare the effects of clonidine and atenolol as oral premedication for the same.

Objectives

To compare the efficacy of oral atenolol versus oral clonidine premedication for patients under general anaesthesia for induced hypotension undergoing functional endoscopic sinus surgery based on,

1. Intra-operative hemodynamic stability.
2. The requirement of additional vasodilators.
3. Peri-operative side effects and complications.
4. Postoperative hemodynamic stability.

METHODS

This study was conducted from January 2019 to January 2020 (one year) in the Department of Anaesthesia, Sri Venkateswara Medical College-SVMC, Tirupati. This study was designed in a prospective, randomised, double blinded fashion and patients were divided in to two groups according to premedication they received.

Hundred patients were enrolled, fifty in each group. The randomization was done using a table of random numbers and the anaesthesiologist recording the findings and the operating surgeon were blinded to the premedication drug. A written, informed consent was obtained from each patient, and the study was approved by our Institution's Ethics Committee- No-95/2018. Patients of 18 - 60 years of age, of either sex, weighing 50 - 70 kg, belonging to American Society of Anaesthesiologists I or II, and scheduled for FESS were recruited. Patients on treatment with drugs known to affect the heart rate, blood pressure, patients with baseline heart rate < 60 beats/min, patients with bleeding disorders and those on anticoagulants, patients with history of hypertension, cardiac diseases and bronchospasm, pregnant and lactating women were excluded from study. Group - A (n = 50), a non-labelled clonidine tablet was given PO to the patients in the clonidine group in the dose of 2 mcg/kg at 7 pm the day before surgery and 4 mcg/kg 2 hours before surgery.

Group - B (n = 50), a non-labelled atenolol 25 mg tablet was given PO to the patients in the atenolol group at 7 pm the day before surgery and also 2 hours before surgery. Standard monitoring was done with continuous electrocardiogram (ECG), non-invasive blood pressure (includes SBP, DBP and MBP) and SpO2 intra-operatively and post-operatively for a minimum of six hours in the post-anaesthesia care unit.

All the patients were preloaded with 500 ml of normal saline before induction. Nasal packing was done with 4 % lignocaine with 1:200000 epinephrine. Patient was preoxygenated with 100 % oxygen for 3 minutes and anaesthesia was induced with glycopyrrolate 0.2 mg, fentanyl 2.0 mcg/kg, Xylocard 1.5 mg/kg, propofol 2.0 - 2.5 mg/kg and vecuronium 0.1 mg/kg. Endotracheal intubation was done orally with appropriate size endotracheal tube (ET).

Throat packing was done within 1 – 3 minutes post-intubation. Maintenance was done with 66 % nitrous oxide, 33 % oxygen, 0.75 % sevoflurane with IPPV and vecuronium. The target mean arterial pressure was maintained between 70 and 80 mmHg and the heart rate within 60 - 70 beats/min. If MAP is more than the set value, the following method of action taken.

Step 1: Increase sevoflurane by up to 1%. If there is no response in ten minutes, go to step 2.

Step 2: To start a titrated NTG infusion. (Each increase in NTG dose done with an interval of 5 minutes to allow equilibration of therapeutic serum levels.)

Intra-operative hypotension (MAP < 60 mm of Hg) is managed by

1. IV fluids bolus RL/NS 10 - 15 ml/kg.
2. Taper down NTG/volatile anaesthetics.
3. Ephedrine 6mg iv boluses

Intra-operative tachycardia (HR > 120 bpm) was controlled using iv metoprolol 2 - 5 mg. Intra-op bradycardia (HR < 50 bpm) was managed with atropine 0.6 mg iv.

If patient was hemodynamically unstable; abandon hypotension, start volume resuscitation, and manage accordingly. At the end of procedure, standard reversal agents (Neostigmine 50 mcg/kg and glycopyrrolate 8 mcg/kg) and extubation was carried out in awake and stable patients.

Measurement of Study Variables in Intraoperative and Postoperative Period

1. Hemodynamic parameters: Heart rate-HR, Systolic blood pressure-SBP, Diastolic blood pressure-DBP and Mean arterial pressure-MAP

2. The requirement of sevoflurane and nitroglycerin (NTG)
3. Intraoperative problems (hypotension, hypertension, arrhythmias, tachycardia, bradycardia, ischaemia)
4. Duration of surgery.
5. Operating field assessment by surgeon - Excellent or good conditions.
6. Post anaesthesia discharge criteria (Table - 1) (PADSS) assessed at 6 hrs and 18 hrs after surgery.

Score	0	1	2
Vital signs	➢ 40 % of preoperative baseline	20 – 40 % of preoperative baseline	Within 20 % of preoperative
Activity	Unable to ambulate	Dyspnoeic requires assistance	Steady gait .No dizziness or pre-op level
Nausea & vomiting	Continues after repeated treament	Moderate, treated with IM medications	Minimal, treated with PO medications
Pain (acceptable to the patient: Controlled with PO meds)	-	No	Yes
Surgical bleeding	Minimal / No dressing change required	Moderate, up to two dressing changes	Severe, more than three dressing changes

Table 1. Post Anaestheisa Discharge Score System - PADSS

Intra-Operative Drug Scores

Sevoflurane Vol %: 0 – 0.75 %, 0.75 – 1 % and > 1.0 % given scores as 0, 1 and 2 respectively.

Statistical Analysis

The sample size was calculated using the "G* power 3 free" software[6]. Sample size estimation for the study was done based on the study findings of Sandeep Kumar et al.[7] where 23.3 % in oral atenolol group and 50 % in clonidine group showed good response. Using the above parameters, sample size was estimated using the formula

$n = [2p(1-p)\ (z\ \{\alpha/2\ + Z_{\beta}\})^2]\ /\ [p1-p2]^2$

Where

z_{α} at 95% CI is 1.96,

Z_{β} at 80%, power = 0.84,

P1 = 23.3%,

P2 = 50%,

P = (P1+P2)/2.

Substituting the values in the above formula sample size was estimated to be 50 per group. The variables entered into Statistical Package for Social Sciences (SPSS, version 11), statistical software for analysis.

Comparison between two groups with respect to continuous variables such as age, weight, duration of surgery and hemodynamic parameters (HR, SBP, DBP) were compared with student t test (t).

Categorical variables such as gender distribution, intraoperative requirement of vasodilators, operative assessment, intraoperative complications and PADSS were analysed by chi-square test ($\chi 2$). The level of significance was set at P< 0.05.

RESULTS

No statistically significant difference was observed in the mean age, distribution of sex, weight of patient and duration of surgery in both the groups (Table-2).

Characteristic	Clonidine (A) Group	Atenolol (B) Group	Statistical Significance
No. of cases (n)	50	50	---
Age (years)	33.86 ± 14.54	34.80 ± 12.38	t =1.844; P = 0.09
Sex M : F	30 : 20	28 : 22	$\chi 2$ = 0.164; P = 0.685
Weight (kg)	57.96 ± 8.55	58.32 ± 6.79	t = 0.208; P = 0.836
Duration of surgery (minutes)	84.00 ± 19.785	82.00 ± 18.239	t=0.525; P = 0.60

Table 2(a). Comparison of Demographic Data and Duration of Surgery

Data entered as mean ± standard deviation; (t-student unpaired t test; $\chi 2$-chi-square test)

There is a significant reduction in heart rate in the atenolol group when compared to the clonidine group. (Table-3). There is no statistically significant difference in SBP, DBP and MAP between both clonidine and atenolol groups. Most of the cases were completed between 60 - 100 min. At 110 and 120 minutes, there are only few cases showing statistically difference in SBP, DBP and MAP. (Table - 4, 5, 6)

Time Interval (min)	Group A (Clonidine) Mean ± SD		Group B (Atenolol) Mean ± SD	Mean Difference	P Value
Pre induction	50	77.34 ± 2.41	67.26 ± 2.00	10.08	0.000**
After indication	50	76.10 ± 3.44	67.84 ± 2.07	8.26	0.000**
After intubation	50	81.04 ± 4.77	72.84 ± 1.60	8.20	0.000**
1 Min	50	77.04 ± 1.28	74.14 ± 1.97	2.90	0.000**
2 Min	50	77.72 ± 1.50	68.46 ± 1.95	9.26	0.000**
3 Min	50	78.02 ± 1.89	64.92 ± 1.40	13.10	0.000**
4 Min	50	76.40 ± 4.77	62.76 ± 2.10	13.64	0.000**
5 Min	50	75.44 ± 4.13	63.68 ± 2.05	11.75	0.000**
10 Min	50	75.38 ± 3.68	65.50 ± 1.72	9.88	0.000**
20 Min	50	75.38 ± 3.54	65.58 ± 1.73	9.80	0.000**
30 Min	50	75.22 ± 3.48	65.64 ± 1.64	9.50	0.000**
40 Min	50	75.10 ± 3.12	65.62 ± 1.64	9.48	0.000**
50 Min	50	76.50 ± 3.92	65.58 ± 1.73	10.92	0.000**
60 Min	50	75.52 ± 3.42	65.64 ± 1.64	9.88	0.000**
70 Min	39	75.18 ± 3.84	65.50 ± 1.65	9.68	0.000**
80 Min	37	75.11 ± 4.21	65.83 ± 1.76	9.27	0.000**
90 Min	18	75.83 ± 2.62	65.28 ± 1.45	10.56	0.000**
100 Min	14	76.00 ± 2.57	62.23 ± 2.01	10.77	0.000**
110 Min	10	75.50 ± 7.1	65.13 ± 1.25	10.38	0.000**
120 Min	5	76.60 ± 3.29	64.33 ± 0.58	12.27	0.001**

Table 2(b). Changes in Heart Rate

**Significant at 0.001 level; (P < 0.001), *Significant at 0.05 level; (P < 0.05)

Time Interval (min)	Group A (Clonidine) Mean ± SD		Group B (Atenolol) Mean ± SD	Mean Difference	P Value
Pre induction	50	107.24 ± 2.56	108.16 ± 3.29	-0.92	0.1219
After indication	50	96.56 ± 3.91	96.94 ± 2.57	-0.38	0.567
After intubation	50	102.18 ± 1.38	103.50 ± 5.43	-1.32	0.099
1 Min	50	96.86 ± 3.35	98.46 ± 5.50	-1.60	0.079
2 Min	50	97.20 ± 4.12	98.84 ± 4.94	-1.64	0.075
3 Min	50	98.32 ± 2.66	97.30 ± 1.57	1.02	0.176
4 Min	50	97.40 ± 14.62	93.97 ± 1.82	3.43	0.103
5 Min	50	98.26 ± 14.66	94.38 ± 1.82	3.88	0.066
10 Min	50	99.14 ± 14.03	93.10 ± 1.89	3.04	0.132
20 Min	50	98.22 ±14.10	93.93 ±1.98	3.69	0.073
30 Min	50	97.24 ± 14.15	93.92 ± 2.98	3.32	0.108
40 Min	50	97.12 ±13.65	93.70 ± 3.06	3.42	0.087
50 Min	50	97.16 ± 14.67	93.32 ± 1.97	3.84	0.069
60 Min	50	97.16 ± 13.67	93.92 ± 1.98	3.42	0.100
70 Min	39	98.04 ± 13.67	92.95 ± 1.94	5.09	0.077
80 Min	37	100.39 ± 17.60	94.56 ± 1.32	5.83	0.062
90 Min	18	101.76 ± 20.82	92.56 ± 1.62	9.02	0.070
100 Min	14	105.50 ± 23.32	93.92 ± 1.66	11.58	0.064
110 Min	10	116.80 ± 21.41	92.63 ± 2.33	24.18	0.006*
120 Min	5	136.00 ± 2.00	94.67 ± 1.15	41.33	0.000**

Table 3(a). Changes in Systolic Blood Pressure

**significant at 0.001 level; (P < 0.001) *significant at 0.05 level; (P < 0.05)

Time Interval (min)	Group A (Clonidine) Mean ± SD		Group B (Atenolol) Mean ± SD	Mean Difference	P Value
Pre induction	50	74.38 ± 2.73	75.48 ± 3.37	-1.10	0.076
After indication	50	63.28 ± 2.98	64.38 ± 3.20	-1.1	0.079
After intubation	50	66.72 ± 3.54	58.00 ± 3.29	-1.26	0.064
1 Min	50	63.28 ± 3.50	54.44 ± 3.27	-1.16	0.084
2 Min	50	64.54 ± 2.18	65.00 ± 1.55	-0.46	0.227
3 Min	50	62.08 ± 2.52	65.12 ± 1.59	-3.04	0.065
4 Min	50	60.16 ± 9.95	59.48 ± 1.80	0.68	0.636
5 Min	50	60.14 ± 9.76	59.46 ± 1.68	0.68	0.628
10 Min	50	59.96 ± 8.24	59.56 ± 1.70	0.40	0.738
20 Min	50	60.26 ± 9.79	59.48 ± 1.71	0.78	0.580
30 Min	50	60.36 ± 9.96	59.42 ± 1.72	0.94	0.512
40 Min	50	60.60 ± 8.61	59.40 ± 1.78	1.20	0.337
50 Min	50	59.42 ± 8.17	59.48 ± 1.71	-0.06	0.960
60 Min	50	59.88 ± 7.97	59.42 ± 1.72	0.44	0.703
70 Min	39	60.44 ± 7.84	59.20 ± 1.68	1.24	0.333
80 Min	37	61.96 ± 9.11	59.80 ± 1.63	2.16	0.090
90 Min	18	63.61 ± 10.80	59.11 ± 1.75	4.50	0.058
100 Min	14	62.86 ± 11.45	59.48 ± 1.98	3.40	0.304
110 Min	10	69.40 ± 11.29	59.00 ± 1.85	10.40	0.001**
120 Min	5	79.40 ± 5.27	59.33 ± 2.08	20.07	0.000**

Table 3(b). Changes in Diastolic Blood Pressure

** Significant at 0.001 level; (p < 0.001), * Significant at 0.05 level; (P < 0.05)

Interpretation of Sevoflurane Requirements

1. High-patients requiring 1 % for 15 minutes or more
2. Moderate-patients requiring 0.75 % or more for more than 15 minutes
3. Low-patients who require less than 0.75 %

Majority of cases in clonidine have a low requirement of sevoflurane intraoperatively. Only 10 % of patients has moderate requirement of sevoflurane. All cases in atenolol group have low requirement of sevoflurane. None of the cases in either atenolol and clonidine groups required nitroglycerin intraoperatively.

Time Interval (min)	Group A (Clonidine) Mean ± SD	Group B (Atenolol) Mean ± SD	Mean Difference	P Value
Pre induction	76.80 ± 4.62	78.18 ± 4.01	-1.38	0.114
After indication	74.52 ± 3.37	75.50 ± 2.10	-0.98	0.084
After intubation	80.40 ± 4.24	81.96 ± 4.61	-1.56	0.081
1 Min	77.44 ± 4.69	79.06 ± 4.18	-1.62	0.071
2 Min	76.30 ± 1.56	77.24 ± 3.94	-0.66	0.214
3 Min	74.58 ± 2.56	75.30 ± 2.97	-0.72	0.1972
4 Min	73.08 ± 11.45	70.44 ± 3.44	2.64	0.1216
5 Min	83.50 ± 80.47	70.00 ± 1.54	13.50	0.238
10 Min	72.46 ± 10.04	70.06 ± 1.43	2.40	0.097
20 Min	72.42 ± 11.10	70.26 ± 1.23	2.16	0.175
30 Min	71.86 ± 11.40	69.98 ± 1.27	1.88	0.249
40 Min	72.37 ± 10.18	70.02 ± 1.33	2.35	0.108
50 Min	72.38 ± 10.18	70.26 ± 1.23	2.12	0.147
60 Min	72.39 ± 10.03	69.98 ± 1.27	2.41	0.095
70 Min	73.62 ± 10.21	71.88 ± 4.22	1.74	0.268
80 Min	75.64 ± 9.21	72.90 ± 3.29	2.74	0.063
90 Min	75.06 ± 9.81	70.89 ± 4.37	4.17	0.157
100 Min	76.36 ± 10.60	70.08 ± 1.55	6.28	0.071
110 Min	84.70 ± 14.50	69.63 ± 1.51	15.08	0.010*
120 Min	97.80 ± 3.03	70.67 ± 1.15	17.13	0.000

Table 4. Changes in Mean Blood Pressure

**Significant at 0.001 level; (P < 0.001) *Significant at 0.05 level; (P < 0.05)

Adverse Events	No. of Patients in Group-A	No. of Patients in Group-B
Hypotension	10	0
Hypertension	5	0
Arrhythmias	0	0
Tachycardia	0	0
Bradycardia	0	0
Ischemia	0	0

Table 5. Intraoperative Adverse Events

Operating Field	No. of Patients in Group-A	No. of Patients in Group-B	Total Number	%
Good	34	35	69	69 %
Excellent	16	15	31	31 %
Total	50	50	100	100 %
Statistical significance	$\chi 2$ =0.047; P = 0.829			

Table 6. Evaluation of Operating Field by Surgeon

PADSS (Mean ± SD)	Group-A	Group-B	Statistical Significance
6-hours	6.88 ± 0.65	7.80 ± 0.404	t=8.416; P = 0.000 (significant)
18-hours	9.62 ± 1.567	9.30 ± 0.463	t=1.38; P = 0.169

Table 7. Comparison of PADSS at 6 Hours & 18 Hours after Surgery in Post-Operative Period

In clonidine group, 10 cases developed hypotension and 5 cases developed hypertension. None of the cases in atenolol group developed hypotension and hypertension. Intraoperative problems like tachycardia, arrhythmias and ischemia are not seen in both clonidine and atenolol groups. (Table-7)

Both the groups provided similar operating field conditions. They provided either excellent or good operating field conditions with no statistically significant difference among them. (Table-8)

There is statistically significant difference in PADSS among two groups on the same day of surgery at 6 hours after surgery. Majority of the patients were fit to be discharged the next day morning with no statistically significance among both groups in PADSS score at 18 hours after surgery. (Table-9)

DISCUSSION

Functional endoscopic sinus surgery was introduced in the 1960s by professors Messerklinger and Wigand. Bleeding during functional endoscopy sinus surgery remains a main consideration. Even a small amount of blood may disturb the endoscopic view, increasing the likelihood of complications. So, we decided to compare the effects of clonidine and atenolol as oral premedication for hypotensive anaesthesia in patients undergoing FESS. Premedication is not only for sedation and anxiolysis, but also to enhance the quality of induction, maintenance, and recovery from anaesthesia. The primary goal of an anaesthetist in FESS procedure is to provide better surgical access, a bloodless operating field, conduct of balanced anaesthesia and prompt recovery.

Hypotensive anaesthesia **-** intraoperatively to reduce surgical blood loss and the need for blood transfusions and also for a better operating field, we use this technique. It entails the controlled lowering of blood pressure to between 80 - 90 mmHg or in a normotensive patient a decrease in mean arterial pressure to 50 - 70 mmHg.

For delivering a bloodless operating field, induced hypotension in addition to proper positioning (150 reverse Trendelenburg position) to promote venous drainage. To achieve a better operating area, the surgeon, on his part, packs the nasal cavity with vasoconstrictor and infiltrates the field with adrenaline (1 : 200000) before incision. We planned a study to compare the efficacy of oral clonidine and oral atenolol to achieve these desired conditions. No statistically significant difference was observed in the mean age, distribution of sex and duration of surgery in both the groups. There was a significant reduction in heart rate in the atenolol group when compared to the clonidine group. There is no statistically significant difference in SBP, DBP and MAP between both clonidine and atenolol groups. Most of the cases were completed between 60 - 100 min. At 110 and 120 minutes, there are only few cases showing statistically difference in SBP, DBP and MAP. None of the patients in the clonidine and atenolol groups required NTG intraoperatively. Intra-operative problems like arrhythmia, tachycardia, and ischemia never encountered among the two groups. Excellent to good operating field conditions provided in both the groups.

Vijay Patil et al. study included total 100 patients of (age 15 – 50 years) ASA grade I and II were randomly divided into two groups of 50 each. Patients received oral clonidine 5 mcg/kg in group C and oral atenolol 1 mg/kg in group A, 90 minutes prior to induction. Induction and maintenance of general anaesthesia was performed by the same standard protocol for both groups. Various study parameters i.e. hemodynamic effect (PR, SBP, DBP & MAP), amount of total blood loss, quality of surgical field, sedation score and side effects were recorded and statistically analyzed conclude that oral clonidine is better than atenolol in terms of hemodynamic stability, lesser blood loss & quality of surgical field without any side effects.

Mikawa et al.[8] study showed that there is a decrease of catecholamine response to tracheal intubation in 105 ASA I children who have taken oral clonidine in a randomized, double-blind study. There is an increase in plasma catecholamine concentrations, blood pressure, and heart rate in children receiving diazepam during tracheal intubation, and the addition of PO clonidine 4 mcg/kg attenuated these responses. That premedication with oral clonidine attenuates intubation response concurs with the findings of the study. Patients in clonidine and atenolol groups mostly had a low requirement for sevoflurane. In the clonidine group, 10 % of the patients had a moderate requirement of sevoflurane in comparison with no need of sevoflurane in the atenolol group. The atenolol group fared better than the clonidine group in the intra-operative conditions for sevoflurane. There was no significant difference in the hemodynamic parameters intraoperatively among the three groups.

Maroof et al.[9] study showed that clonidine premedication for hypotensive anaesthesia with total intravenous anaesthesia for middle ear microsurgery' taken 30 ASA I or II adult patients and surgery is done using total intravenous anaesthesia with fentanyl and propofol. Group I received promethazine and meperidine, group II received clonidine 4 mcg/kg along with meperidine and promethazine. They found that the addition of clonidine premedication with TIVA can provide stable hypotensive anaesthesia with minimum labetalol requirements. That premedication with 4 mcg/kg of clonidine for hypotensive anaesthesia resulted in better hemodynamic stability have concurred with the findings of the study. The findings of Zaugg et al.[10] showed that beta-adrenergic blockade beneficial effects in elderly patients undergoing noncardiac surgery taken 63 patients who were allocated randomly in to three groups. Group A (no atenolol), Group B (Pre- and post-op atenolol) & Group C (intraoperative atenolol).

The hormonal stress response was not significantly altered with beta-blockade. There is improved hemodynamic stability during recovery and post-operatively in beta blockade patients. It also confers other advantages like decreased analgesic requirements; ganglionic blockade is there with the usage of beta-blockade. In their study premedication with atenolol conferred advantages of decreased analgesic requirements and faster recovery which did not correlate with the findings of the study.

Carabine et al.[11] in their study 'Pre-anaesthetic medication with clonidine – a dose-response survey' conducted on eighty female normotensive patients who have taken oral clonidine in doses of 0.1 mg, 0.2 mg, 0.3 mg were compared with standard benzodiazepine premedication. The study conducted in a randomized, double-blind fashion. There is a significant reduction in anxiety and an excellent induction with clonidine 0.2 mg. There is a substantial decrease in blood pressure and heart rate with clonidine 0.3 mg. The use of clonidine in a dose of 0.3 mg as a premedication produces hemodynamic instability in the post-operative period. So, this dose is not recommended.

Mohseni M et al.[12] study showed that in a placebo-controlled clinical trial, a total of 84 American Society of Anaesthesiologists (ASA) physical status I and II patients undergoing endoscopic sinus surgery for chronic sinusitis were randomly allocated to receive either oral clonidine 0.2 mg or identical-looking placebo tablets 90 minutes before arrival at the operating room.

Blood loss in the clonidine group was 214 ± 67 ml on average and that in the placebo group was 276 ± 78 ml (mean ± SD, P <0.01). The median (range) bleeding score in the clonidine group was significantly lower than that in the placebo group (2 (1-3) vs. 2.5 (2-4), P < 0.0001).

Accordingly, the surgeon was more satisfied with the surgical field in the clonidine group than with that in the placebo group (median score, 4 (3-5) vs. 3 (1-5), P < 0.001). In conclusion, premedication with oral clonidine 0.2 mg can effectively reduce bleeding during FESS.

CONCLUSIONS

Clonidine and atenolol premedication provides superior and predictable perioperative hemodynamic control, reduces the requirement of hypotensive agents, and produces acceptable recovery characteristics. The lesser incidence of intraoperative complications recorded with atenolol gives it a more favourable profile when compared to clonidine. Clonidine or atenolol premedication can form an essential and desirable part of hypotensive anaesthesia for surgical procedures like FESS.

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