



COMPARISON OF EFFECTS OF ORAL PREMEDICATION WITH CLONIDINE AND BISOPROLOL ON INTRAOPERATIVE HEMODYNAMICS AND SURGICAL CONDITIONS DURING ENT SURGERIES

Anaesthesiology

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ABSTRACT

Background: Otorhinolaryngology-head and neck (OLHN) surgeries require precise hemodynamic management to optimize surgical outcomes and minimize complications. This study compared the efficacy of Bisoprolol and Clonidine in achieving optimal surgical conditions. **Aims & Objectives:** To compare the effects of oral premedication with clonidine and Bisoprolol on intraoperative hemodynamics and surgical conditions during ENT surgeries. **Methods:** A prospective, observational study was conducted on 100 patients, randomized into two groups receiving either Bisoprolol or Clonidine as premedication. Hemodynamic parameters, surgical field grading, and clinical outcomes were assessed. **Results:** Bisoprolol resulted in better surgical field grading (Lower grades), provided more stable blood pressure and Lower pulse rates. Both drugs maintained adequate oxygen saturation and had similar impacts on other clinical parameters. **Conclusions:** Both Bisoprolol and Clonidine are effective for optimizing surgical conditions in ENT surgeries, with Bisoprolol being better than clonidine.

KEYWORDS

Bisoprolol; Clonidine; ENT surgeries; surgical outcomes; hemodynamic stability.

INTRODUCTION

Otorhinolaryngology-head and neck (OLHN) surgeries encompass a wide array of procedures that demand meticulous perioperative management, particularly concerning hemodynamic stability.¹ One of the critical aspects of these surgeries is the precise control of blood pressure and heart rate, which directly influences the surgical field's clarity and the risk of intraoperative complications. Elevated blood pressure can lead to increased bleeding within the surgical field, significantly hindering the surgeon's ability to visualize crucial anatomical structures and perform delicate procedures.^{2,3} Consequently, maintaining optimal hemodynamic conditions is vital for reducing intraoperative hemorrhage, enhancing surgical outcomes, and minimizing the risk of complications during OLHN surgeries.³

Pharmacological interventions, including the administration of alpha agonists and beta blockers, have been extensively studied for their efficacy in controlling intraoperative blood pressure and heart rate. These medications are particularly beneficial in endoscopic nasal surgeries, such as Functional Endoscopic Sinus Surgery (FESS), where clear visualization of the surgical field is essential for precise tissue manipulation and minimizing the risk of complications.^{4,5,6} Alpha agonists like clonidine and beta blockers like bisoprolol work by reducing sympathetic tone and cardiac output, respectively, leading to controlled hypotension and reduced bleeding. This hemodynamic stability not only improves visibility during surgery but also contributes to shorter operative times and potentially higher success rates.^{7,8,9}

The need to optimize surgical conditions in elective ENT surgeries has led to the exploration of various premedication protocols, aiming to achieve a bloodless surgical field and enhance patient outcomes. This study focuses on comparing the effects of oral premedication with clonidine and bisoprolol on hemodynamic parameters, particularly in achieving optimal surgical conditions as assessed by the FROMME BOEZAART surgical field grading system. Additionally, the study evaluates the impact of these drugs on pre- and postoperative hemoglobin levels, providing insights into their efficacy in managing intraoperative bleeding and their broader implications on patient safety and recovery.

In conclusion, identifying the most effective premedication protocol is

essential for improving surgical outcomes in ENT procedures. By comparing the hemodynamic changes and surgical conditions associated with clonidine and bisoprolol, this study aims to offer a comprehensive understanding of their benefits and limitations, ultimately contributing to the advancement of surgical practices in OLHN surgeries.

MATERIALS & METHODS

This prospective, observational study was conducted in the Department of Anesthesia at Nehru Hospital, B.R.D. Medical College, Gorakhpur, from April 2023 to March 2024. The study population included patients aged 18 to 65 years of either sex, classified as ASA physical status I-II, who were scheduled for elective ENT surgeries under general anesthesia. The study protocol was approved by the institutional ethical committee, and informed written consent was obtained from all participants before their inclusion in the study. A total of 100 patients were enrolled, divided equally into two groups: Group C, which received oral clonidine 300 mcg, and Group B, which received oral bisoprolol 2.5 mg, both administered two hours before surgery.

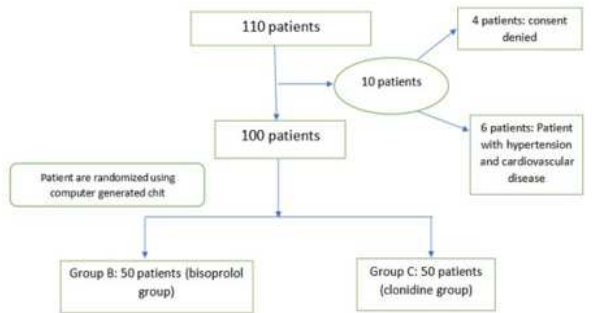
Patients were selected based on strict inclusion and exclusion criteria to ensure the study's validity and reliability. The inclusion criteria encompassed patients aged 18 to 65 years scheduled for elective ENT surgeries, with a BMI of less than 30, and classified as ASA physical status I or II. Exclusion criteria included, patients refusing consent, those with ASA status III or higher, individuals on anticoagulant therapy without proper monitoring, patients with local site infections, drug allergies, and those with systemic conditions like hypertension or cardiovascular disease. Other exclusions were patients with a history of prior ENT surgeries, those with difficult airways, communication disabilities, or surgeries expected to last more than three hours. Pregnant or lactating females and obese patients (BMI > 30 kg/m²) were also excluded.

The pre-operative protocol involved thorough anesthetic assessments conducted the night before surgery. All patients received oral premedication with tablet ranitidine 150 mg and tablet alprazolam 0.25 mg to reduce stomach acidity and anxiety, respectively. On the day of surgery, the study drugs (clonidine or bisoprolol) were randomly

administered according to computer generated chits ,two hours before the procedure, along with sips of water. Upon arrival in the operating theatre, patients were attached to multi-parameter monitors to record baseline vitals, including pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), electrocardiogram (ECG), oxygen saturation (SpO2), and respiratory rate (RR). Intravenous access was secured, and IV fluids were administered to maintain hydration and patient stability during surgery.

General anesthesia was induced with fentanyl at 2 mcg/kg, followed by propofol at 2 mg/kg, and intubation was facilitated with vecuronium at 0.1 mg/kg. Anesthesia was maintained with a mixture of 66% nitrous oxide (N2O), 33% oxygen (O2), and 1% isoflurane. Hemodynamic parameters, including heart rate and blood pressure, were monitored before induction and at 15-minute intervals during the surgery, up to three hours. The surgical field conditions were assessed immediately after surgery by the surgeon using the Fromme-Boezaart surgical field grading system, which evaluates the extent of bleeding and its impact on the surgical field. Pre- and post-operative hemoglobin levels were also measured to assess blood loss.

Following surgery, patients were transferred to the post-anesthetic care unit (PACU) for routine postoperative care, including the administration of intravenous antibiotics and other medications according to hospital protocols. This meticulous approach to perioperative management was designed to ensure optimal surgical conditions, minimize intraoperative bleeding, and enhance overall patient outcomes in ENT surgeries.



RESULTS

Table 1: Comparison Of Surgical Field Grading And Mean Pre And Post Operative Hemoglobin Levels Between Bisoprolol And Clonidine Groups.

Fromme Boezaart Surgical Field Grading	Group B- Bisoprolol		Group C- Clonidine		p value
	Frequency (N)	% of Total	Frequency (N)	% of Total	
1	14	14%	0	0.00%	<0.001
2	34	34%	29	29%	
3	2	2%	17	17%	
4	0	0%	4	4%	

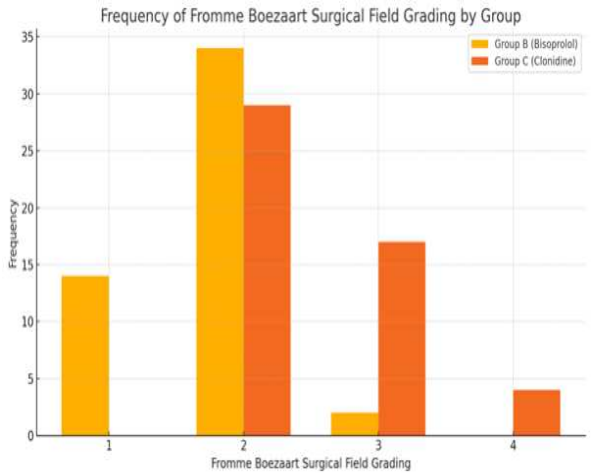


Table 2: Descriptive Statistics Of Study Population For Pre And Post Op. HB. (g/dl) between two groups .

			95% Confidence Interval		SE		95% Confidence Interval		SE	T statistic	p value
Parameter	N	Mean ±SD	Lower	Upper		Mean ±SD	Lower	Upper			
		Group B- Bisoprolol					Group C- Clonidine				
Pre Op. HB (g/dl)	50	13.1 ± 1.62	12.6	13.6	0.229	12.5 ± 1.45	12.1	12.9	0.205	1.91	0.054
Post Op. HB (g/dl)	50	12.7 ± 1.59	12.3	13.2	0.224	11.9 ± 1.47	11.5	12.3	0.208	2.52	0.061



Table 3: Hemodynamics Parameters Comparison Between Bisoprolol And Clonidine Groups

Parameter	Group B - Bisoprolol	Group C – Clonidine
Pulse Rate Before Induction (0 mins)	79.3	83.0
Pulse Rate After Induction (15 mins)	75.4	80.2
Pulse Rate (30 mins)	72.8	78.9
Pulse Rate (45 mins)	69.8	77.0
Pulse Rate (60 mins)	66.0	76.3
Pulse Rate (90 mins)	63.7	75.2
Pulse Rate (120 mins)	60.9	74.2
Systolic BP Before Induction (0 mins)	114	121
Systolic BP After Induction (15 mins)	111	119
Systolic BP (30 mins)	110	117
Systolic BP (45 mins)	109	115
Systolic BP (60 mins)	108	113
Systolic BP (90 mins)	108	113
Systolic BP (120 mins)	108	111
Diastolic BP Before Induction (0 mins)	75.4	80.7
Diastolic BP After Induction (15 mins)	72.7	77.5
Diastolic BP (30 mins)	70.3	75.7
Diastolic BP (45 mins)	70.6	73.0
Diastolic BP (60 mins)	69.6	72.7

Diastolic BP (90 mins)	70.4	72.2
Diastolic BP (120 mins)	68.6	70.2
Mean Arterial Pressure Before Induction (0 mins)	85.9	92.7
Mean Arterial Pressure After Induction (15 mins)	84.4	89.6
Mean Arterial Pressure (30 mins)	82.3	88.2
Mean Arterial Pressure (45 mins)	81.8	86.1
Mean Arterial Pressure (60 mins)	80.9	85.7
Mean Arterial Pressure (90 mins)	81.2	85.1
Mean Arterial Pressure (120 mins)	80.4	83.3

DISCUSSION

This study found that both Bisoprolol and Clonidine were effective in managing hemodynamic parameters during ENT surgeries, with some variations in their impact. Clonidine was associated with a higher incidence of satisfactory surgical field grading at grade 3, while Bisoprolol had lower incidence of surgical field grading at grade 3 and was linked to more stable systolic and diastolic blood pressures and lower pulse rates throughout the surgery. Additionally, Bisoprolol resulted in a smaller mean change in hemoglobin levels postoperatively (-0.4 g/dl) compared to Clonidine (-0.6 g/dl). Oxygen saturation levels were well-maintained in both groups, with minor differences observed in pre-operative clinical parameters such as RBS, TLC, and platelet counts, Lft and Kft.

Our findings on the efficacy of Clonidine in improving surgical field conditions align with a study by **Mohseni et al.¹⁰ (2011)**, which demonstrated that oral Clonidine premedication significantly reduced intraoperative blood loss and improved the quality of the surgical field during endoscopic sinus surgery. In their study, the mean blood loss in the Clonidine group was 150 ml compared to 275 ml in the placebo group, reflecting a notable improvement in surgical conditions. Similarly, the study by **Puthenveetil et al.¹¹ (2013)** compared the effects of Clonidine and Metoprolol on intraoperative hemodynamics and surgical conditions during functional endoscopic sinus surgery (FESS). They found that Clonidine provided better control of intraoperative bleeding and enhanced surgical visibility, with 70% of the patients in the Clonidine group achieving a surgical field grading of grade 2 or better, compared to 50% in the Metoprolol group. This is in contrast with the present study's observation that Bisoprolol was more effective in achieving better surgical field grading.

On the other hand, our study's findings regarding Bisoprolol are consistent with the results of **Jacob et al.¹² (2014)**, who reported that oral Bisoprolol premedication improved the surgical field during FESS by reducing intraoperative bleeding and stabilizing blood pressure. In their study, 68% of patients in the Bisoprolol group achieved a surgical field grading of grade 2, which is similar to the findings in the present study where 68% of patients in the Bisoprolol group were graded at grade 2. This study further highlighted that Bisoprolol was effective in maintaining stable systolic and diastolic blood pressures, which is consistent with the results of our study.

In contrast, some studies such as that by **Nair et al.¹³ (2004)** found that beta-blockers like Esmolol did not significantly improve surgical conditions compared to other hypotensive agents like Nitroprusside. Their study reported that only 55% of patients premedicated with Esmolol achieved satisfactory surgical field conditions, suggesting that the choice of beta-blocker may influence outcomes. However, the current study focused on Bisoprolol, which appears to offer better hemodynamic stability than Esmolol based on the results observed.

Overall, the findings of the our study are in agreement with previous research, indicating that both Clonidine and Bisoprolol are viable options for optimizing surgical conditions in ENT procedures, with each drug offering specific advantages depending on the clinical scenario. However, the study also suggests that Bisoprolol may provide superior control over the surgical field, particularly in terms of reducing intraoperative bleeding, and is more effective in maintaining stable blood pressure and lower pulse rates throughout the surgery.

CONCLUSION

This study indicated that both Bisoprolol and Clonidine were effective in managing the hemodynamic parameters and surgical conditions during ENT surgeries, with slight variations in their impact. The Clonidine group showed a higher incidence of surgical field grading at grade 3 and lower incidence of surgical field grading at grade 2 and no

patients in grade 1, suggesting less optimal surgical conditions, while Bisoprolol had lower incidence of surgical field at grade 3 and higher incidence of surgical field grading at grade 2 and 14% patients in grade 1, suggesting better surgical conditions, and was also associated with lower mean changes in hemoglobin levels post-operatively compared to clonidine group. Although both groups maintained adequate oxygen saturation levels, Bisoprolol demonstrated more stable systolic and diastolic blood pressure and lower pulse rates throughout the surgery. Additionally, pre-operative clinical parameters like RBS, TLC, and liver function tests were comparable between the two groups. Minor side effects were observed in both the groups. Overall, both drugs appeared to be viable options for optimizing surgical outcomes in ENT procedures, with Bisoprolol being slightly better.

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