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Research Article

Assessment of the Haemodynamic Effect of Adrenaline in Septoplasty Procedure

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ABSTRACT

Background: The present study aims to assess the haemodynamic effect of adrenaline in septoplasty procedure. **Materials and Methods:** One hundred ten adult patients in age ranged 20-40 years of either sex were classified them into 2 groups, each containing 55 patients. Group A patients were administered infiltration of 2% lignocaine with 1:100,000 adrenaline and in group B, 2% lignocaine with topical 1:100,000 adrenaline was used. Parameters such as heart rate, blood pressure, blood loss and pain (VAS) was recorded in both groups. **Results:** Mean age in group A was 34.5 years and in group B was 38.2 years, weight was 72.4 kg in group A and 72.8 kg in group B. In group A, pre-anaesthetic systolic blood pressure was 120.6 and in group B was 118.4. The mean pre-operative heart rate (beats/min) was 79.8 in group A and 78.2 in group B, 1st heart rate was 81.2 in group A and 75.2 in group B, 5th heart rate was 78.6 in group A and 73.6 in group B and 10th heart rate was 74.2 in group A and 72.5 in group B. VAS score at 1 hr was 6 in group A and 5 group B, at 2 hrs was 7.2 and 6, at 6 hrs was 8.5 and 7, at 12 hrs was 7 and 8 and at 24 hrs was 8 in group A and 9 in group B. In group A, procedure time was 36.4 min and in group II was 40.2 min, blood loss was 50.6 mL in group A and 72.4 mL in group B and partial oxygen pressure was 99% in both groups. **Conclusion:** There was no difference in haemodynamic in both groups, hence, there is no need to use topical adrenaline in septoplasty patients.

KEYWORDS

Adrenaline, haemodynamic, septoplasty

INTRODUCTION

Septoplasty is the surgical procedure performed in patients with deviated nasal septum. It is routinely performed procedure in otorhinolaryngology[1]. For any surgical method, a good and clear visualization is mandatory so as to perform specific procedure more accurately and precisely[2]. Maintaining haemostasis is of paramount importance in case of septoplasty owing to limited sinonasal region. In is required in both close and open septoplasty cases[3].

Topical and systemic vasoconstrictors agents are highly used in this procedure which limits blood loss[4]. Adrenaline in 1:100,00-1:200,00 concentration as infiltration and in 1:10,000 as concentration as topical form are employed[5]. It is also advisable by otolaryngologists to use local anaesthetic solution with adrenaline in order to control post-operative pain and providing haemostasis[6].

Adrenaline is a sympathomimetic amine having b-adrenergic receptor agonist effects[7]. It is evident that mucous membrane, skin and renal arterioles show vasoconstriction because of a-receptor predominant activation. Studies mention that low concentrations of adrenaline results into preferential b2 receptor activation which is the leading cause of vasodilatation in bronchiolar smooth muscle whereas, increased ranges activate a-receptor-mediated vasoconstriction in vascular smooth

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muscle[8,9]. Considering present function of adrenaline as topical and infiltrative agent we planned present study to study the haemodynamic effect of adrenaline in septoplasty procedure in 110 adult patients selected for the procedure.

MATERIALS AND METHODS

After considering the utility of the study and obtaining approval from ethical review committee of the institute, we selected 110 adult patients in age ranged 20-40 years of either sex. Inclusion criteria was patients within specified a group, patients planned for either open or closed septoplasty and those willing to participate. Exclusion criteria was patients diagnosed with CVDs, patients with history of clotting disorders and those allergic to the agent. After careful examination of the patients, we classified them into 2 groups, each containing 55 patients. Group A patients were administered infiltration of 2% lignocaine with 1:100,000 adrenaline and in group B, 2% lignocaine with topical, 1:100,000 adrenaline was used. Surgery was planned and performed under aseptic procedures following all standardized precautions. During surgical steps, gross amount of blood loss was collected using suction bottle and measured. We calculated surgical procedure time i.e., the time between administration of adrenaline till nasal packing. Parameters such as heart rate, blood pressure and pain (VAS) was also recorded in both groups. The results were compiled and subjected for statistical analysis using Mann-Whitney U test. $p<0.05$ was set significant.

RESULTS

Group A comprised of 30 males and 25 female and group B had 27 males and 28 females (Table 1).

Mean age in group A was 34.5 years and in group B was 38.2 years, weight was 72.4 kg in group A and 72.8 kg in group B. In group A, pre-anaesthetic systolic blood pressure was 120.6 and in group B was 118.4, 1' systolic blood pressure was 114.6 in group A and 117.4 in group B, 5' systolic blood pressure was 99.4 in group A and 104.6 in group B and 10' systolic blood pressure in group A was 99.0 and in group B was 108.2. On comparison using Mann-Whitney U test, difference found to be non-significant ($p>0.05$) (Table 2 and Figure 1).

The mean pre-operative heart rate (beats/min) was 79.8 in group A and 78.2 in group B, 1st heart rate was 81.2 in group A and 75.2 in group B, 5th heart rate was 78.6 in group A and 73.6 in group B and 10th heart rate was 74.2 in group A and 72.5 in group B. A non-significant difference was observed ($p>0.05$) (Table 3 and Figure 2).

VAS score at 1 hr was 6 in group A and 5 group B, at 2 hrs was 7.2 and 6, at 6 hrs was 8.5 and 7, at 12 hrs was 7 and 8 and at 24 hrs was 8 in group A and 9 in group B. The difference was significant ($p<0.05$) (Table 4).

In group A, procedure time was 36.4 min and in group II was 40.2 min, blood loss was 50.6 mL in group A and 72.4 mL in group B and partial oxygen pressure was 99% in both groups. The difference was significant ($p<0.05$) (Table 5).

Table 1: Patients distribution

Groups	Group A	Group B
Method	Infiltration of 2% lignocaine with 1:100,000 adrenaline	2% lignocaine with topical 1:100,000 adrenaline
M:F	30:25	27:28

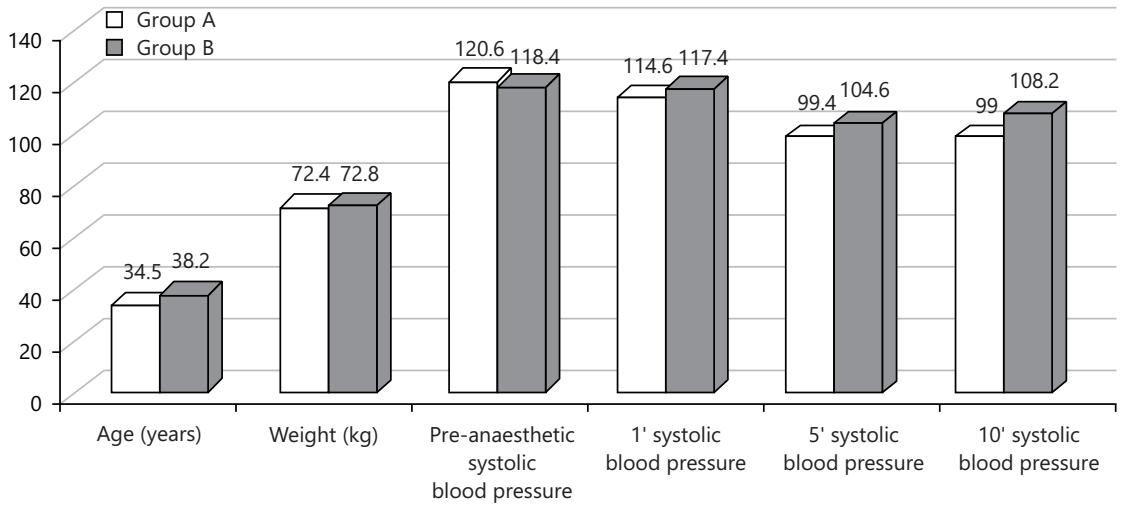

Figure 1: Comparison of demographic and systolic blood pressure between the groups

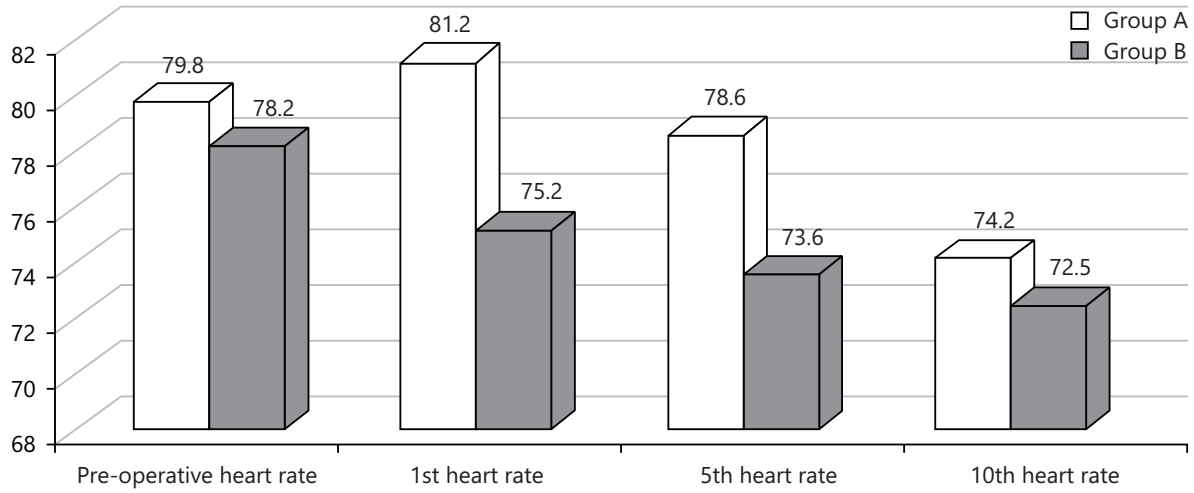

Figure 2: Comparison of heart rate between the groups

Table 2: Patients demographics

Parameters	Group A	Group B	p-value
Age (years)	34.5	38.2	>0.05
Weight (kg)	72.4	72.8	>0.05
Pre-anaesthetic systolic blood pressure	120.6	118.4	>0.05
1' systolic blood pressure	114.6	117.4	>0.05
5' systolic blood pressure	99.4	104.6	>0.05
10' systolic blood pressure	99.0	108.2	>0.05

Table 3: Comparison of heart rate in both groups

Heart rate	Group A	Group B	p-value
Pre-operative heart rate	79.8	78.2	>0.05
1st heart rate	81.2	75.2	>0.05
5th heart rate	78.6	73.6	>0.05
10th heart rate	74.2	72.5	>0.05

Table 4: Comparison of pain score in both groups

VAS	Group A	Group B	p-value
At 1 hr	6	5	>0.05
At 2 hrs	7.2	6	<0.05
At 6 hrs	8.5	7	<0.05
At 12 hrs	7	8	>0.05
At 24 hrs	8	9	>0.05

Table 5: Other parameters

Parameters	Group A	Group B	p-value
Procedure time (min)	36.4	40.2	>0.05
Blood loss (mL)	50.6	72.4	>0.05
Partial oxygen pressure	99	99	>0.05

DISCUSSION

Most of the surgical procedure performed in sino-nasal complex demands a good visualization with minimum or no haemorrhage[10]. The use of adrenaline in infiltration or as topical agent in local anaesthetic solutions are widely used[11]. It is observed that local anaesthetic solution as well general anaesthesia produces some sort of hyperaemia of nasal mucosa and haemorrhage due to vasodilating effect. This necessitates the use of topical vasoconstrictors in local anaesthetics. Because of venous and arteriolar sinusoidal constrictions, it is regarded as potent nonselective alpha agonist[12]. This study compared the haemodynamic effect of adrenaline in septoplasty procedure in 110 adult patients. Our data showed that there were 2 groups. Group A patients were administered infiltration of 2% lignocaine with 1:100,000 adrenaline and in group B, 2% lignocaine with topical; 1:100,000 adrenaline was used. Each group comprised of 55 patients. A study by Alfattani *et al.*[13] had

223 patients with 72.6% males and 27.4% females[13]. Günel *et al*.[14] included 88 septoplasty patients with 34 males and 14 female sin group I and 29 male and 11 females in group II. In this study, there were 30 male and 25 female in group A and 27 male and 28 female in group B.

This study revealed that mean age in group A was 34.5 years and in group B was 38.2 years, weight was 72.4 kg in group A and 72.8 kg in group B. In group A, pre-anaesthetic systolic blood pressure was 120.6 and in group B was 118.4, 1' systolic blood pressure was 114.6 in group A and 117.4 in group B, 5' systolic blood pressure was 99.4 in group A and 104.6 in group B and 10' systolic blood pressure in group A was 99.0 and in group B was 108.2. Günel *et al*.[14] found that, there was no difference in median blood pressure, systolic blood pressure and heart rate in both groups.

The results found that mean pre-operative heart rate (beats/min) was 79.8 in group A and 78.2 in group B, 1st heart rate was 81.2 in group A and 75.2 in group B, 5th heart rate was 78.6 in group A and 73.6 in group B and 10th heart rate was 74.2 in group A and 72.5 in group B. Alfattani *et al*.[13] observed that, mean arterial pressure, heart rate, systolic blood pressure, diastolic blood pressure and oxygen saturation recorded at baseline and after injection for 12 min showed no significant changes.

The data demonstrated that VAS score at 1 hr was 6 in group A and 5 group B, at 2 hrs was 7.2 and 6, at 6 hrs was 8.5 and 7, at 12 hrs was 7 and 8 and at 24 hrs was 8 in group A and 9 in group B. A study by John *et al*.[15] found that infiltration technique is superior as compared to surface anaesthesia in pain control. On the other hand, Temple and Timms[16] in their study comparing topical adrenaline and injecting adrenaline and xylocaine revealed no difference in pain after turbinectomy between both groups.

It was observed in our study than in group A, procedure time was 36.4 min and in group II was 40.2 min, blood loss was 50.6 mL in group A and 72.4 mL in group B and partial oxygen pressure was 99% in both groups. Lee *et al*.[17] in their study, comparing injectable and topical adrenaline in patients elected for Functional Endoscopic Sinus Surgery (FESS) found no difference in decreasing operation time or blood loss.

CONCLUSION

There was no difference in haemodynamic in both group, hence there is no need to use topical adrenaline in septoplasty patients.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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DISCLAIMERS

The opinions expressed in this article are the authors' personal views and do not represent that of their affiliated organizations, employers, or associations.

DATA AVAILABILITY STATEMENT

Not Applicable

HIGHLIGHTS OF THE STUDY

- Topical or systemic vasoconstrictors agents are highly used in this procedure which limits blood loss
- Topical or systemic vasoconstrictors doesn't alter the haemodynamics of the patient in the peri-operative period

AUTHOR CONTRIBUTIONS

HG conceived the review idea. SS conducted the literature search. SS prepared the first draft of the manuscript. HG reviewed, edited and revised the manuscript substantially on the key intellectual content. HG finalized and approved the current version agreed to be accountable for accuracy and integrity and decided to submit the manuscript to Trends in Medical Research.

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