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ORIGINAL ARTICLE

Comparison of Peroperative Peritonsillar Injection of Adrenaline vs Control to Reduce Intraoperative Bleeding in Tonsillectomy Patients

MOMINA ZEB1, ASAD ULLAH[2], SADAF RAFFAT MUSTAFA[3], WAJIH-UD-DIN SHINWARI[4], MEHREEN BABAR[5], MINAHIL ARSHAD[6]
[1,2]Postgraduate Trainee, [6]House Officer, Department of ENT, Pakistan Institute of Medical Sciences, Islamabad
[3]Associate Professor, Department of ENT, Hi-Tech Institute of Medical Sciences, Taxila Cantt
[4]Associate Professor, Department of ENT, Frontier Medical College Abbottabad
[5]Assistant Professor, Department of ENT, Wah Medical College, POF Hospital, Wah Cantt
Correspondence to: Dr. Momina Zeb, Email: drmominazeb@gmail.com, Cell: 0333-5047439

ABSTRACT

Background: Tonsillectomy is a common surgical procedure that is being carried out in ENT departments. Tonsillar enlargement can lead to airway obstruction, disrupts normal sleep patterns and can cause dysphagia. This procedure is frequently associated with significant intraoperative and postoperative bleeding. Therefore various methods and techniques have being used to reduce both intraoperative and postoperative bleeding.

Objective: To determine the effectiveness of preoperative peritonsillar injection of adrenaline to reduce intraoperative bleeding in tonsillectomy patients.

Study design: Quantitative randomized controlled trial.

Place and duration of study: Department of Otorhinolaryngology and Head and Neck Surgery, PIMS, Islamabad from 1st August 2022 to 31st January 2023.

Methodology: Ninety eight patients with clinical and demographic data, undergoing tonsillectomy were enrolled. After proper history and examination, patients were divided into two groups; group A (received adrenaline prior to tonsillectomy) and group B (control group). Peroperative blood loss in both the groups during surgery was estimated on the basis of quantity of blood in the suction machine and number of blood soaked sponges .Effect of adrenaline on the time to achieve hemostasis number of cauterization and operation duration was also studied.

Results: There was marked reduction in the amount of blood loss in group A than group B that was statistically significant. There was mild reduction in the time to achieve hemostasis, number of cauterization used and duration of surgery that was also statistically significant (P<0.005).

Conclusion: A marked reduction in peroperative loss of blood, total time required for surgery, number of cautery used was observed in the study group.

Keywords: Tonsillectomy, Peroperative bleeding, Adrenaline.

INTRODUCTION

Tonsils are vital part of the immune system and their infection occur frequently in humans. Tonsils are more active immunologically in childhood.[1] In adults, lymphoid tissue regresses, fibrosis occurs in the subepithelial tissue and crypts become filled up the with keratin debris. When infection occurs, the microorganism infiltrates from the crypts into the tonsillar tissue and forms toxinsin it, which is followed by polymorphponuclear leukocyte infiltration eventually leading to hypertrophy, necrosis and ulceration on the surface of tonsils. After infection, microorganism sometime inoculates into the tonsillar tissue.[2]

Tonsillar infections are common especially in children. In acute tonsillitis, antibiotic therapy may be sufficient to relieve symptoms, still in recurrent and chronic tonsillitis tonsillectomy remains the treatment of choice[1]. Tonsillectomy is a procedure in which tonsils are dissected out from the areas present on both the sides of the pharynx called the tonsillar bed.[2] Indications of this procedure include recurrent episodes of acute infection, sleep disturbance, nasal blockage, diphtheria carriers or abscess in the peritonsillar region.[3]

Coblation is a method in which radio-frequent energy is passed through a conductive medium i.e. isotonic NaCl that create a plasma field this leads to formation of energetic charge carrying ions that destroy the molecular bonds thus provide removal of tonsil and coagulation of the vessels simultaneously at a temperature upto 70°C that is much lower than the temperature generated by a monopolarcautery that is upto 600°C.[4] The thermal damage to the adjcent tissue is reduced and it is associated with low intensity of pain in the postoperative period and also provides early healing of the tissues in contrast to diathermy tonsillectomy.[5]

A harmonic scalpel is a new method of tonsillectomy that was first used in the twentieth century. In this procedure, the blade of the scalpel vibrates at 55 kHz and simultaneously cuts the tissues and coagulates the vessels and thus reduces both peroperative and post operative haemorrhage.[6]

Brkic et al[7] studied the haemorrhage rates after two commonly used tonsillectomy methods and concluded that the hot tonsillectomy has lowest post-tonsillectomy haemorrhage rate.

But still according to the several studies published in the last decade, there is an increased risk of post tonsillectomy hemorrhage, when tonsillectomy is done by the method in which heat is used like diathermy.[8,9]

Despite of all the techniques, peroperative bleeding still remains one of the biggest challenge and counts for most of the post-tonsillectomy fatalities. Different strategies have been developed to minimize the loss of blood during the procedure. Injection of various types of anesthetics agents in addition with adrenaline in the peritonsillar region to reduce peroperative bleeding is one of the methods that are being used. Adrenaline is avaso-constrictor that causes constriction of the vessels in the tonsillar fossa and causes platelet aggregation thus helps in formation of a blood clot and thus provides hemostasis.[10]

According to multiple randomized control trials, various methods have been used to reduce complications both preoperative and postoperative like using steroids, pain killers, antibiotics have been shown some positive outcomes. One of these methods is infiltration of adrenaline in the peritonsillar plain to minimize both the peroperative and postoperative bleeding.[11] Beigh et al[11] also studied the advantage using injection of tramadol and Adrenaline in the peritonsillar region before tonsillectomy and found that there was significant statistical difference in no. of cauterization, hemostasis achievement time and total duration of operation duration in the study group. Heamostasis time (min) in group A was 8±2 and group B was 15±3 with P value<0.001, number of cautery used in group A was 3±2 and group B was 7±3 with P value <0.001, operation time in group A was 15±4 and group B was 25±5 with P value <0.001.[12] Bameshki et al[13] studied the outcome of infiltration of epinephrine and bupivacaine on pain

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occurring after tonsillectomy and blood loss and concluded that the bleeding in the early postoperative period was less in study group.

MATERIALS AND METHODS

This quantitative randomized controlled trial was conducted at Department of Otorhinolaryngology and Head and Neck Surgery, PIMS, Islamabad from 1st August 2022 to 31st January 2023 and 98 patients were enrolled. They were divided in two groups; each group comprised 49 patients. Patients aged more than 5 years, fit for general anesthesia, recurrent tonsillitis and enlarged tonsils causing upper airway obstruction, dysphagia, obstructivesleep apnea were included. Patients having bleeding disorders, hypertensive patients, pregnant females and any contraindication to surgery were excluded.

An ethical approval was obtained from hospital ethical committee before conducting the study. Group A (patients who received adrenaline) and Group B (control group) and were counseled for participation in the study and informed written consent was taken. Detailed history and ENT examination of the patients was done and findings were noted. Basic investigations and pre- operative anesthesia fitness was done. Patients underwent the procedure by expert surgeon. Before the surgery, the suction bottle and the rubber tube were emptied and cleaned completely and 150ml of saline was taken in the bowl and for intermittent suctioning, to prevent suction tube blockage. After giving general anaesthesia and proper positioning, patients in the case group were given 8 ml of diluted adrenaline, 4 ml in the peritonsillar plane of each tonsil as follows: 1ml into the anterior pole, 1ml into the posterior pole, 1ml in the upper and 1ml in the lower pole. Tonsils were removed by dissection method. Hemostasis was secured by monopolar cauterization if needed. After removing the first tonsil, saline soaked gauze was placed in the tonsillar bed. After removing the other tonsil, bleeding was secured by monopolar cauterization if needed and the tonsillectomy in patients in control group was done by conventional method. After ligation of the bleeders, blood in pharynx was sucked. Then the saline left in the bowl was sucked into the suction bottle. The suction tube was raised above the level of the bottle to make sure that all the fluid enters the suction bottle. At the end of each tonsillectomy, the total amount of bleeding was estimated on the basis of total amount of blood in the suction bottle, number of cauterization, number of blood soaked gauzes, time to achieve hemostasis and operation duration. Total amount of blood in the suction bottle was calculated by substracting the amount of normal saline taken (150 ml) in the suction bottle from the total blood present in the bottle. The data was entered and analyzed through SPSS-25.

RESULTS

There were 27 (27.6%) males and 22 (22.4 %) females in group A while in group B, 26 (26.5%) and 23 (23.4%) females. Twenty six 26 (53%) patients in group A while in group B, 25 (51%) patients between 4–8 years, 19 (38.8%) patients in group A and 20 (40.8%) patients in group B between 9–12 years, 4 (8.2%) patients in group A and 4 (8.2%) patients in group B between 21–30 years with mean age of the patients was 9.57±5.12 years of group A while 9.40±4.79 years of group B (Table 1).

Table 1: Demographic information of the patients (n=98)

Variable	Group A	Group B
Gender		
Male	27 (27.6 %)	23 (23.4 %)
Female	22 (22.4 %)	26 (26.5 %)
Age (years)		
4- 8	26 (53%)	25 (51%)
9 – 12	19 (38.8%)	20 (40.8%)
21-30	4 (8.2%)	4 (8.2%)

The mean number of completely blood soaked sponges in group A was 10.59±2.33 and in group B was 13.04±2.05 and there is significant (P<0.05) difference, mean blood in the suction bottle in group A was 53.26±5.61 ml and in group B was 63.02±4.93 ml and statistically the significant (P<0.005) difference, mean number of cautery used to achieve hemostasis in group A was 3.00±1.39 and in group B, 4.28±1.957 with P value was significant (P<0.005). The mean time to achieve hemostasis in group A was 4.36±1.536 and in group B was 5.71±1.594 and P value significant (P<0.005). Mean duration of surgery in group A was 28.36±5.34 and in group B was 32.30±5.79 and the P<0.005 that is significant (Table 2).

Table 2: Comparison of number of used sponges, duration of surgery, time of achieve hemostasis, amount of blood and number of cautery in both groups

Variable	Group A	Group B	P value
Number of used sponges	10.59±2.33	13.04±2.05	0.005
Duration of surgery	28.36±5.34	32.30±5.79	0.005
Time to achieve hemostasis	4.36±1.53	5.71±1.59	0.005
Amount of blood	53.26±5.61	63.20±4.93	0.005
Number of cautery	3.00±1.39	4.28±1.95	0.005

DISCUSSION

Conventional methods to control hemostasis like cauterization and/or ligation can stop the major bleeders but sometimes diffuse bleeding and oozing from the capillaries may cause difficulty for the surgeon to locate the bleeding vessel, leading to inefficient hemostasis and inturn increase the blood loss and prolong the operating time.[14] Adrenaline is a commonly use hemostatic agent that has a powerful vaso-constricting properties causing retraction of blood vessels in the tonsillar bed. Adrenaline also promotes the platelet aggregation and thus helps in the formation of a blood clot and adrenaline is an inexpensive agent, with little risk, and decreases the intraoperative bleeding, therefore can be used as a reasonable hemostatic agent. These features of adrenaline especially the decrease in peroperative bleeding is demonstrated in the current study.

A total of 98 patients were studied with mean age of the patients were 9.48±4.939 years with the age ranging from 4-30 yrs. The majority cases were in the age group 8-12 years. In this study, males were the predominant gender 51% (n=50) whereas females were 49% (n=48). In our study, we found that the mean peroperative blood loss in case group (patients received adrenaline) was 53.26ml and in group B (control group) was 63.02ml.. The total amount of blood loss in both the groups was statistically significant (p=0.005).Similar to the result of our study, Broadman et al[15],reported the benefits of peroperative peritonsillar infiltration with adrenaline and concluded that infiltration should be done with either normal saline containing adrenaline (1:200,000) or lignocaine containing adrenaline (1:200,000). Manikandan et al[14] reported that mean amount of blood loss in males was 98.48 ml and in females was 88.45ml although the blood loss in males was 10.03ml more than in females, but it was not found statistically significant (P>0.005).

In our study mean time to achieve hemostasis in the study group (group A) was 4.3mins and in control group (group B) was 5.7mins.Mean duration of surgery in group A was 28.3 mins and in group B was 32.3 mins. Mean no. of cautery used in group A was 3 was 4.2. Mean no. of sponges used in group A was 10.5 and in group B was 13.0. Similar to the result of our study, Beigh et al[11], reported that the number of cautery used to achieve hemostasis, time to achieve hemostasis and operation duration was significantly lower in group A (that received peritonsillar injection of adrenaline) compared to group B(control group). Hemostasis time in group A was 8±2 min and in group B was 15±2min. The no. of cautery used in group A was 3±2 and in group B was 7±3. Operation duration in group A was 15±4 and in group B was 25±5.

Bameshki et al[13] reported the mean duration of surgery in both the group was equal at 21 minutes and 40 seconds (SD=5.14 min). The peroperative bleeding according to the surgeon's opinion was not significant between both the groups, but the mean number of cauterization was used to achieve hemostasis in case group

was significantly less than in the control group (P=0.002). The number of sponges used peroperatively in the control group (4.2 and 3.4 sponges respectively) was more as compared to the case group (2.2 sponges) but this difference was not significant. Apart from pre-operative peritonsillar injections of various agents to minimize peroperative blood loss, several studies have described that different techniques of tonsillectomy can have an effect on the blood loss. These studies are different from our study, as we studied the effect of peritonsillar injections of adrenaline before surgery to minimize the intraoperative loss of blood, while these studies focused on the techniques of tonsillectomy that result in least peroperative and postoperative haemorrhage. Bukhari et al[16] compared monopolar electrodissection with cold dissection tonsillectomy and concluded that the blood loss was minimal with the diathermy technique; averaging 25.37 ml compared to 88.5 ml for cold dissection tonsillectomy. Similarly, Shah and Ghani[17] described peroperative blood loss to be 4ml and 10ml respectively in bipolar electrocautery dissection technique, which indicate bipolar electrocautery dissection better than cold steel dissection technique. In a study by Robert et al[18] comparison of electrocautery dissection with other techniques of tonsillectomy was done and he reported that electrocautery results were better in peroperative and postoperative bleeding. It is also considered as a cost effective method for tonsillectomy.

It has been reported the use of tranexamic acid effective in reducing the intraoperative bleeding in tonsillectomy patients. A study carried by Robb and fellows[19] reported that tranexamic acid has the advantage to minimize postoperative haemorrhage in peadiatric patients. In another study, a dose of tranexamic acid given intravenously at the dose of 10mg/kg caused a blood loss of 56.61ml compared to control group blood loss that was 66.52 ml in tonsillectomy done by conventional dissection method. Soliman and Alshehri[20] reported that there was no benefit of aone I/V shot of tranexamic acid to minimise the haemorrhage in tonsillectomy and the reason is not clear inspite of multiple studies showing the effectiveness of tranexamic acid in mnimizingthe intraoperative bleeding. Brum et al[19] did a randomized controlled trial on ninety-five peadiatric patients undergoing adenotonsillectomy, concluded that there is no advantage of using tranexamic acid to minimize intraoperative haemorrhage during in children.

Pre-treatment of patients undergoing tonsillectomy with antibiotics can reduce the blood loss as studied by Prasad et al[21] who pretreated patients with antibiotics before tonsillectomy and narrated that the intraoperative haemorrhage in patients receiving preop antibiotics was less as compare to the group not receiving antibiotic. It was observed that intraoperative haemorrhage in patients receiving antibiotic was less.

CONCLUSION

A marked reduction in peroperative loss of blood, total time required for surgery, number of cautery used was observed in the study group.

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