

Original Research Article

Does tranexamic acid have role in controlling intraoperative blood loss in tonsillectomy?

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ABSTRACT

Background: The study was done with the objective to assess the effect of tranexamic acid in controlling intraoperative bleeding in tonsillectomy.

Methods: Retrospective study was conducted in the Department of ENT and HNS, Tribhuvan University Teaching Hospital, Kathmandu, Nepal from August 2016 to July 2017. Patients more than 15 years who underwent bilateral tonsillectomy were included in the study. Whereas patients who underwent unilateral tonsillectomy and patients who had hypersensitivity to tranexamic acid were excluded from the study. The patients who received tranexamic acid during surgery were taken as study group whereas the patients who didn't receive tranexamic acid were taken as control. The amount of the intraoperative blood loss, i.e. mean and the frequency of early post-operative bleeding were evaluated.

Results: A total of 48 patients who fulfilled the inclusion criteria were evaluated. Among whom, 24 patients who received tranexamic acid during tonsillectomy were taken as study group and other 24 patients who did not received tranexamic acid were taken as control. The mean blood loss in study and control group were 92.85 ml and 91.40 ml respectively and the difference was statistically not significant ($p=0.785$). There were no cases of early postoperative bleeding recorded in either group within the first 24 hours of surgery.

Conclusions: There is no significant role of tranexamic acid in controlling intraoperative bleeding in tonsillectomy.

Keywords: Tranexamic acid, Tonsillectomy, Intraoperative bleeding

INTRODUCTION

Tonsillectomy is defined as the surgical excision of the palatine tonsils which has been performed for over three thousand years.¹

Among the various complications of tonsillectomy, bleeding is one of the most serious complications related to tonsillectomy and it may occur intraoperatively or postoperatively. Primary hemorrhage is defined as the bleeding which occurs during the surgery and in the first 24 hours after the surgery. Secondary haemorrhage occurs after 24 hours of the surgery.² Among the primary haemorrhage, intraoperative bleeding may occur due to

trauma to the mucosal tissue of the tonsillar pillar, the underlying muscle and vessels as well as due to the type of the operative techniques. Primary haemorrhage is the most feared complication because of the risk of airway obstruction, shock, requirement of early second general anesthetic drugs and ultimately death if not diagnosed early or inappropriately treated.³

Tranexamic acid is an antifibrinolytic agent used for treating and preventing bleeding.⁴ It is a synthetic lysine analogue, producing an antifibrinolytic effect by the reversible blockage of lysine binding sites on plasminogen molecules.⁵ This inhibits the conversion of plasminogen to plasmin on the surface of the fibrin.⁶ It

has been used in the clinical practice for over 40 year, but has only recently been established as a valuable pharmaceutical tool for reducing blood loss during surgery and following major trauma.⁷

The aim of the study was to evaluate the effect of tranexamic acid on intraoperative bleeding in patient undergoing tonsillectomy

METHODS

It was a retrospective study done on the patient who underwent tonsillectomy in Department of ENT and HNS, Tribhuvan Teaching Hospital, Kathmandu, Nepal from August 2016 to July 2017. Patients more than 15 years who underwent bilateral tonsillectomy by cold dissection methods were included in the study. Whereas patients who underwent unilateral tonsillectomy and patients who had hypersensitivity to tranexamic acid were excluded from the study. The patients who received tranexamic acid during surgery were taken as study group whereas the patients who didn't receive tranexamic acid were taken as control.

All the patients were selected in outpatient department. The patients were admitted one day prior to surgery. All the patients underwent cold dissection tonsillectomy under general anaesthesia. During the surgery, the study group received intravenous tranexamic acid 500 mg after induction. The blood loss was evaluated by net volume of blood in the suction jar and number of gauze piece used. The standard sized gauze pieces 19×14 cm were used. The patients were assessed for early postoperative bleeding for 24 hours after surgery in the inpatient ward.

The results were analyzed in terms of the amount of the intraoperative blood loss, i.e. mean±SD (standard deviation) and the frequency of early postoperative bleeding. The independent t-test was used for this purpose. The data analysis was done using the computer program SPSS (statistical package for the social sciences) version 21 for microsoft windows.

RESULTS

A total of 48 patients who fulfilled the inclusion criteria were evaluated. Among whom, 24 patients who received tranexamic acid during tonsillectomy were taken as study group and other 24 patients who did not received tranexamic acid were taken as control. Recurrent tonsillectomy was observed in 47 cases and OSAS in 1 case. There were 27 males and 21 females in the study.

Intraoperative blood loss in the study group

The maximum blood loss was 127.5 ml and the minimum blood loss was 45.5 ml. The mean blood loss was 92.85 ml.

Table 1: Age distribution (n=48).

Age in years	Study group	Control group
15-24	10	12
25-34	13	11
35-44	0	1
>45	1	0
Total	24	24

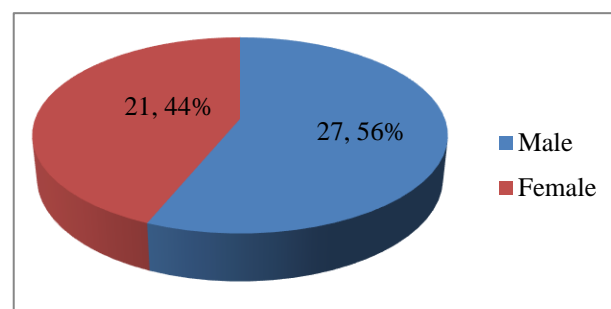


Figure 1: Gender distribution (n=48).

Table 2: Intraoperative blood loss in the study group.

Cases	Blood loss (ml)
1	102
2	125
3	45.5
4	76.5
5	127.5
6	84
7	95
8	83
9	67.5
10	82
11	69.5
12	104
13	109.5
14	104
15	71
16	108
17	107
18	118.5
19	95.5
20	105.5
21	61
22	104
23	80
24	103

Intraoperative blood loss in the control group

The maximum blood loss was 137.5 ml and minimum blood loss was 67.5 ml. The mean blood loss was 91.40 ml.

Table 3: Intraoperative blood loss in the control group.

Cases	Blood loss (ml)
1	137.5
2	102
3	67.5
4	83
5	117
6	82.5
7	99
8	90.5
9	81.5
10	103.5
11	105
12	101.5
13	102.5
14	85.5
15	98
16	87.5
17	73.5
18	77.5
19	76
20	89
21	84
22	73.5
23	90.5
24	85.5

Table 4: Comparison of intraoperative blood loss (n=48).

Group	Mean blood loss in ml (mean±SD)	P value
Study (n=24)	92.85±20.83	0.785
Control (n=24)	91.40±15.59	

There was no early postoperative bleeding within 7 days of surgery.

DISCUSSION

Total number of 48 patients were enrolled in this study, out of which 27 were males 56% and 21 were females 44%. Male to female ratio was 1.3:1. The results were close to a study done by George et al where there was male to female ratio of 1.1:1 and similar to our study more females in the study group 54% and more males in the control group 58%.⁸

The age of the patients included in our study ranged from 15 to 48 years. The majority of the patients undergoing tonsillectomy were seen in the age group of 25-34 year, 24 patients (50%). There were 22 patients (46%) in the age group 15-24 years. The mean age of the population was 25.25 years. In the study done by George et al the

majority of the patients were in second and third decade of life with 47% were in the age group 11-20 years.⁸

In the present study, the indications of tonsillectomy in 97.9% cases were recurrent acute tonsillitis that reveals the high incidence of this condition. This was similar to the study done by George et al and Santosh et al where all the patients undergoing tonsillectomy were recurrent acute tonsillitis.^{8,9}

In our study, all the cases were done by cold dissection method with bipolar diathermy haemostasis. In the similar study done by Santosh et al all the patients underwent dissection and snare method of tonsillectomy.⁹

Haemorrhage is one of the common complication post tonsillectomy because of the airway obstruction, shock and ultimately death if not diagnosed early or inappropriate treated. The rate of primary hemorrhage has ranged from 0.2% to 2.2% and the rate of secondary hemorrhage from 0.1% to 3%.¹⁰

The intraoperative blood loss was calculated by measuring the blood collected in the suction jar and by the use of the standard gauze piece. Though the colorimetric method¹¹ is the more correct method of measuring blood content in the used gauze pieces, and the gravimetric method which also correlates well with colorimetric method, we have used a visual estimation method to evaluate intraoperative blood loss with the standard gauze piece of size 19×14 cm, calculating 2.5 ml and 4 ml if it is partially soaked and fully soaked respectively.¹² The colorimetric and gravimetric methods were not used due to the unavailability of those facilities in our department.

The study group was given intravenous bolus dose of tranexamic acid 500 mg after induction but immediately before surgery. The dose of tranexamic acid used in our study was within the dose range previously found effective in the studies done by George et al and Santosh et al it has been proposed that therapeutic plasma concentration of tranexamic acid is 5 to 10 mg/l and is maintained for 3 hours.^{8,9} Considering the relative short duration of tonsillectomy procedure, we assumed that a single intravenous bolus dose of tranexamic 500mg would fulfill the goal. In our study, the patients were assessed for the intraoperative blood loss volume and frequency of early postoperative bleeding which was observed for the first 24 hours after the surgery as this study is done on primary haemorrhage in tonsillectomy.

The mean blood loss in the study group was 92.85 ml, while the mean blood loss in the control group was 91.40 ml. There was 1.6% more bleeding in the study group. The blood loss in the two groups were not statistically significant (p=0.785). Similar result was observed by Mazauric et al on extra capsular tonsillectomy in adults showed that there was no significant benefit from the routine use of tranexamic acid during tonsillectomy.¹³

Brum et al did a double blinded randomized controlled trial and concluded no benefit of using the tranexamic acid for reducing bleeding during adenotonsillectomy in children.¹⁴ Similarly, Soliman et al in pediatric patients of 225 showed no effect of tranexamic acid in decreasing tonsillectomy bleeding.¹⁵

Whereas, other studies showed effective role of tranexamic acid in control of post tonsillectomy bleeding. A study done by Castelli et al included 80 patients and found significant reduction of blood loss in study compared to control group in intraoperative period.¹⁶ Similarly, a study by George et al found tranexamic acid is effective and significantly decreased tonsillectomy bleeding.⁸ There was 44.75% less bleeding in the study group. In study done by Santosh et al found mean blood loss of 56.61 ml in the study group compared with 106.84 ml in the control group.⁹

The present study and the other studies are also showing different results regarding the effect of tranexamic acid in decreasing the bleeding associated with tonsillectomy as some authors found that tranexamic acid is effective in decreasing tonsillectomy bleeding, while others showing no benefits from tranexamic acid and this may be related to many factors such as age of patients, route, dose, duration of administration, surgical techniques of tonsillectomy, method of assessing blood loss and number of patients in the studies. There are also studies which have documented the effectiveness of tranexamic acid in the presence of fibrinolysis during cardiac surgery and cardiopulmonary bypass, neurosurgery, prostatectomy and other surgeries, while there are no studies which measured the fibrinolytic activity during tonsillectomy. This means that the tranexamic acid may be more effective to decrease the bleeding due to fibrinolysis, while it is not effective in other surgery without fibrinolysis.

CONCLUSION

In spite of many studies showed the effectiveness of tranexamic acid in decreasing surgical bleeding, this retrospective study showed no use of tranexamic acid in decreasing intraoperative blood loss during tonsillectomy. However, there was no case of post-operative bleeding noted in our study and there were no adverse effects of tranexamic acid in any of the cases in this study.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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