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Local application of haemocoagulase for control of haemorrhages after tonsillectomy: a study in a teaching hospital

Harikrishna Kishore*

Department of ENT, Vishwabharathi Medical College, R.T. Nagar, Kurnool, Andhra Pradesh, India

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***Correspondence:**
Dr. Harikrishna Kishore,
E-mail: belagantiharireddy@gmail.com

ABSTRACT

Background: Post-tonsillectomy haemorrhage remains the most serious complication of tonsillectomy. Many topical agents have been used to control the post-operative bleeding by the surgeons. This study was undertaken to evaluate hemocoagulase as a local application in tonsillectomy for the control of primary, reactionary and secondary haemorrhages.
Methods: 50 patients, between the ages 5-60 years, who came with chronic tonsillitis or adenoid hypertrophy, were included into the study. The surgery was performed under general anaesthesia by tonsillar resection or tonsilloadenoid resection.
Results: The most common age group to be affected was between 5 and 15 years, though in this age group the number of females and males were the same, accounting for 28% each of the total number of patients. Among the 50 patients, only 5 (10%) of them had reactionary haemorrhage, which was immediately contained. None of the patients had either primary or secondary haemorrhage.
Conclusions: The use of hemocoagulase has after tonsillectomy has definite advantage in controlling post-operative bleeding. It can be used as a routine application after tonsillectomy to control the bleeding.

Keywords: Tonsillectomy, Post-operative bleeding, Haemocoagulase, Local application

INTRODUCTION

Tonsillectomy is a common otorhinolaryngology surgery, postoperative bleeding is the most common complications can be life-threatening. Although today, there are many procedures for tonsillectomy including blunt dissection, guillotine excision, electrocautery, cryosurgery, coblation, ultrasonic removal, laser removal, monopolar and bipolar dissection, thermal welding tonsillectomy, and ligature tonsillectomy but dissection is by far the most commonly used technique and has stood the test of time.[1,2]

The incidence of tonsillectomy is around 20-40% of all the otolaryngeal surgeries.[3,4] It is normally considered a simple and safe surgery, however, this operation is still associated with the risk of hemorrhage both during the operation and post-surgery.[5] Excessive bleeding requires prompt attention by the surgeon and immediate treatment.

Post-tonsillectomy hemorrhage remains the most serious complication of tonsillectomy. Hemorrhage has been divided into two broad categories; primary, occurring <24 hour after surgery and secondary, occurring >24 hour, commonly 5-10 days after the operation. 3-5% of the patients get readmitted due to secondary hemorrhage.[6] Primary hemorrhage occurs due to the after effects of the surgical technique, while secondary hemorrhage is said to occur due to environmental factors.[7]

Many topical agents have been used to control the post-operative bleeding by the surgeons. Hydrogen peroxide is one such agent where the incidence of oozing and active bleeding decreased. The post-operative blood loss due to

this was found to be reduced by 32%.[8,9] Bismuth subgaliate, diathermy with ligation have also been considered as a treatment.[10,11]

This study was undertaken to evaluate hemocoagulase as a local application in tonsillectomy for the control of primary, reactionary and secondary hemorrhages.

METHODS

This study was conducted by the Department of ENT at Viswabharathi Medical College, Kurnool, Andhra Pradesh, India during the period of two years.

50 patients, between the ages 5-60 years, who came with chronic tonsillitis or adenoid hypertrophy, were included into the study. A detailed history and demographic details were collected from all the patients. Conditions such as hemophilia, aplastic anemia or leukemia, hypertension or any other cardiac diseases were noted. If there as an involvement of any medical treatment that would interfere with the bleeding and clotting time was taken into consideration.

All the patients underwent regular medical examination such as blood pressure testing, presence of pallor, patechiae, palpable jugulodigastric nodes, size and chronic sepsis of the nodules. Blood investigations such as hemoglobin levels, bleeding and clotting time, prothrombin levels etc. were also performed.

The surgery was performed under general anesthesia by tonsillar resection or tonsilloadenoid resection. After tonsillectomy, active bleeders in bilateral tonsillar fossae were ligated. The patient was then observed for primary haemorrhage, reactionary haemorrhage and secondary haemorrhage.

For primary haemorrhage, both the right and left fossae were examined for bleed and if found, gauze sheet of 20 x 20cms was folded to 2 x 2 cms and soaked in 15 drops of haemocoagulase equivalent to 1cc was placed in the fossa for 10 minutes.

After 10 min, both the fossae were observed for bleed. If they were still filling with blood, they were once more treated with another gauze piece with haemocoagulase.

In the case of reactionary haemorrhage, the tonsillar fossae were observed for bleeding, clot or any active bleeder. At the same time, patients pulse, blood pressure, excessive swallowing movements, vomiting of blood were observed every hourly for the first 8 hours and thereafter 4th hourly for the next 16 hours. If a small clot was present, the patient was treated with weak hydrogen peroxide or Condy's gargles and watched for increase or decrease of the clot.

All the patients were then discharged after giving appropriate antibiotics, antipyretic, and b-complex for 5 days. All the patients were further review on the 5th and the 10th day of surgery and apart from the regular checkup, history of blood loss was specifically asked and noted. If there was any case of blood stained sputum, fever or foul smell, it was also noted carefully for further analysis. On physical examination, any signs of pallor, raised temperature, halitosis, unhealthy slough, clot or ooze from the fossae was also carefully noted.

RESULTS

Out of the 50 patients in the study, there was more number of females (56%) than males (44%). The most common age group to be affected was between 5 and 15 years, though in this age group the number of females and males were the same, accounting for 28% each of the total number of patients (Table 1).

Table 1: Age wise distribution of the patients.

Age in years	No of males (%)	No of females (%)	Total
5-15	14 (28%)	14 (28%)	28 (56%)
16-35	8 (16%)	13 (26%)	21 (42%)
36-60	0	1 (2%)	1 (2%)
Total	22 (44%)	28 (56%)	50 (100%)

The most common type of procedure performed on the patients was tonsillar resection in 92% of the cases. In 4 cases (8%), tonsilloadenoid resection was performed (Figure 1).

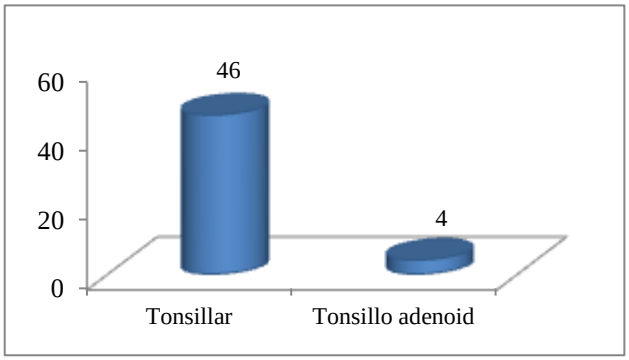

Figure 1: Type of resection performed.

Among the 50 patients, only 5 (10%) of them had reactionary hemorrhage, which was immediately contained. None of the patients had either primary secondary hemorrhage (Table 2).

Table: 2: Type of haemorrhage observed.

Type of haemorrhage	Number	Percentage
Primary	0	-
Reactionary	5	10%
Secondary	0	-
Total	5	10%

During the surgery, 4 patients (8%), suffered mild mucosal tear of the uvula, while none of them suffered other common problems such as, soft palate damage, damage to tonsillar fossa or base of tongue or to anterior or posterior pillar (Table 3).

Table 3: Damage in the surrounding structures during surgery.

Structures	Number	Percentage
Soft Palate	0	-
Mild Mucosal tear of uvula	4	8%
Tonsillar fossa	0	-
Base of tongue	0	-
Anterior pillar	0	-
Posterior pillar	0	-

Most of the patients (88%), loss around 5 ccs of blood, while 6 (12%), of then lost less than 10 ccs of blood. There was no case where a patient lost more than 10ccs (Table 4).

Table 4: Average blood loss.

Amount of blood loss	Number	Percentage
5 cc	44	88%
10 cc	6	12%
>10 cc	0	-

DISCUSSION

Hemorrhage due to tonsillectomy is still not properly defined. Many authors have tried to define it depending on the technique of the surgery used, such as macroscopic or microscopic. Most of the time, hemorrhages needed the return to the theatre i.e. to undergo a resurgery. Therefore, the bleeding post tonsillectomy has to be properly recognized so that proper action can be taken.

Hemocoagulase has thrombine and thromboplastine like action on blood coagulation. *In-vitro*, the thrombin-like activity of hemocoagulase transforms fibrinogen into fibrin by gradually splitting off fibrinopeptide-A, giving rise to des-A-fibrin monomers, which polymerize end-to-end to fibrin. However, unlike thrombin, this activity of hemocoagulase is not inhibited by heparin. The des-A-fibrin monomer produced by the thrombin-like enzymatic activity in the circulating blood remains in solution because it forms a complex with native fibrinogen. These complexes of high molecular weight accelerate the platelet aggregation and reduce capillary permeability at the site of the vascular lesion. The presence of platelet factor III, released from thrombocytes aggregating at a bleeding site, is essential for the thromboplastin-like enzymatic activity of hemocoagulase to activate factor X. This activated factor Xa then supports thrombin formation at the site of hemorrhage. In the absence of platelet factor III and of factor X *in-vitro*, the thromboplastin-like enzymatic activity activates prothrombin to thrombin, which converts fibrinogen to fibrin. This effect is independent of the presence of calcium, though it is accelerated in the presence of calcium ions. Thus, hemocoagulase shortens the bleeding and coagulation time so that blood loss is reduced. In vivo, therapeutic doses of hemocoagulase are not shown to initiate intravascular coagulation.[13-17]

The various methods of haemostasis are bleeders ligations, diathermy haemostasis and local applicators of agents like hydrogen peroxide, bismuth sulphate, calcium alginate, betadine silver nitrate, 1% lidocaine etc.[10,11,18-20]

In our present study, females were more affected with tonsillitis than males. The main age group that was affected was in children with 56%, followed by 16-35 years. Very few elderly people suffered from tonsillitis.

Tonsillar resection was the most predominant type of correction performed. Reactionary hemorrhage was observed in 5 (10%) of the patients. In present study, there was no case of either primary or secondary bleeding. In a study by Jun CX et al, 17 cases out of 364 tonsillectomy cases had post-operative bleeding.[21] The number of males were more than the females with the age group between 30-39 years being more affected. In a study by Bhattacharya et al, the rate of post tonsillectomy bleeding was 5.1%. There was no statistical difference in the bleed in the genders. The predominant type of bleed was secondary hemorrhage in this study.[22]

In a study by Papangelou, in 579 patients there was no difference in post-operative hemorrhage rates between ligations and diathermy.[23] Similar results was found in another study by Mallik et al and Watson et al.[24,25]

An incidence of 2.7% post op bleed was observed by Schmidt et al. They observed that postoperative bleeders were more likely to have abnormal preoperative clotting studies, greater elevations of their mean postoperative blood pressures and unusual surgical indications. They found that anaesthesia was not a risk factor for post tonsillectomy bleeding.[26]

While primary bleeding events are often caused by insufficient intraoperative hemostasis, secondary hemorrhage is frequently related to the rejection of the wound surface and fibrinogen degeneration during wound healing determined by the surgical technique used for tonsillectomy.

There was no secondary bleeding in present study, which was in accordance to a study by Pinder et al.[27]

CONCLUSION

The use of hemocoagulase has after tonsillectomy has definite advantage in controlling post-operative bleeding. Also the process of application of the hemocoagulase is

very simple, easy and cost effective. It can be used as a routine application after tonsillectomy to control the bleeding.

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

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