Original Article

THE EFFECTIVENESS OF LOWER POLE LIGATION IN TONSILLECTOMY

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ABSTRACT:

OBJECTIVE: Hemorrhage following tonsillectomy has always been a serious problem. Recently several techniques, devices and materials have been developed to reduce the intra-operative and post-operative blood loss but still no optimal methods have emerged. In this study we assessed the effectiveness of lower pole ligation in tonsillectomy ensuring the hemostasis and preventing the post-operative hemorrhage in early and late stages.

MATERIALS AND METHODS: This was a hospital based retrospective study performed in the department of ENT, Aziz Fatima Hospital (Medical College) and Faisal Hospital Faisalabad from May 2014 to June 2017. During this period 310 patients underwent tonsillectomy using COLD DISSECTION TECHNIQUE. Inferior pole was ligated by Negus artery forceps as close to its junction with the lingual tonsils ensuring no tissue remnants are left and knot applied by Negus ligature carrier with Black Silk #1. Bipolar diathermy was used for tonsillar bed hemostasis. Follow-up was continued for the next 4 weeks.

RESULTS: Out of 310 patients undergoing the procedure only 2 presented with reactionary hemorrhage. One of them presented after 3 hours and the cause of bleeding was appreciated as slipping of the knot from the lower pole which was shifted to OT and ligated again using the Silk # 1. Second patient presented after 2 hours with mild reactionary hemorrhage and the site was not from the lower pole, but diffuse oozing from the tonsillar bed which was conservatively dealt by cold sponging and ice cold gargles. Out of 310 only 1 patient presented after 3 weeks with secondary hemorrhage which was treated by broad spectrum antibiotics.

CONCLUSION: The use of lower pole ligation in tonsillectomy affords efficient and practical hemostasis. The procedure is inexpensive and requires no special and refined equipment. The anterior and posterior tonsillar pillars remained intact thus the functional anatomy was preserved.

KEY WORDS: Hemorrhage, Suture, Tonsillectomy, Lower Pole, Ligation.

INTRODUCTION:

Tonsillectomy is one of the most commonly done surgical procedures in the world.[1] The incidence of post-operative hemorrhage ranges from 0.3% to 12 %.[1,5] Hemorrhage is still considered to be the most serious complication of this procedure. [1] Mortality rate varies from 1/12000 to 1/75000. [1] The risk factors for post tonsillectomy hemorrhage are older age, lack of preparation for surgery pre-operatively, excessive intra-operative blood loss by inexpert hands, elevated post-operative mean arterial blood pressure, short neck, obesity, and bulky tongue.[1,6]

Now a day's different methods are used for tonsillectomy e.g. blunt dissection, cold methods, electro cautery or hot methods like lasers and coblation methods. Hemostasis can be achieved by different methods like ligatures, diathermy, laser coagulation of bleeding vessels, calcium alginate swabs after tonsillectomy and adrenaline soaked packs with

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lignocaine to reduce the pain and bleeding intra and post-operatively.[4, 5] Due to high intra-operative blood loss, cold steel technique have been infrequently used in the United States,[3] but no optimal methods emerged.[2] The palatine tonsils receive their blood supply mainly from lower pole through the tonsillar branch of dorsal lingual artery, the ascending Palatine artery and tonsillar branch of facial artery. Additional sources are from ascending pharyngeal artery and the lesser palatine artery at upper pole. Due to this fact hemorrhage commonly seen on the lower pole.[4] There are few suture or tie ligature techniques that is slip knot, under suture, clipping with negus artery forceps and applying knot with ligature carrier. These techniques may vary from surgeon to surgeon. In this study, we used the ligation of the lower pole by clipping it with negus artery forceps and ligating it with ligature carrier by Black Silk #1. The aim of this study is to demonstrate the effectiveness of lower pole ligation technique in ensuring hemostasis intra-operatively and preventing post tonsillectomy hemorrhage in early and late stage and to compare the results with international literatures.

MATERIAL AND METHODS:

This was a hospital based, retrospective study, performed at Aziz Fatimah Hospital and Faisal Hospital, Faisalabad from May 2014 to June 2017. An informed consent was taken from each patient or from their parents. 310 patients underwent surgery for different indications. Preoperative information including age, gender, and indication for surgery was obtained and reviewed. Preoperative investigations included Complete Blood Count, Bleeding profile including BT/CT (bleeding time/clotting time), PT/APTT, HBsAg, Anti-HCV, Anti-HIV, radiography of the soft tissue neck lateral view to see the post nasal space where indicated, chest radiography, ECG for patients aged above 40 and other special investigations where indicated. Preoperative antibiotics were given for 5 days as part of pre-operative preparation.
Indications of surgery in these patients included chronic tonsillitis, snoring with or without sleep apnea syndrome and Peri-Tonsillar abscess.
Tonsillectomy was done under General Anesthesia with endotracheal intubation with standard rose position, Boyle-Davis mouth gag with tongue blade having slit/groove in the middle to retain the endotracheal tube in the midline. Mucosal incision was given with tonsillectomy scissors or toothed forceps after holding the tonsil with tonsil holding forceps from the upper pole and retracting it medially for proper incision to gain access in the proper plane i.e. peritonsillar space. The dissection was done gently from upper to lower pole keeping with cold dissection technique. The Lower pole pedicle was grasped by negus artery forceps as close to the lingual tonsils and ligated with Black silk # 1. Same was done on the opposite side and both fossae were packed with normal saline soaked cotton for 3 minutes to establish a degree of hemostasis. Bipolar diathermy was used for tonsillar bed hemostasis. No other coagulation agents were given for hemostasis.
Patients were followed-up for 4 weeks after surgery. Blood loss was assessed by measuring blood loss in the suction bottle and the number of blood soaked swabs that were used on each side.
Primary hemorrhage was a very important complication during surgery, Reactionary hemorrhage happened within first 24 hours, while secondary hemorrhage occurred post operatively within 2 weeks.

Fig No.1: Instruments Used During Surgery

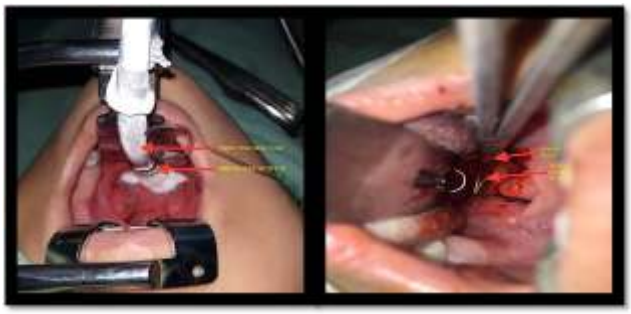

Fig No. 2: Slit Tongue Blade Keeping ETT in MidlineFig No. 3: Applying Negus Artery Forceps

RESULTS:

Out of 310 patients, 191 (61.6%) were male and females were 119 (38.4%). Age ranged from 4 to 45 years, average being 22 years.

TABLE No. 1:

			Gender		
			Male	Female	Total
Age	4-15	Count	136	79	215
		% within Age	63.3%	36.7%	100.0%
	16-30	Count	43	29	72
		% within Age	59.7%	40.3%	100.0%
	31-45	Count	12	11	23
		% within Age	52.2%	47.8%	100.0%
Total		Count	191	119	310
		% within Age	61.6%	38.4%	100.0%

Indications of Tonsillectomy were mainly due to chronic tonsillitis that is 82%, Snoring and Sleep Aponea were 12 % and Peritonsillar abscess were 6%.

TABLE No. 2:

			Gender		
			Male	Female	Total
Indications of Tonsillectomy	Chronic Tonsillitis	Count	161	93	254
		% within Gender	84.3%	78.2%	81.9%
	Snoring with sleep aponea syndrome	Count	20	17	37
		% within Gender	10.5%	14.3%	11.9%
	Peritonsillar abscess	Count	10	9	19
		% within Gender	5.2%	7.6%	6.1%
Total		Count	191	119	310
		% within Gender	100.0%	100.0%	100.0%

COMPLICATIONS	**No. Of Patients**
Early	
Primary Hemorrhages	**2 (0.65%)**
Reactionary Hemorrhages	**2 (0.65%)**
Anesthetic Complications	**0**
Late	
Secondary Hemorrhages	**1 (0.3%)**
Recurrence of Snoring	**0**
Tonsillar remnants	**0**
Voice Changes	**0**
TOTAL	**5 (1.6%)**

Only Two patients presented with reactionary hemorrhage having age of 19 years and 31 years both were male and 1 with secondary hemorrhage having the age of 25 years and was

female. Of the two with reactionary hemorrhage one was having mild bleeding and happened within two hours after surgery and was settled with cold sponging and gargles. The second occurred after 4 hours when the patient was shifted in ward and had to be shifted in OT for ligation, the cause of hemorrhage in this case was slipping of ligature from the lower pole due to post-op cough and exertion. While the late complications were treated as secondary hemorrhage by broad spectrum antibiotics and he presented after 16 days of the surgery. So our results for the reactionary hemorrhage were 0.65%, which are quite negligible as compared to international studies. And for Secondary hemorrhage results were 0.3%.

No Anesthetic complications during surgery were encountered and no other significant early or late complications were seen.

DISCUSSION:

There are different surgical techniques for tonsillectomy all over the world and different opinions supporting and opposing each of the methods exist.[4,13] The safety of day-care tonsillectomy is well documented in the literature.[8] The goals of using these different tonsillectomy techniques are to find the ideal way to minimize pain, to reduce peri-operative and post-operative hemorrhage and to ensure patients comfort.[1, 8] This article highlighted the benefits of ligating the lower pole in tonsillectomy. Post tonsillectomy bleeding remains the most common and serious complication of tonsillectomy procedure.[1,7,8] Earlier studies which compare the techniques such as using bipolar diathermy and coblation with cold dissection reported that the risk of post-operative bleeding is significantly more with bipolar diathermy and coblation procedures.[5, 6, 7, 8] National Institute for Health and care excellence[5] compared these two methods and cold dissection technique was associated with shorter operative time and better intra-operative hemostasis, the overall post tonsillectomy hemorrhage is typically 3 to 5 % with less than 1 % requiring return to the operation theatre.[4,5] Primary and Reactionary hemorrhage are generally considered to be related with surgical technique and pre-operative preparation of patients relating acute infections, where as secondary hemorrhage relies upon the environmental factors and compliance of the post operative treatment by the patient that influence the oropharyngeal healing of wound. [4, 6] Some researchers have shown post-tonsillectomy bleeding rates of 5.1% in adults and 6.75% in children.[5] According to Blackley, post-tonsillectomy bleeding rate is typically 5%. [15]In recent study by D' Agostino et al on 3306 patients undergoing elective Adeno-Tonsillectomy by 5 senior surgeons with different surgical techniques, late post-operative hemorrhage rate of 1.78% was found that started all at home. [12]Raut found 16.9% secondary hemorrhage rates in 200 patients after 15 to 17 days' post operatively. [14]

Bleeding is the major source of morbidity and mortality in tonsillectomy and most of the post operative time spent in securing the hemostasis [15, 16]and this bleeding is mostly from the lower pole. [9,15,16,1]

The bleeding was less in inferior pole ligation method probably due to dealing with the offending vessels, by competent and secured way of hemostasis which was inferior pole ligation of the pedicle. This phenomenon had also been observed by others, Al- Juboori showed that the blood loss was significantly lower in surgery, where ligation of the lower pole of tonsil was exercised.[1] Same observation was made in our study, almost negligible rate of hemorrhage comparing with the literature. [8,10,11,12]

In our study, the reactionary hemorrhage was 0.65% and primary hemorrhage was 0.65% while secondary hemorrhage was even significantly lower, being only 0.3%. These values are significantly less than the previous studies. [1, 5, 7, 8] Patients operated with inferior pole ligation technique report high degree of symptom relief [16, 17, 1] and it was consistent with the results of our study.

There were certain problems mentioned in literature that were fall in oxygen saturation during surgery due to compression and manipulation of endotracheal tube while changing the sides, recurrence of symptoms due to tonsillar tissue remnants and snoring.[1] We didn't experience such problems in our

study probably due to:

1. Better optics by using the magnifying loupe in some cases i.e. patient having short neck, elderly patients who have thick bulk of the tongue.
2. Ligation of lower pole was done as close to junction of Palatine tonsils with lingual tonsil as possible not leaving any tonsillar tissue
3. Mouth gag with slit tongue blade for endo-tracheal tube engagement in the midline was used so that manipulation of tube is minimized and no risk of compression is present.

The use of inferior pole ligation method is advisable to minimize post-tonsillectomy bleeding rate, which is the main morbid problem of the procedure.

CONCLUSION:

Improvements in tonsillectomy techniques are defined by general reduction of post-operative pain, low rate of peri-operative and post-operative blood loss and early return to normal activity. Keeping them in view lower pole ligation is a good cost effective method to fulfil goals. It is imperative to operate patients of tonsillitis in the earlier age.

Further, we concluded that the inferior pole ligation in cold dissection method is very much safe to minimize the bleeding/hemorrhage in tonsillectomy during the surgery and post-operatively.

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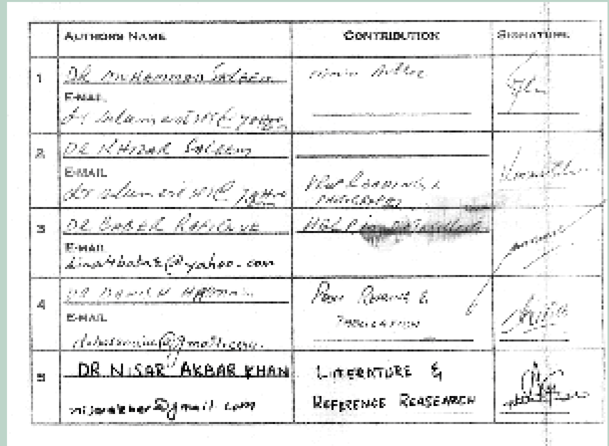

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Submitted for publication: 02.08.2018

Accepted for publication: 01.02.2019
After Revision

Value of a man depends upon his courage; his veracity depends upon his self-respect and his chastity depends upon his sense of honor

Hazrat Ali (Karmulha Wajhay)