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ORIGINAL ARTICLE

Comparison of Tonsillectomy Techniques with Reference to their Histopathologic Healing Patterns

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ABSTRACT

Aim: To determine the histopathologic healing patterns after tonsillectomy done by dissection ligation versus electrocautery technique.
Setting: ENT Unit II of Fatima Jinnah Medical University Sir Ganga Raam Hospital Lahore
Duration: 1st July 2021 to 30th June 2022
Study Design: Randomised control trial
Sampling: Total of 106 patients were included and divided into 2 groups with probability simple random sampling.
Methods: All patients of 10 to 18 years of age with history and examination that was consistent with recurrent tonsillitis were included. Group A underwent tonsillectomy with dissection-ligation technique and Group B with electrocautery. At 7th post operative day tissue samples were taken from palatopharyngeal arch and sent for histopathologic evaluation and healing was graded as good, fair and poor. Patients with acute inflammatory conditions of tonsil or suspicion of malignancy, post tonsillectomy hemorrhage and those with co morbidities were excluded.
Results: Mean age of Group A was 13.79 years and in Group B mean age was 13.54 years. When we calculated the association of inflammation, granulation tissue formation, pattern and orientation of collagen fibers between the two groups, the resulting p value was <0.05 in each category. This shows that all the parameters that favors healing were scored high in Group A. Mean of healing score of each group was also calculated. Mean of healing score of Group A is 10.8302 and of Group B is 9.5849. Practical implication As in our study healing outcomes of tonsillectomy done by dissection ligation technique is better as compared to electrocautery, better healing in dissection method will result in quick recovery and decreasing chances of secondary hemorrhage. Which means that patient can resume regular oral intake early in post operative period. Less inflammation in dissection method will result in less pain and odynophagia and hence improves patient's comfort and quality of life in immediate post operative period.
Conclusion: Dissection ligation technique has better healing outcomes than the electrocautery technique of tonsillectomy.
Keywords: Recurrent tonsillitis, tonsillectomy, dissection ligation technique, electrocautery technique, healing outcomes.

INTRODUCTION

Tonsil removal has been documented as a medical procedure since the first century AD. New equipment technology has led to new techniques of tonsillectomy which includes blunt dissection, guillotine excision, electrocautery, cryosurgery, coblation, ultrasonic ablation and laser removal[1]. As Krishna et al., have described in their study that the safest and least invasive tonsillectomy technique is unknown. The most common surgical technique was monopolar electrocautery which was related to reduced blood loss per operatively. Patients and surgeons nowadays prefer minimally invasive procedures with less post operative pain and quick recovery in terms of early resumption of normal diet and activities. Pain and inflammation after tonsillectomy leads to spasm of pharyngeal muscles which leads to ischemia and more pain. Complete healing and mucosal layer takes 14 to 21 days to form after surgery[2].

Healing is a biological process in which tissue repairs itself to restore normal state and function by physiological response of the body. Histological parameters that were studied in post tonsillectomy specimens include inflammation, granulation tissue formation, pattern and orientation of collagen fibers[3]. Traditional tonsillectomy induces pain and bleeding that is why surgeons constantly compare surgical techniques. A cold steel dissection method can help get better results with less pain and faster recovery. The results of dissection ligation and cauterization tonsillectomy in children aged 8 to 16 years were compared. The study ran from January to March 2017. A retrospective data of 15 months was taken from Alnamas General Hospital. Healing time was compared of both the techniques. Electrocautery was less unpleasant than cold dissection however postoperative pain is still a major cause of morbidity[4]. In this study two most common used tonsillectomy techniques i.e. dissection ligation and electrocautery; were compared in terms of post operative healing by accessing histological parameters that play a key role in wound healing. Existing studies that compared various methods of tonsillectomy and its outcomes of healing have relied on clinical examination of tonsillar fossa to determine the extent of healing[5]. Our study in this regard has accessed basic histopathological processes undergoing in the tonsillar fossa after tonsillectomy and its effects on wound healing.

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MATERIALS AND METHODS

The study was conducted in ENT Unit II of Fatima Jinnah Medical University Sir Ganga Raam Hospital Lahore from 1st July 2021 to 30th June 2022. This study is a randomized control trial including 106 patients. Data was collected from 106 patients who were divided into 2 groups with probability simple random sampling. Each group had 53 patients. Group A underwent tonsillectomy with dissection-ligation technique and Group B with electrocautery. Informed written consent was signed by the patient.

Patients of either gender of 10 to 18 years of age were included with history and examination indicating recurrent tonsillitis and obstructive sleep apnea due to hypertrophic tonsils. Patients with peritonsillar abscess, unilateral enlargement of tonsil, craniofacial abnormalities, diabetes mellitus and any other chronic disease and those with post tonsillectomy hemorrhage were excluded. Patients were followed up at 7th post operative day after tonsillectomy. Data was collected by using predesigned questionnaire. The considered variables were symptoms of recurrent sore throat, obstructive sleep apnea (OSA), any history of previous surgery of throat and demographic data. Outcomes regarding healing were assessed by taking tissue sample of

margins of palatopharyngeal arch and sent for histopathology. Healing score was calculated as per report as follows:

Table 1: Healing parameters and score assigned to each parameter

Histological Parameter	Score
Inflammation	Profound 1 Moderate 2 Few 3
Granulation tissue formation	Abundant 1 Moderate 2 Scanty 3 Absent 4
Pattern of collagen fibers	Reticular 1 Mixed 2 Fascicle 3
Orientation of collagen fibers	Vertical 1 Mixed 2 Horizontal 3

A cumulative healing score was calculated and mean score is calculated and healing is graded as follows:

1) Good 11-13
2) Fair 8-10
3) Poor 4-7

Data was analyzed using SPSS version 20.0. Quantitative variables like age, duration of illness, number of episodes of sore throat were shown inform of mean ± SD. Qualitative variables like gender and control of symptoms were expressed as frequency and percentage. Comparison of healing outcomes of two groups was done by independent samples t test. *p* value of ≤0.05 was taken as statistically significant.

RESULTS

Mean age of patients in Group A was 13.79 years and in Group B 13.54 years. There were total 45 females and 61 males. In Group A 52/53 (98.1%) patients had OSA and in Group B 51/53 patients had OSA. We studied various healing parameters (Inflammation, granulation tissue formation, pattern and orientation of collagen fibers) of both groups. These are represented in Table 2.

Healing score was calculated for each group according to Table 1 and mean was calculated and represented in Table 3 along with standard deviation SD.

To find out the association of healing parameter outcomes between both groups Pearson Chi-square test was applied. *p* value of ≤0.05 was taken as significant. Results are shown in Table 4.

Healing outcomes of dissection ligation technique and electrocautery technique of tonsillectomy was calculated by applying Independent T test and represented in Table 5. The test was statistically significant hence proving that dissection ligation technique has better healing outcomes.

Table 2: Outcomes of Healing Parameters of each Group

Group A	Group B
Inflammation	
Profound = 5 (9.4%)	Profound = 6 (11.3%)
Moderate = 17 (32.1)	Moderate = 22 (42.5)
Few = 31 (58.5)	Few = 25 (47.2)
Granulation Tissue	
Abundant = 4 (7.5)	Abundant = 8 (15.1)
Moderate = 5 (9.4)	Moderate = 20 (37.7)
Scanty = 15 (28.3)	Scanty = 15 (28.3)
Absent = 29 (54.7)	Absent = 10 (18.9)
Pattern of Collagen Fibers	
Reticular = 4 (7.5)	Reticular = 8 (15.1)
Mixed = 16 (30.2)	Mixed = 19 (35.8)
Fascicle = 33 (62.3)	Fascicle = 26 (49.1)
Orientation of Collagen Fibers	
Vertical = 4 (7.5)	Vertical = 11 (20.8)
Mixed = 18 (34)	Mixed = 17 (32.1)
Horizontal = 31 (58.5)	Horizontal = 25 (47.2)

Table 3: Mean healing score of each group

Healing Score	Group A n = 53	Group B n = 53
Mean	10.8302	9.5849
SD	1.36911	2.65615
Standard Error of Mean	0.18806	0.36485

Table 4: Association of healing outcomes between Group A & B

Healing Parameters	Value*	*p* Value**
Inflammation	30.647	0.000
Granulation Tissue	82.241	0.000
Pattern of Collagen Fibers	11.824	0.019
Orientation of Collagen Fibers	21.732	0.000

*Pearson Chi-square test was applied, **Significant at *P*≤0.05

Table 5: Healing outcomes of Group A (dissection ligation) and Group B (electrocautery)

	Levene's Test for Equality of Variances	t-test for Equality of Means					
	P Value	t-Value	P Value	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	0.000	3.034	0.003	1.24528	0.41047	0.43131	2.05925
Equal variances not assumed		3.034	0.003	1.24528	0.41047	0.43131	2.05925

DISCUSSION

Tonsillectomy is a routine procedure globally. It accounts for 20% of otorhinolaryngology clinic surgeries, say Allford and Guruswamy. Various surgical methods exist for doing tonsillectomy. The optimum method should be rapid and reliable with little discomfort and blood loss and a short recovery period[6]. Several studies are done to compare the clinical benefits of cauterization to the traditional approach. The most common significant consequence of tonsillectomy is delayed bleeding, which affects 2-4% of individuals. Most of these are due to primary hemorrhage. First bleeding is riskier and can occur within 24 hours of surgery. Secondary hemorrhage occurs after 24 hours of surgery and requires immediate intervention especially in children. It might occur up to two weeks after surgery. Studies show lesser risk of bleeding in cauterization then the conventional group. Most studies have found no significant variance in postoperative bleeding rates. Postoperative bleeding has no effect on pain[7]. Nunez studied both the methods in 100 patients who underwent tonsillectomy. Cold steel tonsillectomy took 21.5 minutes (18 to 25) and cauterization 9 minutes (5 to 13). Both approaches have distinct usual operation times. Six patients who had dissection tonsillectomy met with hemorrhage which was profuse. After cauterization no patient developed life threatening bleeding[8].

Post operative discomfort was similar for both surgeries. The traditional procedure produces more pain than cauterization, the day after surgery. Fever, hemorrhage and anesthesia difficulties can occur after tonsillectomy. The study indicates that in dissection ligation method healing took 2 weeks. Most of the patients took 3 weeks to recover following electrocautery technique[9]. Belloso et

al., stated that dissection ligation tonsillectomy has similar effect to postoperative discomfort as electrocautery causing dehydration and limitation of daily activities. Throat pain impairs tonsil clearance, which can lead to infection and/or hemorrhage[10]. Parsons et al., offer harmonic ultrasonic knives, coblator devices, lasers and radiofrequency excision to reduce bleeding, postoperative pain and operation time[11]. Rawlison et al state that postoperative pain therapy includes local or systemic steroid, local anesthesia and analgesic[12].

According to Sezen et al., the cauterization method reduces postoperative discomfort. The conventional procedure took slightly longer time. The operation time is the period from when the mouth gauge is placed to when the procedure is finished. The length of the surgery and the anesthesia time affect morbidity, as in our study.

In our study most of the patients were females. In Group A 52/53 (98.1%) patients had OSA and in Group B 51/53 patients had OSA. When we calculated the association of inflammation, granulation tissue formation, pattern and orientation of collagen fibers between the two groups, the resulting *p* value was <0.05 in each category. This shows that all the parameters that favors healing were scored high in Group A. Association between mean healing score between the two groups was also significant: Group A = 10.8302 and Group B = 9.5849, indicating that Group A patients had better healing at 7th post operative day.

CONCLUSION

On the basis of our study we conclude that dissection ligation method has better healing outcomes in terms of following healing parameters: inflammation, granulation tissue formation, pattern and orientation of collagen fibers. Also dissection ligation has better mean healing score as compared to electrocautery at 7th post operative day of tonsillectomy.

Conflict of interest: Nil

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