

Comparison of Histopathological Healing Outcome between Dissection Ligation and Electrocautery Technique of Tonsillectomy

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Submitted for Publication: 11-06-2023

Accepted for Publication 06-09-2023

How to Cite: Ali N, Rafiq S, Noor N, Rehman A, Hussain B, Shah RZ. Comparison of Histopathological Healing Outcome between Dissection Ligation and Electrocautery Technique of Tonsillectomy. *APMC* 2023;17(3):332-335. DOI: 10.29054/APMC/2023.1503

ABSTRACT

Background: Various techniques are available for tonsillectomy. Selection of the technique is based on the duration of surgery, intraoperative blood loss, post operative pain, duration and healing pattern of the tonsillar fossa. **Objective:** To compare the outcome of better healing pattern in dissection ligation technique and electrocautery technique of tonsillectomy. **Study Design:** Randomized control trial. **Settings:** ENT Department, Mayo Hospital Lahore Pakistan. **Duration:** Two years from December 01, 2019 to November 30, 2021. **Methods:** 106 patients with symptoms of recurrent attacks of sore throat with fever, obstructive sleep apnea, pain and difficulty in swallowing were included. Patients were randomized into two groups by random number table. Group A was operated by dissection-ligation technique and group B was operated by electrocautery technique. On 7th post tonsillectomy day healing score was calculated by taking tissue sample for histopathology from the tonsillar fossa. **Results:** Mean age of patients in group A was 14.59 ± 2.23 and in group B was 12.29 ± 2.09 years. In group A there were 55% males and 45% females while in group B 60% and 40% respectively. Statistically significant difference were found in terms of profound inflammation, formation of abundant granulation tissue and collagen fibers reticular pattern between two groups on histopathology. **Conclusion:** Healing outcomes are better in dissection ligation technique than electrocautery technique of tonsillectomy.

Keywords: Tonsillectomy, Histopathology, Healing patterns, Dissection ligation technique.

INTRODUCTION

One of the most commonly performed surgical procedures in otolaryngology is tonsillectomy. It is frequently performed in pediatrics age group, however it is also done in adults for various indications.¹ Approximately 577,000 pediatrics and 225,000 adult undergo tonsillectomy every year in the USA. Tonsils are removed under the general anesthesia.²

Various techniques are available for tonsillectomy which i.e. electrocautery, dissection ligation, coblation tonsillectomy, ultrasonic dissection and laser tonsillectomy.³ Out of these techniques, practiced techniques by ENT surgeons are dissection ligation and electrocautery although coblation and laser are now a days trending more but very expensive and skill

demanding.⁴ Selection of the technique is based on the intraoperative blood loss, post operative pain, duration of surgery and any history of bleeding diathesis.

There are few studies conducted across the world which compare healing pattern of different tonsillectomy techniques. One study assessed post tonsillectomy healing by direct clinical examination and other by fiberoptic pharyngoscopic examination of the tonsillar fossa and results favored the dissection ligation method. Some authors have used clinical photography to measure the area of healing either macroscopic or endoscopic photograph and compared dissection ligation, electrocautery and laser method, result showing no significant wound healing difference between these techniques on 14th post operative day.⁵ There is lack of

accurate method for the assessment of tonsillar fossa wound healing. Due to limitation of resources, most commonly used techniques in our set up are dissection ligation and electrocautery.⁶

The aim of our study was to compare these two techniques in term of histopathological healing pattern by taking tissue sample biopsy from tonsillar fossa which is one of the most important and accurate method of confirming better healing and to found better tonsillectomy technique. As healing is major concern of every patient after surgery, such studies can build our knowledge which can later be applied to gain the best possible outcomes and satisfaction of the patients.

METHODS

This randomized control trial study conducted at ENT Department of Mayo Hospital Lahore. Data was collected from 106 patients (53 in each group) and was estimated by assuming 5% level of significance, 90% power of test with expected mean value of dissection-ligation as 303.6 \pm 93.9 and electrocautery as 214.6 \pm 61.2 by open epi software.⁴ Pediatrics and adults of either sex, of age 10-18 years diagnosed with obstructive sleep apnea due to chronic tonsillitis were included. Patients with symptoms of peritonsillar abscess, unilateral tonsillar enlargement, craniofacial anomalies, diabetes and any other chronic illness were excluded from the study.

Data was collected after taking Informed consent. Patient's demographic data including age and sex was noted. General physical and throat examination was performed. CBC was done to rule out acute infection and nasopharynx radiograph (lateral view) was done to rule out the hypertrophied adenoids. Patients were categorized into two groups i.e., Group A and Group B by using computerized "random number table". Group A was operated by dissection-ligation technique and group B by electrocautery technique. At 7th day after tonsillectomy patients were followed up. Healing outcomes were assessed by taking sample for tissue biopsy from tonsillar fossa under local anesthesia and sending it for histopathology. Healing scores were calculated as good, fair and poor by measuring parameters such as inflammation, granulation tissue formation, pattern of collagen fibers and their orientation.

Data was analyzed on SPSS 20 version using mean and standard deviation. Comparison of healing outcomes was done by independent sample t-test between two groups. P-value \leq 0.05 was considered as significant.

RESULTS

The minimum age of patients in both group was 10 years and the maximum age was 18 years with group A as 14.59

\pm 2.23 and group B as 12.29 \pm 2.09 mean and standard deviation. Table 1

Table 1: Descriptive Statistics of Age of Patients in Both A and B Group

Study Groups	Total No. of Patients	Minimum	Maximum	Mean \pm Std. Deviation
Group A	53	10	18.00	14.5 \pm 2.23
Group B	53	10	18.00	12.2 \pm 2.09

In group A 55% were males and 45% were females, while in group B 60% were males and 40% were females. In group A dissection-ligation, profound inflammation was found in 8/53(15.09%) patients, moderate inflammation was found in 15/53(28.30%) patients, very few inflammation was found in 30/53(56.6%) patients versus group B as 10/53(18.8%), 22/53(42.5%) and 21/53(39.6%) patients respectively. In group A, abundant granulation tissue formation was seen in 6/53(11.3%) patients, moderate granulation tissue formation was found in 8/53(15.09%) patients, scanty granulation tissue formation was found in 10/53(18.8%) patients and no granulation tissue formation was found in 29/53(54.7%) patients versus group B as 10/53(18.8%), 18/53(33.9%), 14/53(26.4%) and 11/53(20.7%) patients respectively. In group A, reticular pattern of collagen fibers was seen in 6/53(11.3%) patients, mixed pattern was seen in 13/53(24.5%) patients, fascicle pattern was seen in 34/53(64.1%) patients versus group B as 10/53(18.8%), 15/53(28.3%) and 28/53(52.8%) patients respectively. In group A, vertical pattern of the collagen fibers was seen in 8/53(15.1%) patients, mixed orientation was seen in 15/53(28.3%) patients and horizontal orientation was seen in 30/53(56.6%) patients versus group B as 10/53(18.8%), 15/53(28.3%) and 28/53(52.8%) patients respectively.

According to statistics, Chi square test have been applied to evaluate the association between group A and group B in terms of inflammation, formation of granulation tissue, pattern of collagen fiber and their orientation. The resulted p values were less than 0.05 hence significant statistically. The mean of healing score of group A was 11.59 with 1.26 as SD. The mean of healing score of group B was 10.52 with 2.05 as SD. Table

Table 2: Group statistics of healing scores

Healing Score	Group Statistics				
	Groups	N	Mean	Std. Deviation	Std. Error Mean
	A	53	11.59	1.26	0.20
B	53	10.52	2.05	0.34	

Independent t-test was applied to compare the healing outcomes of two techniques of tonsillectomy. The test was statistically significant with better healing outcome

in group A dissection ligation technique of tonsillectomy. Table 3.

Table 3: Group statistics of healing outcomes of dissection ligation technique and electrocautery technique of tonsillectomy

		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
Healing Score	Equal variances assumed	0.000	3.03	0.003	1.24	0.41	0.43	2.05
	Equal variances not assumed		3.03	0.003	1.24	0.41	0.42	2.06

DISCUSSION

Tonsillectomy has been documented as a surgical procedure since the first century AD. Newly equipped technologies have led to new tonsillectomy techniques which includes cryosurgery, coblation, ultrasonic ablation, laser removal and thermal welding. The number of comparative studies is rising.^{7,8} Surgeons nowadays choose minimally invasive procedures with quick recovery. A painless technique allows patients to resume normal diet and activities as soon as possible. Mucosa covers the muscles 14–21 days following surgery. Our study contrasts the two methods. Electrocautery cauterizes tonsil tissue to reduce blood loss. Electrocautery tonsillectomy has lately gained popularity due to minimal blood loss and faster surgical time. However, electrocautery surgery increases postoperative pain.⁸

Results of routine and electrocautery tonsillectomies were compared in children aged 8 to 16 years at Alnamas General Hospital. 100 files from 100 children underwent tonsillectomy by dissection or cauterizations were studied. The study was accepted by King Khalid University College of Medicine in Abha.⁹ Post operative healing times and any issues were compared between the two groups. Morbidity affected by duration of surgery and the anesthesia time. Cold steel technique took 21.5 minutes and cauterization took 9 minutes. The "operation time" is the period from when the mouth opener is implanted till the completion of procedure.

In our study, cauterization significantly reduced postoperative discomfort. These results are similar to a study conducted by Sezen *et al* which stated that cauterization reduces postoperative discomfort.⁸ The old tonsillectomy technique produces more pain than electrocauterization the day after surgery.¹⁰ Another

study indicated that either by cautery or conventional technique, healing takes two weeks.¹¹

The most significant consequence of tonsillectomy is hemorrhage, which affects 2-4% of individuals and mainly due to primary hemorrhage. Windfuhr *et al* stated that the primary bleeding is risky and can occur within 24 hours of surgery.¹² Secondary hemorrhage requires immediate intervention in children. Secondary hemorrhage might occur two weeks after tonsillectomy. Compared to cauterization, traditional procedures cause more postoperative hemorrhage.¹³ Most studies have found no significant variation in postoperative bleeding and its effect on pain.¹⁴ The cauterization method promoted faster recovery, as all patients recovered within two weeks. Pain was the most common reason for outpatient care in the first two weeks after surgery.¹⁵ Belloso *et al* found that tonsil clearance significantly affected by throat pain which can cause infection or haemorrhage.¹⁶

Leinbach *et al* found electrocauterization to be less unpleasant than cold dissection and traditional dissection.⁹ However, postoperative pain is still a major reason of morbidity. Nunez *et al* reported thermal welding as an alternative procedure to bipolar electrocautery for coagulating and dissecting soft tissue and blood vessels.¹³ Parsons *et al* used ultrasonic knives, coblator devices, laser and radiofrequency excisions in order to reduce post operative bleeding, pain and total surgery time.¹⁰ Rawlison *et al* state that postoperative pain can be reduced by administration of local or systemic steroid, local anesthesia, and analgesic therapies.¹¹

CONCLUSION

Results of this study demonstrate that healing outcomes are better in dissection ligation technique than electrocautery technique of tonsillectomy.

LIMITATIONS

Latest technologies like radiofrequency, coblation and laser equipment were lacking in our set up. So, we could not compare all other techniques of tonsillectomy. This was the limitation of our study.

SUGGESTIONS / RECOMMENDATIONS

We suggest to compare other techniques of tonsillectomies to measure rapid healing and for longer Follow up duration.

CONFLICT OF INTEREST / DISCLOSURE

Nil.

ACKNOWLEDGEMENTS

We are thankful to Prof. Dr. Khalid Cheema, previous Head of ENT department mayo hospital, Lahore for supervision and permission to conduct the study in Ent department.

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