

# Tonsillectomy: A Comparison between the Conventional Cold Steel Dissection Method with Contact Diode Laser

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## ABSTRACT

**Aim:** To compare the mean operative time, mean blood loss and post operative pain in conventional cold steel dissection tonsillectomy with contact diode laser tonsillectomy

**Study design:** This study was a randomized control study

**Setting:** Department of ENT, Ameer-ud-din Medical College/ PGMI/ Lahore General Hospital, Lahore

**Duration:** 1<sup>st</sup> September 2017 to 28<sup>th</sup> February 2018 (six months)

**Sampling size & technique:** 100 patients Non probability purposive sampling

**Methods:** These patients were selected from the OPD department of the hospital, having history of recurrent attacks of acute tonsillitis and filling the inclusion criteria. The age group of the patients ranged between 5 to 15 years. These 100 Patients were divided in two equal groups containing 50 patients each, labeled as group-A and group-B. In the group-A patients requiring tonsillectomy the tonsils were removed with the conventional cold steel dissection method however in the other group-B of the patients requiring tonsillectomy the tonsils were removed by using contact diode laser.

**Results:** The patients in the laser group had mean operative time 25.23 min(+10.93) (range, 20-45 min) and the patients in the cold dissection group had mean operative time 36.62 min(+ 12.36) (range, 15-55 min). P value was 0.0004 and statistically significant. The laser group of patients for mean intraoperative bleeding was 28.4 mL + 13.86 (range, 10-75 mL) compared with 112.6 mL + 56.26 for patients in the cold dissection group (range, 16-250 mL). P value was 0.001 and statistically significant.

**Conclusion:** Tonsillectomy done using contact diode laser has some advantages over the conventional cold steel dissection method. The intra operative blood loss and time taken for surgery was reduced significantly in contact diode laser surgery. But there was no statistically significant difference seen regarding the postoperative pain when comparing both the surgical methods.

**Keywords:** Diode laser, Tonsillectomy, Dissection method

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## INTRODUCTION

The removal of palatine tonsils in otorhinolaryngology is called tonsillectomy and it is the commonest surgical procedure performed in children. It is routinely recommended in patients with repeated attacks of acute tonsillitis (7 or more attacks in last year, 5 or more episodes in previous two year), case of peritonsillar abscess, obstructive sleep apnea syndrome and cases of strong suspicion of tonsillar malignancy showing unilateral hypertrophy of tonsils<sup>1,2</sup>. The standard or extra capsular tonsillectomy is performed under general anesthesia involving removal of tonsils along with capsule. Haemostasis is initially secured by pressure packing and later with ligature. The diathermy used nowadays secures bleeding by coagulation and sealing of the bleeding points<sup>3</sup>. The most important issues involved with the procedure of tonsillectomy are the haemorrhage (both operative and post operative), time required for surgery (operative time) and post operative pain which mostly results in odynophagia. However patients can also experience ear pain, dehydration due to poor intake, fever and airway obstruction<sup>4</sup>. The ideal tonsillectomy procedure should achieve a safe, less traumatic, less haemorrhagic and less painful removal of tonsils. Over the years various new techniques have been evolved to attain these goals like

electrocautry, harmonic scalpel tonsillectomy, coblation tonsillectomy, thermal welding system, microdebrider and laser. First clinical experience with laser was reported in 1973, but recently the use of laser has been wide spread like Carbon Dioxide, KTP and Diode laser<sup>5</sup>. Diode laser is most commonly used in tonsillectomy. In Diode laser, energy is delivered through a flexible optical fiber which is used as a scalpel to dissect tissues and coagulate vessels<sup>6</sup>. Laser tonsillectomy is associated with less intraoperative blood loss, time required for surgery (operative time) and pain after surgery (post operative pain)<sup>7</sup>. I was interested in this study because previously other kinds of lasers were used and very minimal data was available regarding contact diode laser tonsillectomy. Much controversy was present about superiority of contact diode laser over the orthodox dissection tonsillectomy done by cold steel. Our study compared the results of tonsillectomy carried out by contact diode laser with the dissection tonsillectomy done by cold steel, with respect to mean time required for surgery (operative time) and loss of blood during surgery (per operative blood loss). Improved surgical techniques help to remove chronically diseased tonsil which has therapeutic advantages<sup>8</sup>.

## MATERIALS AND METHODS

As a hospital based study, subjects were selected according to inclusion criteria from ward and outpatient department of otolaryngology and were entered in the study. Operative procedures were conducted in the surgical theatre of the department of otolaryngology and the assessment data of main outcome measures were done during the stay of patient in ward post operatively and on

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follow up visits. The Study took six months to complete. 50 patients in each group were selected who presented in OPD with history of recurrent attacks of acute tonsillitis. The age group ranged from 5 to 15 years. Patients who required tonsillectomy were segregated in two groups. The patients in group-A requiring tonsillectomy had their tonsils removed by conventional cold steel dissection method while the other group-B had all cases of tonsillectomy managed by contact diode. Intraoperative blood loss and time consumed during the procedure was measured in each patient of both groups.

**Data collection procedure:** 100 patients having history of recurrent Acute Tonsillitis requiring tonsillectomy were selected from ENT OPD and ward. An informed consent was taken from the legal guardian of each patient for assigning them to particular procedure and using their data for research. Detailed history of each patient with a thorough examination of the ear nose and throat was done. Contact diode Laser tonsillectomy was performed with Sharplan model 1080S. All precautions regarding diode laser procedures were adhered during the removal of tonsils. In the conventional cold dissection technique of tonsillectomy, blunt steel dissector was used to dissect the palatine tonsillar tissue from the tonsillar bed. Haemostasis was managed by pressure packings, suture ligation & electrocautry in cold steel dissection and with pressure packings & laser in contact diode laser techniques. The data was collected and analysis was done by version 10 of SPSS. Variables labeled as Quantitative were age and outcome (in terms of mean blood loss & operative time). The presentation of these quantitative variables were made as mean, +/- standard deviation. Variables labeled as Qualitative were sex. These were presented as frequency and percentages. The comparisons of qualitative variables i.e. mean blood loss & operative time was done through t-test. Value of P < 0.05 was considered to be significant.

**RESULTS**

A sum of 100 patients included in our study were segregated into two groups, 50 patients were included in group-A who underwent the conventional cold steel dissection tonsillectomy and the other 50 patients who underwent contact diode laser tonsillectomy were labeled as group-B. All of these 100 patients were included in the study who had history of recurrent acute tonsillitis and they met the inclusion criteria. The ratio of male patients were more than female patients in both the groups. The contact diode laser had male :female equal to 29:21 and conventional cold steel dissection group showed male to female ratio 32:18 respectively. The overall ratio in both the procedures were male :female 61:39 overall (Table 1 and 2 respectively). The mean age of presentation was 9.85 + 2.73years (range, 4- 15 y).The mean age was 9.52 + 2.54 years (range, 4- 15 y) for laser group and 10.18+2.86 years for the patients in cold steel dissection group (range, 6-42 y) (Table 3 and 4 respectively).

**Operative time:** The operative time for both the surgical procedures was collected. The contact diode laser group had operative time 25.23 min + 10.93 (range, 20-45 min) and 36.62 min + 12.36 for the operative time of conventional cold steel dissection group (range, 15-55 min).P value was calculated as 0.0004 which is <0.05 and statistically significant. (Table 5)

**Intraoperative bleeding:** The blood loss during both the surgical procedures was collected as intraoperative bleeding. The intra operative bleeding calculated for the contact diode laser group was 28.4 mL + 13.86(range, 10-75 mL) compared with the measurement for intra operative bleeding for conventional cold steel dissection method group 112.6 mL + 56.26 (range, 16-250 mL). The value of P was calculated as 0.001 which is <0.05 and statistically significant. (Table 6)

**Postoperative pain:** The post operative pain was analyzed as pain scores (VAS) for both the surgical procedures. There was no statistically significant difference between the bith the surgical procedures when compared for pain. The mean score for pain in contact diode laser group was 7.93 + 2.76 and 8.17 + 2.43 for the patients in conventional cold steel dissection group. P value was calculated 0.65 which is >0.05 and statistically not significant. (Table 6)

Table 1: Gender distribution of patients (n=100)

	Frequency	%	Cumulative%
Male	61	61	55
Female	39	39	100
Total	100	100	100

Table 2: Gender distribution according to type of procedure

	Dissection	Laser
Gender	n=50	n=50
Male: Female	29:21	32:18

Table 3: Age distribution of patients (n=100)

Age(years)	n=100
Mean	9.85 + 2.73
Min	5
Max	15

Table 4: Age distribution of patients according to type of procedure

Age(years)	Dissection (n=50)	Laser (n=50)
Mean	10.18 + 2.86	9.52 + 2.54
Min	5	5
Max	15	15

Table 5: Comparison of operative time

Dissection (n=50)			Laser (n=50)		
Min	Mean	Max	Min	Mean	Max
15	36.62 + 12.36	55	20	25.23 + 10.93	45

P value=0.0004

Table 6: Comparison of intraoperative blood loss

Dissection (n=50)			Laser (n=50)		
Min	Mean	Max	Min	Mean	Max
16	112.6 +56.26	250	10	28.4 +13.86	75

P value=0.001

Table 7: Comparison of visual analog scale

Dissection (n=50)			Laser (n=50)		
Min	Mean	Max	Min	Mean	Max
3	7.93 +2.24	9	2	8.17+1.93	9

**DISSCUSSION**

Although the ratio of tonsillectomy has declined over years, but still the most routinely performed surgical procedure in otorhinolaryngology is tonsillectomy. All chronically diseased tonsils have to be removed for therapeutic purposes<sup>9</sup>. The traditional method of removing the palatine

tonsils in major setups around the world is cold steel dissection technique. Around AD 30 Aulus Cornelius Celsus was believed to have performed tonsillectomy using his fingernails. Since then a continuing evolution has been observed in surgical technique and devices over the years. Multiple instruments used in the procedure of tonsillectomy have been evolving and different newer techniques have been used to render a precise operation. So the evolving techniques for removal of tonsil has brought us to a result that no consensus on the optimum method of performing tonsillectomy can be made. Different methods of removal of tonsil have been described which are compared and discussed in otolaryngology literature frequently<sup>10</sup>. Cold steel dissection tonsillectomy method has mentioned as a better technique with evidence showing that it provides healing of the tonsillar fossa on a rapid rate which in turn results in lesser post operative pain than compared to other techniques<sup>11</sup>. In recent literature, most of the new surgical techniques used to remove the tonsils are usually compared to the conventional Cold steel dissection tonsillectomy technique. Regarding the procedure of tonsillectomy the efficacy of a new technique must be judged by the results parameters concerning the per-operative and postoperative morbidity and not adding to the complications of the procedure. The commonest intra operative and postoperative concerns following tonsillectomy are hemorrhage and pain. Postoperative pain is the most significant subjective symptoms as far as patient is concerned. In this study, operating time for tonsillectomy is determined by the time duration, from the time of incision made till the bleeding is secured to achieve the final hemostasis. Therefore, the time taken to secure haemostasis will influence the time of surgical procedure (operating time) as well as the (per operative blood loss). A study conducted by Weimert et al. reported a remarkable reduction in intraoperative blood loss and operating time with technique of diathermy assisted tonsillectomy. Ishlah et.al, Giles JE et.al and other researchers also mentioned a statistically similar results showing remarkable reduction in both the variables of bleeding per-operative and time required for surgery (operating time) with newer technique of laser assisted tonsillectomy as compared to conventional dissection tonsillectomy. Results of our study were very much similar to above mentioned researches. In our study, the per-operative loss of blood was substantially reduced and the time required for surgery (operative time) was also significantly lesser in the contact diode laser group, thus, in return also reducing the time for anesthesia. We almost had the bloodless operative field which in turn reduced the operative time and collateral damage. The technique for tonsillectomy involving contact diode Laser as with other electrosurgical instrument achieves cutting and haemostasis simultaneously by virtue of sealing the blood vessel lumen due to tissue heating. Histologically, in the immediate laser wound there was evidence of endothelial damage and thrombosis of the capillaries especially small diameter vessel. The reduced operative time is important as increased numbers of operations could be performed and reduces the number of unnecessary cancellation of cases in a fixed theater session. Postoperative pain should be minimized not just for the patients comfort but also because it may impair swallowing with a risk of dehydration, infection and secondary haemorrhage. Hot tonsillectomy techniques involving electro surgery and

contact diode laser tonsillectomy has been documented to cause greater postoperative pain than the conventional Cold steel dissection tonsillectomy technique. Our study revealed that the postoperative pain in the group using the contact diode laser was almost similar to the dissection group. It indicates that laser tonsillectomy is not associated with increased postoperative pain in comparison to dissection technique. It is worth noted that there were no major complications observed in this study and all patients from both groups did not require second general anesthesia for primary or secondary haemorrhage. Other intraoperative and postoperative complications do not differ remarkably between both the groups of tonsillectomy using contact diode laser and cold steel dissection techniques.

## CONCLUSION

The procedure of tonsillectomy using contact diode laser has proven benefits in literature but still there were questions regarding its efficacy. My study has provided a reasonably reliable assessment regarding the contact diode laser tonsillectomy as an accepted procedure in ENT surgery. The newer technique of Contact Diode tonsillectomy has shown to have remarkably decreased the operative time and reduced the per-operative blood loss. Adding to this is that postoperative pain in both the surgical techniques of tonsillectomy, the contact diode laser and cold steel dissection method was almost similar. Which meant it does not cause any additional morbidity. Contact Diode tonsillectomy apparently seems to be a safer alternative to conventional cold steel dissection tonsillectomy method in patients with some kind of bleeding and clotting disorders requiring tonsillectomy but this should be subjected to trial before establishing its efficacy and safety.

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