

# Laser Versus Dissection Technique of Tonsillectomy

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## Summary

Tonsillectomy is the single most common operation performed in Ear, Nose and Throat Department. Various methods of tonsillectomy have been practiced over the century aimed at reducing or eliminating intraoperative and postoperative morbidity. Due to various blood supplies received, intraoperative bleeding is the most difficult problem and securing it is time-consuming. The time taken to control the bleeding would invariably determine the length of operation. Common postoperative complications are bleeding and pain. This study evaluated the operative time, intraoperative blood loss, postoperative pain and other postoperative complications of tonsillectomy performed by laser as compared to conventional dissection technique. This is a prospective randomized study whereby sixty patients were divided into two groups of equal number. In one group, the tonsillectomy performed by laser and in the other group the tonsillectomy performed by conventional dissection technique. Operative time and amount of blood loss is significantly reduced in the laser group. Total postoperative pain and post operative complications were not significantly different between the two groups. Tonsillectomy by using laser have shown less intraoperative bleeding and shortened the operative time. In the hospital where laser machine and expertise are available, it is justifiable to use this technique as effective method of performing tonsillectomy.

**Key Words:** Laser, Tonsillectomy

## Introduction

Tonsils are part of the Waldeyer's ring, which is an aggregates of lymphoid tissue located in the nasopharynx and oropharynx at the entrance of the aerodigestive tract. It is important in children for its role in immunology and defense mechanism. Antibody secretion, notably, in secretory IgA production, plays an important part in mucosal defense mechanism. For unknown reason, their protective mechanism sometime fails and become seat of infection rendering sorethroat, fever and other complications. This requires removal of the diseased tonsils.

In the early 20th century, tonsillectomy was the most popular operative procedure for treating various respiratory and systemic diseases<sup>1,2</sup>. In the 1960s and 1970s, one to 2 million tonsillectomies,

adenoidectomies or combined procedures was performed annually in the United States<sup>1,3,4</sup>.

There have been many different studies of methods of tonsils removal and hemostasis. Probably the two most common techniques are dissection with cold instruments and electrosurgery. However, the dissection technique has remained the standard procedure for tonsillectomy for many years till now.

Electrocautery method of removing tonsils represents the major advance in tonsillectomy of the 20th century. Electrocautery is used to make the mucosal incision, dissect tissue and suction cautery to obtain hemostasis. Since the first use of monopolar diathermy coagulation, electrosurgery excision has become a widely used method because of its documented advantages of decreased blood loss and shorter surgical time<sup>4,5</sup>.

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For some years, laser has been used to minimize the intraoperative blood loss during the course of tonsillectomy<sup>7</sup>. Various type of laser wavelength had been studied of their usage in tonsillectomy including argon plasma coagulation (APC), potassium titanyl phosphate (KTP) crystal, neodymium: Yttrium-aluminium-garnet (Nd: Yag) and carbon dioxide (CO<sub>2</sub>) laser. Bergler et al. used APC tonsillectomy in 201 patients which revealed no significant difference between APC and conventional dissection technique in the intensity of the postoperative pain, the mean duration of the operative procedure was reduced by more than 50 per cent and blood loss was decreased by 90 per cent in the APC group<sup>8</sup>. However, recent developments in CO<sub>2</sub> laser technology offer features of tissue cutting as well as tissue ablation<sup>9</sup>. In our study we used CO<sub>2</sub> laser to assist in tonsillectomy procedure and the intraoperative and postoperative outcomes is compared to the conventional dissection of tonsillectomy.

## Materials and Methods

This is a prospective randomized study to compare the result of laser-assisted tonsillectomy with those of conventional dissection technique with regards to the operative time, intra-operative bleeding, postoperative bleeding and other related complications. The study was carried out at Hospital Tengku Ampuan Afzan, dated from June 2001 to May 2002. Sixty patients were recruited for this study. Approval from the ethical hospital committee was granted. The patients were randomized to either the laser group or the conventional method group of equal number. Tonsillectomy was carried out by three grades of surgeons (consultants, staff surgeon and medical officers) who were all familiar with both methods of tonsillectomy.

Laser tonsillectomy was performed using Sharplan model 1080S. The power was set between 10 to 15 watts and laser was used to separate the tonsil tissue from tonsillar bed. Laser precaution procedures were adhered to. In the conventional dissection technique of tonsillectomy, we used blunt dissector to dissect the tonsillar tissue from the tonsillar bed and tonsil snare was applied at the tissue attachment in the inferior pole. Hemostasis was secured by suture ligation or diathermy in both techniques.

Surgical time was measured from the insertion of Boyle-Davis mouth gag to the removal of tonsil tissue from the oral cavity. Intraoperative blood loss was measured by weighing the tonsil swab before and after tonsillectomy and by measuring the amount in the suction bottle.

Postoperatively, pain scores were charted from day one to 2 weeks using standardized visual analogue scale in which 0 indicate no pain and 10 very severe pain. Intramuscular and oral Tramal was a standard pain control regime used in all patients given every 8 hourly. Patients were discharge 1 or 2 days after the operation.

Patients were reviewed in the clinic after two week to one month of surgery. Patients who were failed to come for follow-up were contacted by and interviewed through telephone. Statistical analysis was carried out using Epi-info version 6 (CDC Atlanta). A P value <0.05 was considered significant.

## Results

Of the sixty patients recruited in this study, thirty patients were in the laser group and another 30 patients were in the conventional dissection group. Male outnumbered female in both groups with the ratio of 18:12 and 17:13 in the laser and conventional group respectively. The mean age was 15.3 years (range, 6-49 y) for laser group and 16.8 years for dissection group (range, 6-42 y) (Table I). The main indication for tonsillectomy was chronic/ recurrent tonsillitis (Table II) in both groups.

### **Operative time: (Table III)**

The mean operative time for laser group was 25.23 min (range, 12-51 min) and 31.90 min for dissection group (range, 15-55 min). P value was 0.02

### **Intraoperative bleeding: (Table III)**

Mean intraoperative bleeding for laser group was 94.8 mL (range, 19-256 mL) compared with 151.7 mL for dissection group (range, 16-642 mL). P value was 0.014

### **Postoperative pain: (Table III)**

The pain scores (VAS) and duration of pain in both groups were compared. There was no statistically significant difference between the two methods. The mean pain score for laser group was 24.93 and 29.17 for the dissection group.

Four patients, two from each group were readmitted for problems like postoperative fever, halitosis and persistent blood-stained saliva. Although they were readmitted, they were treated conservatively with

antibiotics, analgesics and hydrogen peroxide mouthwashes. None of the patients requires second general anesthesia for hemostasis.

**Table I: Distribution of patients according to age, gender and ethnic group in laser and dissection group**

	Laser (n=30)	Dissection (n=30)	P Value
<b>Age:</b>			
Mean	15.3	16.8	0.59
Min	6	6	
Max	49	42	
<b>Gender</b>			
Male:female	18:12	17:13	1:00
<b>Race:</b>			
Malay:Chinese:Indian	24:4:2	27:1:2	0.37

**Table II: Indications for tonsillectomy in laser and dissection group**

Diagnosis	Laser (n=30)		Dissection (n=30)	
Chr./Rec tonsillitis	24	80%	26	86.7%
Tonsillar crypt	1	3.3%	0	0%
Hypertrophy	4	13.3%	1	3.3%
Obst.sleep apnea	1	3.3%	2	6.7%
Post quincy	0	0%	1	3.3%
<b>Total</b>	<b>30</b>	<b>100%</b>	<b>30</b>	<b>100%</b>

**Table III: Comparison of operative time, intraoperative blood loss and visual analog scale in laser and dissection group**

	Laser			Dissection			P value
	Min	Mean	Max	Min	Mean	Max	
Operative time (minute)	12.00	25.23	51.00	15.00	31.90	55.00	0.02
Intraoperative blood loss (mL)	19.00	94.80	256.00	34.00	151.70	487.00	0.014
Visual analog scale	2	24.93	96	0	29.17	80	0.43

## Discussion

In the Pahang state of Malaysia, the study on the usage of laser in surgery could only possibly be done in Hospital Kuantan as it is the only hospital with a laser facility. As for the department of ENT, tonsillectomy is the most frequently operative procedure performed and conventional blunt dissection technique has been and continue to be considered a most common and standard method of tonsillectomy.

The instruments used for tonsillectomy have evolved to render a precise operation, but past and current indications for the procedure are almost identical as shown in this study.

There is no consensus on the optimum method of performing tonsillectomy. Various methods have been described which are frequently compared and discussed in otolaryngology literature<sup>10</sup>. Advocates of cold blunt dissection tonsillectomy have presented evidence that the healing is more rapid and postoperative pain less than other techniques<sup>6,11</sup>. In most studies, most of the new techniques used are usually compare to the standard blunt dissection technique. The value of a new technique must be judged by the results concerning intraoperative and postoperative morbidity and complications. The most common 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 duration, which the bleeding is secured. Thus, the time taken to control the bleeding will influence the operating time as well as the blood loss. Weimert et al. reported a significant reduction in intraoperative blood loss and operating time with diathermy assisted tonsillectomy<sup>12</sup>. In our study, the blood loss was significantly reduced and operative time was significantly shorter in the laser group. Thus, indirectly reduces anesthetic time. We had a near bloodless operation rendering good view to the

surgeon to operate on smoothly. Laser as with electro-surgical instrument achieves cutting and simultaneous hemostasis by sealing the blood vessel lumen by virtue of tissue heating<sup>13</sup>. Histologically, in the immediate laser wound there was evidence of endothelial damage and thrombosis of the capillaries especially small diameter vessel<sup>14</sup>. 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 electro-surgery and laser tonsillectomy has been reported to cause more severe postoperative pain than conventional blunt dissection technique<sup>15,16</sup>. In our study, we found that postoperative pain in the laser group 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 significantly between laser and dissection group.

## Conclusion

Despite questions regarding its efficacy and proven benefits in the past, laser tonsillectomy has become an accepted procedure in Otorhinolaryngology-Head and neck surgery. Laser-assisted tonsillectomy has shown to have significantly shortened the operative time and reduces the blood loss. Even more important that the postoperative pain was almost similar between the laser surgery and dissection technique, thus it does not cause any additional morbidity.

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