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Original Article

Diode laser versus blunt dissection tonsillectomy

MA Matin[1], M Alamgir Chowdhury[2]

Abstract:

Introduction: Tonsillectomy is the commonest operation performed in Ear, Nose and Throat Department. Various methods of tonsillectomy have been practiced over the century aimed at reducing or eliminating intra-operative and postoperative morbidity.

Aim: This prospective study is aimed at evaluation of advantages and disadvantages of laser tonsillectomy over blunt dissection tonsillectomy in respect of operative time, intra-operative blood loss, postoperative pain, rate of healing of tonsillar fossa and other postoperative complications.

Method: This prospective randomized study was done for 18 months from April 2010 to September 2011.One hundred patients were divided into two groups of equal number. In one group, the tonsillectomy performed by Diode laser and in the other group the tonsillectomy performed by conventional dissection technique.

Results: Age ranged from 5 - 34 years with mean age 15.4 in laser group and 4-35 years with mean age 15.98 in dissection group. Operative time and amount of blood loss is significantly reduced in the laser group (10-25 min, mean 12 min in laser group, 15-45 min, and mean 25 min in dissection group). Tonsillectomy by using laser has shown less intra-operative bleeding (5ml-20 ml, mean 10 ml compared with 45-250 ml, mean 70 ml in dissection method). Patients experienced mild to moderate pain in laser group and moderate to severe pain in dissection group in first 24-48 hours. Pain increased in intensity after 5-6 days in laser group. On 8th post operative day thin to thick white coating is observed with smooth tonsillar fossa in laser group whereas granulation tissue is observed in dissection group.

Conclusion: In conclusion laser tonsillectomy has some advantages over dissection method. There is less operative time and intra-operative bleeding and less immediate post operative pain. Disadvantage of laser tonsillectomy is that there is more pain in 5th to 6th post operative period this may be due to thick slough formation.

Key words: *Tonsillectomy; Diode laser; dissection method*

1. Associate Professor, ENT - HNS, Rajshahi Medical College, Rajshahi, Bangladesh.
2. Professor, ENT - HNS, Anwer Khan Modern Medical College Hospital, House 17, Road 8, Dhanmondi RA, Dhaka 1205, Bangladesh.

Address of Correspondence: Dr. M A Matin FRCS(Eng), FRCS(Ed), FRCS(Glasg), DLO (Lond), Associate Professor, ENT - HNS, Rajshahi Medical College, Rajshahi, Bangladesh. email: matinfrcs@yahoo.com, Mobile: 01725 897870

Introduction:

Tonsillectomy is the surgical procedure of removing the tonsils. It is recommended in patients with chronic tonsillitis, recurrent attack of acute tonsillitis, peri-tonsillar abscess, sleep apnoea syndrome and unilateral tonsillar hypertrophy with suspicion of malignancy, TB or any other growth[1,2]. In the early 20th century, tonsillectomy was the most popular operative procedure for treating

various respiratory and systemic diseases[3,4]. In the 1960s and1970s, one to 2 million tonsillectomies, adenoidectomies or combined procedures were performed annually in the United States[5,6,7]. The most important complications of tonsillectomy are the operative and post operative haemorrhage and severe post operative pain resulting in odynophagia[5]. There have been many different studies of methods of tonsils removal and haemostasis. 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 haemostasis. Since the first use of mono-polar diathermy coagulation, electrosurgery excision has become a widely used method because of its documented advantages of decreased blood loss and shorter surgical time[7, 8]. There are other methods of tonsillectomy like laser, coblation and by harmonic scalpel[9].

Methods:

This is a prospective randomized study to compare the result of laser assisted tonsillectomy with conventional dissection technique with regards to the operative time, intra-operative bleeding, postoperative bleeding and other related complications. This prospective randomized study was done at Maleka Nursing Home, Bogra and Bangladesh ENT Hospital, Dhaka, Bangladesh from April 2010 to September 2011. One hundred patients were divided into two groups of equal number. In one group, the tonsillectomy performed by Diode laser and in the other group the tonsillectomy performed by dissection technique. The patients were randomized to either the laser group or the conventional method group of equal number.

Laser tonsillectomy was performed using Biotec diode laser. The power was set at 7 watts and laser was used to separate the tonsil tissue from the 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 the lower pole was clamped using Wilson forceps and silk ligature was used. Haemostasis was secured by suture ligation or by bipolar diathermy in dissection group and bipolar in laser group. Surgical time was measured from the insertion of Boyle-Davis mouth gag to the final haemostasis and removal of mouth gag. Intra operative 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 day 8 using standardized visual analogue scale in which 0 indicate no pain and 10 for very severe pain. Intra-muscular, per rectal diclofenac and oral paracetamol was a standard pain control regime used in all patients given every 8 hourly depending on the severity of pain. Patients were discharge 1 day after the operation and reviewed in the clinic on 8th post operative day.

Results:

Of the 100 patients recruited in this study, 50 patients were in the laser group and another 50 patients were in the conventional dissection group. The mean age was 15.4 years (range, 5-34 year) for laser group and 15.98 years for dissection group (range, 4-35 year) (Table-I).

Table-I
Distribution of patients according to age (n= 100).

Age	Laser group	Dissection group
Minimum	5	4
Maximum	34	35
Mean	15.46	15.98

The mean operative time for laser group was 12 min, (range, 10-25 min.) and 25 min. for dissection group (range, 15-55 min) (Table-II).

Table-II
Operative time in minutes (n= 100).

Time	Laser group	Dissection group
Minimum	10	15
Maximum	25	55
Mean	12	25

Mean intra-operative bleeding for laser group was 10 ml (range, 5-20 ml) compared with 70 ml for dissection group (range, 45-250 ml) (Table-III).

Table-III
Intra operative blood loss in ml (n= 100).

Amount of loss in ml	Laser group	Dissection group
Minimum	5	45
Maximum	20	250
Mean	10	70

The pain scores (VAS) and duration of pain in both groups were compared. Patients experienced mild to moderate pain in laser group and moderate to severe pain in dissection group in first 24-48 hours. Pain increased in intensity after 5-6 days in laser group (Table-IV).

Table-IV
Post operative pain (n= 100).

Time	Laser group	Dissection group
First 24-48 hrs	Mild to moderate	Severe
Last 5-7 days	Moderate to severe	Mild to moderate
	In some adult patients	

On 8th post operative day thin to thick white coating is observed with smooth tonsillar fossa in laser group whereas granulation tissue is observed in dissection group (Table-V).

Table-V
Tonsillar fossa on 8th post operative day (n= 100).

Laser group	Thin to thick white coating with no granulation tissue
Dissection group	Some granulation tissue

One adult patient in laser group was admitted on day 14 due to severe pain and slight bleeding which was managed conservatively, and another child was seen on day 10 due to severe pain in laser group. None of the patients requires second general anesthesia for haemostasis.

Discussion:

In Bangladesh use of laser has been started very recently and few numbers of ENT Surgeons are doing laser tonsillectomy but no article published regarding the advantages and disadvantages of laser tonsillectomy over dissection tonsillectomy. This small study will give some ideas about the application of laser in tonsil for the new surgeons who want to start laser. 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. 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[14]. Advocates of cold blunt dissection tonsillectomy have presented evidence that the healing is more rapid and post operative pain less than other techniques[10 - 15]. 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 intra-operative 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, when the bleeding is secured. Thus, the time taken to control the bleeding will influence the operating time as well as the blood loss. A study reported a significant reduction in intra operative blood loss and operating time with diathermy assisted tonsillectomy[16]. 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 electrosurgical instrument achieves cutting and simultaneous haemostasis by sealing the blood vessel lumen by virtue of tissue heating[17]. Histologically, in the immediate laser wound there was evidence of endothelial damage and thrombosis of the capillaries especially small diameter vessel[18]. 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 electrosurgery and laser tonsillectomy has been reported to cause more severe postoperative pain than conventional blunt dissection technique[19, 20]. In our study, we found that postoperative pain in the laser group was initially mild to moderate in first 24-48 hours but pain increased in 5th to 6th POD in some patients in comparison to dissection group where pain was moderate to severe in first 24-96 hours and then gradually decreased in 8th POD and that is the main disadvantage of laser. Almost similar to the dissection group, 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 haemorrhage. Other intra-operative 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 Otolaryngology - Head and Neck Surgery. Laser-assisted tonsillectomy has shown to have significantly shortened the operative time and reduces the blood loss although post operative pain increased in 5-7 days in some patients especially in adult patients in comparison to children which can easily be overcome by adequate analgesia.

References:

1. Paradise JL. Tonsillectomy and Adenotonsillectomy for recurrent throat

infection in moderately affected children: Paediatrics 2002; 110(1): 7-9.

2. Paradise JL, Bluestone CD, Bachman RZ; Efficacy of tonsillectomy for recurrent throat infection in severely affected children-results of parallel randomized and nonrandomized clinical trial. N Eng J Med 1984; 310: 674-83.
3. Kornblut AD. A traditional approach to surgery of the tonsils and adenoids. Otolaryngol Clin North Am 1987; 20: 349-63.
4. MacBeth RG. The tonsil problem. J Laryngol Otol 1950; 64: 591-98.
5. Khan MF, Iqbal J, Raza N, Amjad M. Diode laser tonsillectomy a comparison with conventional technique. Pakistan Journal of Otolaryngology.2002; 26: 30-31.
6. Faigel HC. Tonsillectomy: a bloody mess. Clin Pediatr (Phil) 1966; 5: 652-53.
7. Gibb AC. Unusual complications of tonsil and adenoid removal. J Laryngol Otol 1969; 83: 1159-174.
8. Haase Fr, Noguera JT. Haemostasis in tonsillectomy by electrocautery. Arch Otolaryngol 1962; 75: 125-26.
9. M Alamgir Chowdhury, Naseem Yasmeen, SM Golam Rabbani et al. Advantages of ultrasonic tonsillectomy by harmonic Scalpel. Bangladesh J Otorhinolaryngol 2010; 16(2): 91-95.
10. Tay HL. Postoperative morbidity in electrodissection tonsillectomy. J Laryngol Otol 1995; 109: 209-11.
11. Stevens MH. Laser surgery of tonsils, adenoids and pharynx. Otolaryngol Clin North Am 1990; 23: 43-47.
12. Bergler W, Huber K, Hammerschmitt N, Hormann K. Tonsillectomy with argon plasma coagulation (APC): evaluation of pain and hemorrhage. Laryngoscope 2001; 111: 1423-429.
13. Krespi YP. Tonsil cryptolysis utilizing CO_2 SwiftLase. Laser Med Surg 1993; (suppl 5): 40-41.
14. McGregor FB, Albert DM, Bhattacharya AK. Postoperative morbidity following paediatric tonsillectomy: a comparison of bipolar diathermy dissection and blunt dissection. Int J Otorhinolaryngol 1995; 31: 1-6.
15. Handler SD, Miller L, Richmond KH, Corso Baranak C. Post-tonsillectomy haemorrhage: incidence, prevention and management. Laryngoscope 1986; 96: 1243-247.
16. Weimert TA, Babyak JW, Richter HJ. Electrodissection tonsillectomy. Arch Otolaryngol Head & Neck Surg 1990; 116: 186-88.
17. Sajjadian A, Isaccson G. Electrosurgery in the head and neck. Ann Otol Rhinol Laryngol 1998; 107: 254-61.
18. Basu MK, Frame JW, Rhys Evans PH. Wound healing following partial glossectomy using the CO_2 laser, diathermy and scalpel: A histological study in rats. J laryngol Otol. April 1998; 102: 322-27.
19. Leach J, Manning S, Schaefer S. Comparison of two methods of tonsillectomy. Laryngoscope 1993; 103: 619-22.
20. Auf I, Osborne JE, Sparkes C, Khall H. Is the KTP laser effective in tonsillectomy? Clin Otolaryngol 1997; 22: 145-46.