

## Original Article

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# A Comparative Study of Coblation versus Dissection Tonsillectomy

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### Abstract:

**Objectives:** To compare the efficacy of coblation tonsillectomy and dissection tonsillectomy regarding the duration of surgery, amount of intraoperative bleeding, postoperative pain, recovery time and complications.

**Methods:** 50 patients aged 5-30 years with chronic tonsillitis who underwent tonsillectomy operation were randomly divided into two groups. One group underwent coblation tonsillectomy while other group with dissection tonsillectomy. Chronic tonsillitis patients with adenoid hypertrophy and Otitis media with effusion were excluded by diagnostic nasal endoscopy, imaging and audiometry. All patient were examined regularly after surgery for 10 days to assess the postoperative morbidity and efficacy of both coblation and dissection methods. Duration of surgery, amount of intraoperative bleeding, recovery time, postoperative pain & requirement of analgesics, time required to regain normal diet & activity and complication were assessed.

**Result:** Comparing the coblation tonsillectomy to cold dissection group the mean duration of surgery was 9.7 versus 18.4 minutes, the amount of intra operative bleeding 10.62 versus 28.72 milliliter. The difference on the postoperative pain scale, requirement of analgesics, condition of the tonsillar fossa, time required to regain normal diet & activity between two groups were statistically significant.

**Conclusion:** In our study patient underwent coblation tonsillectomy providing a near bloodless field, minimum operating time, less postoperative pain, quicker return to normal diet, normal activity and less use of analgesics than patients underwent dissection tonsillectomy. Postoperative morbidity and complications were lower as compared to conventional cold dissection technique.

**Keywords:** Coblation, Cold dissection, Pain scale.

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**Introduction:**

Tonsillectomy is one of the most frequently used procedure in otolaryngology<sup>1</sup>. The indication of tonsillectomy remains controversial in all over the world. Most commonly tonsillectomy is done in children to reduce the frequency and severity of recurrent sore throat. The best method of tonsillectomy depends upon some parameter like, intra operative time, primary haemorrhage, postoperative pain, haemorrhage and healing. There are various methods of tonsillectomy like, Dissection, Diathermy, LASER, Cryosurgery and Coblation<sup>2</sup>. However, debate still continues in which method has the least postoperative morbidity.

The most common postoperative complications are pain and haemorrhage. The pain is the result of disruption of underlying muscle and irritation of glossopharyngeal nerve fiber. These leads to subsequent inflammation and spasm of the muscle causing ischemia and protracted cycle of pain that also causes dysphagia. When the electrocautery is used for hemostasis or dissection, it produces intense heat that causes further tissue damage<sup>3</sup>. After tonsillectomy, healing of the tonsillar fossa by the healthy mucosa occurs within 2-3 weeks. The secondary haemorrhage may occur due to infection of the tonsillar fossa that causes disruption of the blood vessels which requires urgent intervention.

Coblation tonsillectomy is a new technique that was introduced in 2001<sup>4</sup>. Following which many articles have been published to confirm its efficiency. It acts by passing a radiofrequency bipolar electric current through a medium of normal saline, resulting in a plasma field of highly ionized particles, which in turn break down intercellular bonds

and thus melt tissue at around 40° - 70°C. But the diathermic methods generate temperature more than 500°C. In addition the coblation can also be used for bipolar coagulation to achieve haemostasis<sup>3</sup>.

This study was designed to compare the intra-operative time, intra-operative bleeding, postoperative pain, time required to regain normal diet and activity in coblation and dissection tonsillectomy.

**Methods:**

This study was designed as a prospective, randomized, single blind study. The study was performed in Department of Otolaryngology & Head & Neck Surgery, Sir Salimullah Medical College Mitford Hospital, Dhaka, from July 2019 to December 2019, which was comprised of 50 patients between 5 - 30 years of age. All the subjects were divided into two groups, based on odd and even serial number of the subjects during their enrollment in this study. Odd serial numbers were included in Coblation group (Group 1) and even numbers were included in conventional Dissection group (Group 2). Informed written consent was obtained from patients. Inclusion criteria of the study population were recurrent tonsillitis and tonsillar hypertrophy with obstructive symptoms. Patients who were less than five years of age, known case of bleeding disorder, unilateral tonsillar enlargement, peritonsillar abscess, enlarged adenoid with OME were excluded from the study.

Before operation all patient and their parents were taught how to fill up the postoperative pain score form. Pain was assessed by using Visual Analog Scale (VAS). Tonsillectomy was done by a single surgeon. All the data was collected by an assistant surgeon. Intra operative time and blood loss during operation were estimated. Postoperative

pain score in 1<sup>st</sup>, 2<sup>nd</sup> and 10<sup>th</sup> postoperative day were documented by visual analog scale of pain. Data for the number of days needed to return to normal diet, normal work and any postoperative complication also collected. The area of slough in each tonsillar fossa was assessed by direct visual examination. The extent of healing within the tonsillar fossa was estimated by recording the percentage of the fossa that had remucosalized. All patients received same antibiotic and analgesic (Paracetamol) at a fixed time and duration. All of the patients underwent tonsillectomy were discharged on 2<sup>nd</sup> postoperative day. In order to evaluate the return to normal diet or activities, the patients were asked the postoperative day they would be able to return normal diet or work. They were regularly followed up for any problem or complication. The statistical analyses were performed using the SPSS-23.

### Results:

This study comprising of 50 patients between 5-30 years of age. Patients were randomly divided into two groups with 25 patients in each group. The mean age of group 1 was 12.5 (8-21), while in group 2, the mean age was 10.7 years (5-30). Group 1 was comprised of 15 males and 10 females, while group 2 was comprised of 12 male and 13 females. The majority of the patients were less than 12 years of age. There were no significant differences in age or gender distribution.

The mean duration of surgery in group 1 was  $9.7 \pm 2.3$  minutes, while in group 2, it was  $18.4 \pm 4.1$  minutes. The mean duration is measured from giving incision over tonsil up to achieving complete haemostasis. This difference was statistically significant ( $t=9.2534, p< 0.001$ ). (Table - I)

**Table-I :**

*Duration of surgery between groups.*

Groups	Mean±SD (Min)	t-value	p-value
Group 1	9.7 ± 2.3	9.2534	< 0.001
Group 2	18.4 ± 4.1		

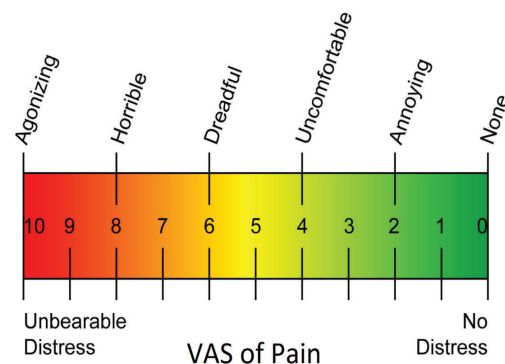
The mean per-operative blood loss in group 1 was only  $10.62 \pm 3.23$  ml as compared to a mean blood loss of  $28.72 \pm 6.31$  in group 2. This difference was statistically significant ( $t= 12.77, p< 0.001$ ). (Table - II)

**Table - II :**

*Per-operative blood loss between groups.*

Groups	Mean±SD (ml)	t-test value	p-value
Group 1	10.62 ± 3.23	12.77	< 0.001
Group 2	28.72 ± 6.31		

Postoperative pain scores were evaluated for both group by using Visual Analog Scale (VAS). Mean pain average over 10 days was 3.66 in group 1 and 6 in group 2. Lower postoperative pain score in group 1 was statistically significant ( $p< 0.001$ ). (Table – III).



**Fig.-I :** Visual Analog Scale (VAS).

**Table – III :**  
*Postoperative pain average over 10 days.*

Postoperative days	Group - 1	Group - 2	t- test value	p- value
1 <sup>st</sup> POD	4	8	-16.538	<0.001
2 <sup>nd</sup> POD	4	6	-14.392	<0.001
10 <sup>th</sup> POD	3	4	-3.11	<0.001

The postoperative tonsillar fossa healing was estimated by percentage of slough covered in the tonsillar fossa and it was compared on 1st, 2nd and 10th postoperative day. Percentage of tonsillar fossa was covered by slough on 1st, 2nd and 10th postoperative day, in group 1 was 85%, 76%, 49% and in group 2 it was 45%, 48%, 32%. This difference was statistically significant ( $p < 0.001$ ). (Table - IV).

There was significant difference in analgesic requirement in the postoperative period over 10 days. In group 1, the mean analgesic requirement was  $1.35 \pm 0.45$  gm as compared to  $4.82 \pm 1.14$  gm in group 2 ( $p < 0.001$ ). (Table – V)

Patient return to normal diet was significantly shorter in the group 1 (4.7 verses 7.2 days  $p < 0.001$ ) and return to normal general condition was significantly earlier in the group 1 (5.6 verses 7.5 days  $p < 0.001$ ). (Table - VI).

**Table - IV :**  
*Postoperative tonsillar fossa covered by slough (Percentage).*

Postoperative days	Group - 1 (Mean $\pm$ SD)	Group - 2 (Mean $\pm$ SD)	t-test value	p - value
1 <sup>st</sup> POD	85 $\pm$ 7.3	45 $\pm$ 3.6	34.75	<0.001
2 <sup>nd</sup> POD	76 $\pm$ 5.4	48 $\pm$ 4.5	28.17	<0.001
10 <sup>th</sup> POD	49 $\pm$ 3.7	32 $\pm$ 2.5	26.99	<0.001

**Table - V:**  
*Postoperative analgesic (Paracetamol) requirement*

Groups	Mean $\pm$ SD (gm)	t - test value	p - value
Group 1	1.35 $\pm$ 0.45	- 14.16	< 0.001
Group 2	4.82 $\pm$ 1.14		

**Table – VI :**  
*Postoperative return of normal diet and general condition.*

Postoperative normal diet and general condition	Group - 1 (Mean $\pm$ SD)	Group - 2 (Mean $\pm$ SD)	t - test value	p value
Normal Diet Intake (Days)	4.7 $\pm$ 1.2	7.2 $\pm$ 1.5	-6.50724	<0.001
Normal general condition (Days)	5.6 $\pm$ 1.3	7.5 $\pm$ 1.8	-4.27858	<0.001

None of the patients in our study underwent any damage to adjacent structures (anterior pillar, uvula, and soft palate) peroperatively. There was no case of postoperative hemorrhage in our study.

### Discussion:

Tonsillectomy is the most common surgery that performed by an otolaryngologist. Despite advances in surgical and anaesthetic techniques, postoperative pain and morbidity remains a significant problem after tonsillectomy. The pain inhibits chewing and swallowing, which leads to dehydration and contributes to lassitude and delayed recovery of strength and well-being. Many studies have attempted to use various interventions to reduce postoperative pain.

Post tonsillectomy morbidity reduction is very important not only with respect to patient's comfort but also because reduced pain improves oral intake, reduces the risk of dehydration, infection, and postoperative hemorrhage. Tonsillectomy is one of the most common operation performed by otolaryngologists in the pediatric population<sup>2</sup>. The particular interest is the peroperative blood loss due to the small total circulating blood volume in younger children and postoperative pain which influences the time taken to resume a normal diet and achieve complete recovery<sup>3</sup>. Coblation is rapidly growing in popularity since it is associated with a less mean duration of surgery, excellent hemostasis, and minimal postoperative pain.

In our study, the predominant age group was found to be 16-20 years. There was no significant difference in the incidence among age distribution and gender and it does not seem to significantly affect the study outcome.

The mean duration of surgery in group 1 was  $9.7 \pm 2.3$  minutes, while in group 2, it was

$18.4 \pm 4.1$  minutes. This difference was statistically significant ( $t= 9.2534$ ,  $p < 0.001$ ). Nelson<sup>5</sup> demonstrated that the total duration of operating time per tonsil for all ablations averaged 4.5 min, with a range of 1.9–9.4 min, which is similar to our study. Kumar S et al.<sup>6</sup>, demonstrated that the mean operation time with coblation was 6.92 minutes (range 4–8 min) and Zaki M F<sup>7</sup> demonstrated that the mean operation time with coblation was  $10.63 \pm 2.45$  minutes, which are consistent with our study. However, a study reported by Morinière et al.<sup>8</sup>, showed no statistically significant difference between the 2 groups in terms of mean operating time.

The Intra-operative blood loss was compared in both groups. In group 1 it was  $10.62 \pm 3.23$  ml and in group 2 it was  $18.72 \pm 6.31$  ml, which is about 8ml of blood loss is minimized in coblation method. This difference was statistically significant ( $t= 12.77$ ,  $p < 0.001$ ). Friedman et al.<sup>3</sup>, observed  $< 20$  mL to no blood loss in their study on radiofrequency tonsil volume reduction and Nelson<sup>5</sup>, demonstrated that the operative blood loss for temperature controlled radiofrequency tonsil reduction is estimated to be less than 1 ml, which are consistent with our study. Peroperative blood loss is an important consideration in patients with coagulopathies, especially in small children where total circulating blood volume is smaller.

The postoperative pain was measured using Visual Analog Scale in both groups on 1st, 2nd and 10th postoperative days. After 10 postoperative day, mean postoperative pain score in group 1 was 3.66 and whereas in group 2 it was 6.0. About 60-70% patients had lesser pain in coblation compared to conventional method. Lower postoperative pain score in group 1 was statistically significant ( $p < 0.001$ ).

The increase in pain morbidity in the group 2 was probably due to slower healing and the extent of dissection done. Friedman et al. (3), demonstrated that pediatric patients experienced pain for a mean period of 1.7 days following ablation and 7.1 following conventional tonsillectomy. In adults, the mean number of days for which patients experienced pain was 1.6 days following ablation and 9.4 days following tonsillectomy. Kumar S et al.<sup>6,7</sup>, demonstrated that patients undergoing ablation were pain-free by the 3<sup>rd</sup> postoperative day and patients who underwent conventional tonsillectomy experienced pain beyond the 6<sup>th</sup> postoperative day.

The postoperative tonsillar fossa healing was estimated by amount of slough covered in the tonsillar fossa and it was compared on 1st, 2nd and 10th postoperative day. In group 1 percentage of slough formation was 85%, 76% and 49% respectively on 1st, 2nd and 10th postoperative days, whereas in group 2 it was 45%, 48%, 32%. So, slough formation was more in group 1 compared to group 2. This difference was statistically significant ( $p < 0.001$ ). Nallasivam et al.<sup>8,9</sup>, demonstrated that the percentage of slough formation in tonsillar fossa was 80%, 74% and 45% respectively on 1st, 2nd and 7th postoperative days in coblation method whereas in conventional method it was 40%, 47% and 17%. Which is consistent with this study.

In our study, we also observed a statistically significant difference in analgesic requirement in the postoperative period over 10 days. In group 1, the mean analgesic requirement was  $1.35 \pm 0.45$  gm as compared to  $4.82 \pm 1.14$  gm in group 2. This difference was statistically significant ( $p < 0.001$ ). According to Babademez et al.<sup>10</sup>, observed less mean total analgesic requirement postoperatively in the coblation

group in a study on the comparison with laser tonsillectomy and radiofrequency tonsil ablation. In a study reported by Ericsson et al.<sup>11</sup>, patients who underwent radiofrequency ablation had less pain from the 1st day of surgery, needed less analgesics and were pain-free earlier than the conventional tonsillectomy group.

Patient return to normal diet of both groups are compared. Diet recovery period was significantly shorter in the group 1 (4.7 vs. 7.2 days  $p < 0.001$ ). On the other hand, return to normal general condition was significantly earlier in the group 1 (5.6 vs. 7.5 days  $p < 0.001$ ). These findings were consistent with study conducted by Omrani et al.<sup>12</sup>.

None of the patients in our study underwent any damage to adjacent structures (anterior pillar, uvula, and soft palate) perioperatively. There was no case of postoperative hemorrhage in our study.

The reduction of intraoperative blood loss and operation time in coblation tonsillectomy was obvious and reduction of the postoperative pain and early return to normal diet and activities without increasing the postoperative complications were clinically and statistically significant. Therefore, we believe that the coblation tonsillectomy is an effective and cost-effective method.

#### **Conclusion:**

Among the different methods of tonsillectomy coblation is a safe and effective methods in both pediatric and adult population. Coblation tonsillectomy is relatively easy technique to perform providing a near bloodless field and minimal surrounding tissue damage. This technique results in less operative blood loss, operative time and postoperative pain as compared to conventional cold dissection tonsillectomy. As postoperative pain is significantly less in coblation tonsillectomy that results in

decrease postoperative analgesic demand and the patient to resume their normal activity. But only deterring factor in the regular usage of coblation is the cost factor which has to be overcome. Otherwise, in all aspect coblation tonsillectomy is superior to other methods of tonsillectomy.

#### References:

1. Marcelle M. Acute and chronic pharyngeal infection. In: Scott-Brown's Otolaryngology, Head and Neck Surgery. Michael Gleeson. Edition-7.vol-2. Hodder Arnold. 2008:1981-2024.
2. Verma R, Verma RR, Verma RR. Tonsillectomy-Comparative Study of Various Techniques and Changing Trend. Indian J Otolaryngol Head Neck Surg. 2017; 69(4): 549-558.
3. Friedman M, LoSavio P, Ibrahim H, Ramakrishnan V. Radiofrequency tonsil reduction: safety, morbidity, and efficacy. Laryngoscope. 2003 May; 113(5): 882-887.
4. Timms MS, Temple RH. Coblation tonsillectomy: a double blind randomized controlled study. J Laryngol Otol. 2002 Jun; 116(6): 450-452.
5. Nelson LM. Temperature-controlled radiofrequency tonsil reduction in children. Arch Otolaryngol Head Neck Surg. 2003 May; 129(5): 533-537.
6. Kumar S, Padiyar BV, Rai AK. Cold Dissection Tonsillectomy and Radiofrequency Tonsil Ablation: A Prospective Comparative Study. Dubai Med J. 2018; 1:6-12.
7. Zaki M F. Coblation versus Traditional Tonsillectomy: A Double Blind Randomized Controlled Trial. Glob J Oto. 2017; 6(3): 61-65.
8. Morinière S et al. Radiofrequency tonsillotomy versus bipolar scissors tonsillectomy for the treatment of OSAS in children: a prospective study. Eur Ann Otorhinolaryngol Head Neck Dis. 2013 Apr; 130(2): 67-72.
9. Nallasivam M, Sivakumar M. A comparative study of coblation versus conventional tonsillectomy. IOSR Journal of Dental and Medical Sciences. 16: 102-107.
10. Babademez MA, Yurekli MF, Acar B, Günbey E. Comparison of radiofrequency ablation, laser and coblator techniques in reduction of tonsil size. Acta Otolaryngol. 2011 Jul; 131(7): 750-756.
11. Ericsson E, Wadsby M, Hultcrantz E. Pre-surgical child behavior ratings and pain management after two different techniques of tonsil surgery. Int J Pediatr Otorhinolaryngol. 2006 Oct; 70(10): 1749-58.
12. Omrani et al. Coblation versus traditional tonsillectomy: A double blind randomized controlled trial. J Res Med Sci. 2012 Jan; 17(1): 45-50.