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Comparative outcomes of coblation vs. dissection tonsillectomy: Intraoperative time and blood loss

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Abstract
Background: Tonsillectomy is one of the most frequent surgical procedures in the treatment of diseases like chronic tonsillitis and obstructive sleep apnea. Two common techniques are performed: coblation and dissection. Coblation has been introduced as a less invasive alternative to the conventional dissection method, utilizing controlled ablation at temperatures between 60–70°C, thus potentially reducing thermal tissue damage, postoperative pain, and complications. The present study compared the outcomes of coblation versus dissection tonsillectomy in terms of intraoperative time, blood loss, and recovery.
Objective: To compare the intraoperative time, blood loss, postoperative pain, and recovery times for both coblation and dissection tonsillectomy.
Method: A cross-sectional study was carried out in Shaheed Suhrawardy Medical College Hospital, Dhaka, from July to December 2020. Sixty patients aged between 5 and 45 years, diagnosed with chronic tonsillitis or tonsillar hypertrophy, were included in this trial and were divided into two groups: 30 patients underwent coblation tonsillectomy, while the other 30 were subjected to conventional dissection tonsillectomy. Intraoperative time and blood loss were measured, while postoperative recovery, pain, and return to normal activities were assessed.
Results: The operative time (18.7±2.3 minutes vs 25.4±4.1 minutes) and blood loss (20.62±4.23 milliliters vs 48.72±6.31 milliliters) were significantly lower in the coblation group than in the dissection group ($p< 0.001$). The postoperative pain scores on days 1, 5 to 8, and 9 to 15 were significantly lower in the coblation group. Recovery, including return to a normal diet and activities, was quicker in the coblation group (6.1 days vs. 7.8 days for diet; 5.1 days vs. 6.4 days for activities).
Conclusion: Coblation tonsillectomy has clear advantages over traditional dissection by virtue of reduced intraoperative time, blood loss, and pain in the postoperative period and faster recovery. Though more expensive, coblation may prove to be the better way of performing tonsillectomy with improved patient outcomes and efficiency, hence proving to be an important option in clinical practice, especially in high-volume surgical settings.

Keywords: Coblation tonsillectomy, dissection tonsillectomy, intraoperative time, blood loss, postoperative pain, recovery, surgical techniques, tonsillectomy outcomes, patient comfort, surgical efficiency

Introduction
Tonsillectomy is one of the most common surgical procedures performed worldwide, primarily in children and young adults who are afflicted with recurrent tonsillitis, sleep apnea, peritonsillar abscesses, and other tonsil-related diseases [1]. The most common methods of performing tonsillectomy, namely dissection and coblation, have their own advantages and disadvantages with regard to intraoperative time, blood loss, and postoperative recovery [2]. Traditionally, the dissection method has been the standard, based on sharp dissection and physical removal of the tonsils [3]. However, coblation tonsillectomy is a competitive alternative in view of the use of modern medical technology, mainly because it causes a more controlled, lower-temperature ablation process that could lead to less thermal injury and reduced post-operative pain [4]. The increased acceptance of coblation tonsillectomy is based on the promise of its gentler approach [5].

This is because the technology used works through controlled ablation at temperatures between 60–70 °C, while the basic electrosurgery process uses temperatures ranging between 400–600 °C [6]. That consequently reduces collateral tissue damage and theoretically reduces post-op complications like pain and hemorrhage [7]. Since it was introduced in 2001, there has been a trend upwards in the coblation method, especially in settings where recovery time and reduction in postoperative complications are the main focus [8]. In fact, studies performed in different countries showed that coblation may potentially lower intraoperative blood loss and reduce recovery time, hence enabling patients to resume their normal diet and activities early. One study by Farouk *et al*. (2022), with over 500 cases, showed that coblation tonsillectomies are associated with significantly less intraoperative bleeding (mean 65 mL in the coblation group vs. 174 mL in the dissection group) and significantly shorter operation times, further decorating the effectiveness of this method in clinical practice [9]. In Bangladesh, the number of studies on tonsillectomy techniques is still few, but the initial research shows promise for coblation in reducing those complications commonly associated with traditional dissection methods. The success of this procedure in minimizing blood loss and recovery time could therefore be important, especially in settings where quick patient turnover and less post-operative care are desired. For example, at Rajshahi Medical College, the data presented reflect a reduction in mean operative time in favor of coblation (12 minutes vs. 25 minutes for dissection) and a similar reduction in mean intraoperative blood loss for the former (15 ml vs. 65 ml for dissection) [10]. The data are very instrumental therefore in toning down the practices of tonsillectomy within Bangladesh where chronic tonsillitis is relatively common among the populace and thereby making surgical intervention relatively frequent. The present study will try to compare the results of coblation and dissection tonsillectomy techniques, mainly dealing with the intraoperative time and blood loss associated with each procedure, so as to evaluate which technique provides better surgical efficiency and comfort for the patients. With a rising number of studies supporting the less invasive nature of coblation tonsillectomy and fewer complications, this study hopes to contribute to the literature available till now with region-specific data and provide a basis for more refined surgical guidelines in Bangladesh, influencing practices globally.

Methodology

This cross-sectional study was conducted from July to December 2020 at the Department of ENT & Head Neck Surgery, Shaheed Suhrawardy Medical College Hospital (ShSMCH), Dhaka, comparing the outcomes of coblation versus dissection tonsillectomy by focusing on intraoperative time and blood loss. The study has purposively selected a total of 60 patients based on calculated sample size estimates, assuming a 4% prevalence of tonsillitis in the admitted population. Included were those with chronic tonsillitis or obstructive symptoms due to tonsillar hypertrophy, aged between 5 and 45 years, and who had given informed consent. Excluded were patients with bleeding disorders, recent history of tonsillitis, and those out of the defined age group. To compare the two groups on an equal basis, the patients randomly allocated into two groups according to their serial number: odd-numbered patients underwent coblation tonsillectomy and even-numbered patients underwent the conventional dissection method. All were operated under general anesthesia by ENT specialists at Assistant Professor level or above. All patients in the coblation group underwent subcapsular dissection with the EVAC 70 ArthroCare handpiece along the tonsillar pillar mucosa, while patients in the conventional group received sharp dissection with ligature-based hemostasis. Intraoperative time was recorded from insertion of the Boyle-Davis Mouth Gag until final hemostasis was achieved. Blood loss was quantified by weighing swabs and measuring contents of suction, with corrections for saline in the coblation group. Postoperative pain was evaluated on a daily basis for 15 days using a Visual Analog Scale, and the duration of days taken to resume normal diet and activities were recorded on the follow-up visit on Day 4, 8, and 15. Results were analyzed on SPSS software version 23 where quantitative measures were analyzed as mean and standard deviation while qualitative data were analyzed as frequency distribution. Z-test was done for all statistical comparisons between groups where $p < 0.05$ was considered significant. The study was approved by the ShSMCH ethical committee. Informed consent was taken from all patients, explaining the purpose, benefits, and possible risks of the study in a language that they could understand, keeping the study in confidence.

Results

This comparative study of coblation vs. dissection tonsillectomy was conducted on 60 patients who were divided into two groups. In Group 1 (Coblation), there were16 men and 14 women, and in Group 2 (Dissection), there were 17 men and 13 women, with no statistically significant differences regarding gender and age (p> 0, 05). Several advantages were observed with coblation: operating time was decreased by 26.4% (18.7 vs. 25.4 min, $p < 0{,}001$) and blood loss by 57.7% (20.62 vs. 48.72 ml, $p < 0{,}001$). Postoperative pain, measured using the Visual Analog Scale, was also significantly reduced in the coblation group, especially from days 5 to 15 ($p < 0.001$). Coblation hastened healing, as slough coverage was 85% on day 1 and decreased to 0% by day 15, while in the dissection group, healing occurred at a slower rate (45% to 10%). Patients in the coblation group resumed normal diets (6.1 vs. 7.8 days) and activities (5.1 vs. 6.4 days) earlier ($p < 0.001$). Both groups had minor bleeding cases which were managed conservatively. The study overall demonstrates coblation tonsillectomy to be more time and blood loss efficient, less painful, and allow recovery quicker, hence likely to be more patient-friendly.

Table 1: Gender Distribution (N=60)

Group	Males	Females	Male-to-Female Ratio
Coblation Group	16	14	53:47
Dissection Group	17	13	57:43

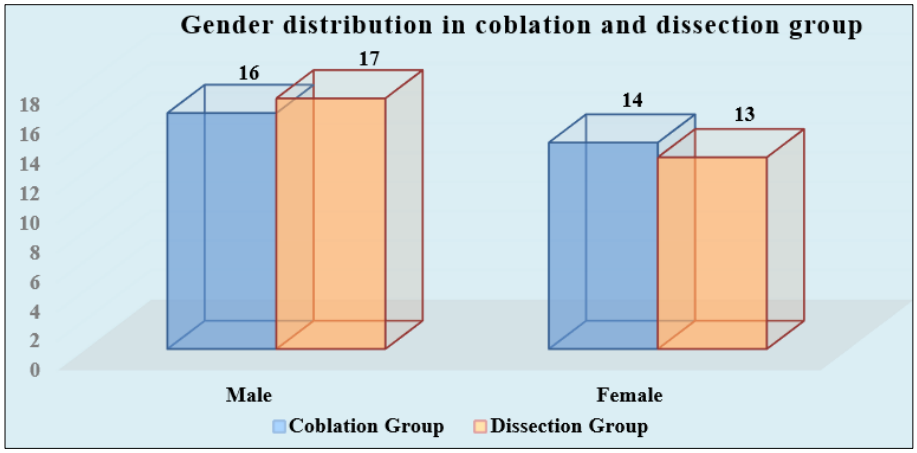

Fig 1: Column chart showed group wise gender distribution among patients (N=60)

Table 2: Age distribution (N=60)

Group	Age Range (Years)	Mean Age (Years)
Coblation Group	5-45 Yrs.	13.6±5.4
Dissection Group	5-45 Yrs.	14.5±4.1

Table 3: Operative time and blood loss (N=60)

Parameter	Coblation Group	Dissection Group	Statistical Significance (p-value)
Mean Operative Time	18.7±2.3 minutes	25.4±4.1 minutes	$p < 0.001$
Mean Intraoperative Blood Loss	20.62±4.23 ml	48.72±6.31 ml	$p < 0.001$

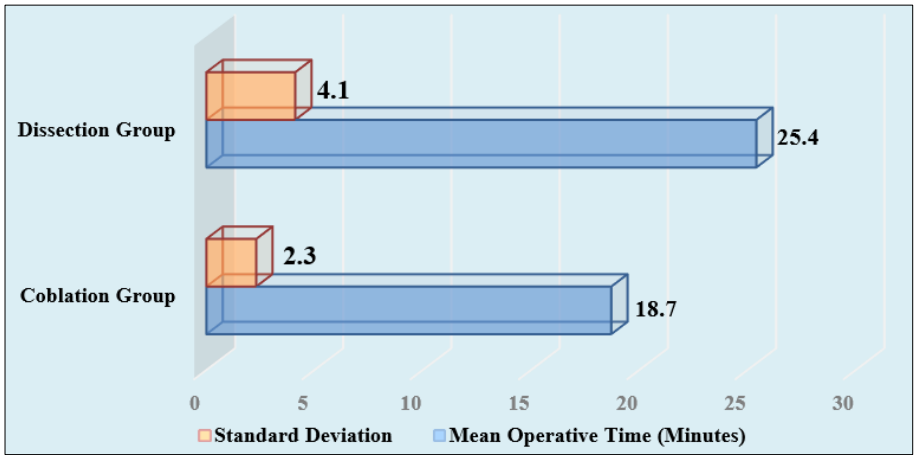

Fig 2: Bar chart showed operative time and blood loss (N=60)

Table 4: Postoperative pain scores (VAS Scale) (N=60)

Observation Day	Coblation Group Pain Score	Dissection Group Pain Score	Statistical Significance (p-value)
Day 1	7.6±1.4	8.5±1.1	$p < 0.05$
Days 2-4	No significant difference	No significant difference	Not significant
Days 5-8	2.9±0.8	5.1±1.1	$p < 0.001$
Days 9-15	No pain	1.4±0.6	$p < 0.001$

Table 5: Healing Process (Percentage of Slough in Tonsillar Fossa) (N=60)

Day	Coblation Group (% Slough)	Dissection Group (% Slough)
Day 1	85%	45%
Day 8	39%	32%
Day 15	0% (Complete Healing)	10%

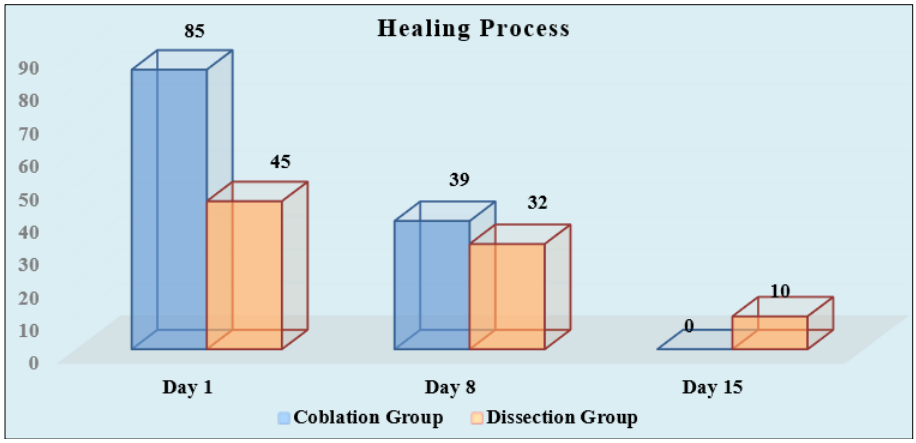

Fig 3: Column chart showed healing process among patients (N=60)

Table 6: Recovery Milestones (N=60)

Recovery Parameter	Coblation Group (Mean Days)	Dissection Group (Mean Days)	Statistical Significance (p-value)
Resumption of Normal Diet	6.1	7.8	$p < 0.001$
Return to Normal Activities	5.1	6.4	$p < 0.001$

Table 7: Complications (N=60)

Complication	Coblation Group	Dissection Group	Management
Adjacent Structure Damage	0	0	None
Secondary Hemorrhage	1	0	Managed Conservatively
Reactionary Hemorrhage	0	1	Managed Conservatively

Discussion

Tonsillectomy is one of the most frequent operations done by otolaryngologists worldwide. In the years to come, several techniques and instruments were developed in order to reduce intraoperative and postoperative morbidity [11]. Of those, conventional dissection tonsillectomy remained for many years the gold standard, though being associated with considerable postoperative pain and complications [12]. In contrast, newer techniques such as coblation tonsillectomy have been increasingly popular due to theoretical advantages with regard to reduced postoperative pain, faster recovery, and improved hemostasis [13]. The aim of this study was to compare the two techniques of coblation and dissection with regards to operative time and blood loss. Another major finding of this study was a reduction in both operative time and blood loss with coblation tonsillectomy compared to traditional dissection. The mean operative time was significantly reduced in the coblation group, at 18.7 minutes, compared to the dissection group at 25.4 minutes ($p < 0.001$). This saving in time is probably because of the fact that the coblation technique affords more precise and efficient tissue removal at a relatively lower temperature, with less thermal injury [14]. Again, the coagulation of the tissue at a relatively cooler temperature, compared to the conventional technique, possibly makes the coblation permit more rapid tissue dissection and more prompt hemostasis, therefore reducing the overall time for the procedure. Another important observation from this trial was that there was a great difference in intraoperative blood loss between the two groups: the mean value of blood loss in the coblation group was only 20.62 ml, while in the dissection group, it was 48.72 ml ($p < 0.001$). The reduction of blood loss is very large in benefit, as too much bleeding may make the procedure complicated and delay recovery. The better hemostatic properties of coblation, facilitated by its ability to coagulate vessels during dissection, likely contributed to this result. The reduced blood loss associated with coblation also reduces the risk of postoperative hemorrhage, which is a common complication of tonsillectomy. Postoperative pain remains the most significant concern following tonsillectomy, but this was lower in the coblation group. Patients undergoing coblation had a mean pain score of 7.6 on postoperative day 1. This reduced significantly during days 5-8 to 2.9 and then resolved completely by days 9-15. The dissection group showed a higher mean pain score of 8.5 on day 1. The pain decreased but remained moderate at 5.1 during days 5-8. This can be credited to the fact that the coblation technique can reduce thermal damage to the tissues surrounding lesion sites. The fact that coblation is less invasive with minimal collateral thermal damage tends to lead to less irritation and inflammation often linked with traditional dissection modalities. The healing rate was also more rapid in the coblation group. The amount of slough in the tonsillar fossa at all times after the operation was significantly less in the coblation compared to the dissection group, the former showing complete healing by day 15 and a more retarded rate of healing in the latter. This is in keeping with the reduced postoperative pain scores in people undergoing the former, as more rapid healing would generally be associated with less inflammation and tissue trauma. Moreover, the earlier resumption of a normal diet and activities in the coblation group underlines even more the advantages of this technique concerning postoperative recovery. Patients in the coblation group resumed a normal diet in an average of 6.1 days and returned to normal activities in 5.1 days, both significantly faster than the dissection group.

Limitations of the study

- This study was conducted at a single tertiary hospital in Dhaka, which limits generalizability.
- The study duration was short.

- This might affect the reliability of the results due to the small sample size; future studies should include a larger sample.

Conclusion and Recommendation

Coblation tonsillectomy is a safe and efficient procedure, offering several advantages over conventional dissection tonsillectomy: less blood loss, shorter operative time, and reduced postoperative pain. Although single-use equipment makes it more expensive, it is better in most respects, including speed of recovery and reduced need for analgesia. Further research with larger sample sizes across multiple hospitals is recommended to validate these findings.

Conflict of Interest

Not available

Financial Support

Not available

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