

Study of Outcome of Coblation Assisted Versus Dissection and Snare Technique of Tonsillectomy

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Abstract: Background: Tonsillectomy is a common surgical procedure in otolaryngology, yet it is often associated with significant postoperative morbidity. The cold dissection and snare method is widely used, while coblation-assisted tonsillectomy has emerged as a promising alternative due to its minimal thermal injury and faster recovery. This study aimed to compare the efficacy and outcomes of coblation versus cold dissection and snare tonsillectomy techniques. Methods: This prospective observational study was conducted on 55 patients undergoing tonsillectomy at a tertiary care center from June 2023 to December 2024. Patients were divided into two groups: Group A (cold dissection and snare, n=28) and Group B (coblation-assisted, n=27). Operative time, intraoperative blood loss, postoperative pain (VAS score), healing of the tonsillar bed, and surgeon satisfaction were assessed and statistically analyzed. Results: Coblation tonsillectomy significantly reduced operative time (19.85 ± 4.03 min vs. 37.82 ± 5.73 min; $p < 0.001$) and blood loss (8.81 ± 1.59 mL vs. 100.75 ± 7.99 mL; $p < 0.001$) compared to cold dissection. Postoperative pain was significantly lower in the coblation group on day 1 (VAS 4.48 vs. 7.82) and day 7 (VAS 2.0 vs. 4.57) ($p < 0.05$). Healing was faster with coblation, with complete resolution of slough by day 28 in 100% of patients, compared to 78.6% in the cold dissection group. Complication rates and surgeon satisfaction also favored the coblation technique. Conclusions: Coblation tonsillectomy offers superior clinical outcomes over the cold dissection method, including reduced operative time, blood loss, pain, and enhanced healing. It presents a safer, more efficient, and patient-friendly surgical alternative.

Keywords: Tonsillectomy, Coblation, Cold dissection, Postoperative pain, Hemostasis

1. Introduction

While tonsillectomy is thought to be a simple procedure, practically all otolaryngologists are concerned about the nearly definite morbidity associated with this technique, especially in children. A safe, painless, atraumatic, and bloodless tonsillectomy is the goal of perfect tonsillectomy technique [1,2]. Due to the rich blood supply of tonsils and oropharynx, there is a significant risk of bleeding and hemorrhage during tonsillectomy. Thus, postoperative discomfort and perioperative and postoperative haemorrhage are common morbidities following tonsillectomy [3].

Various techniques have for tonsillectomy are used in clinical practice,[5] the common procedure is dissection and snare method. Another common method is coblation tonsillectomy, which include removal of tonsils using a coblation device, specifically the ArthroCare Evac 70 ArthroWand (manufactured by ArthroCare Corporation, Sunnyvale, CA). This technique can be applied in extracapsular, intracapsular, or subcapsular dissections [4]. The most crucial factors in determining which surgical approach are optimal for a surgery are decreased post-operative morbidity and increased intra-operative efficiency. Patients undergoing coblation-assisted tonsillectomy (CAT) appear to benefit from improved postoperative recovery due to coblation technology [2].

Coblation produces a significantly lower thermal impact compared to electrocautery, estimated to be between 45° and 85°C. This leads to the assumption of less collateral thermal injury to nearby tissues [6]. In coblation, the temperature can reach 40°C to 70°C. However, the temperature can rise to 400°C to 600°C with electrocautery, which is used in traditional cold dissection tonsillectomy. With coblation, the heat penetration is negligible, but with electrocautery, it is typically fairly deep. Coblation causes the target tissue to dissolve, but electrocautery causes the target tissue to heat up quickly, burn, and cut. Finally, the effects of coblation are minimal on the surrounding tissues, causing minute dissolution. However, accidental burning or charring of adjacent tissue occurs during electrocautery [7]. We thus conducted this study to assess and compare the recovery in healing of tonsillar bed, intraoperative time, and blood loss, as well as postoperative pain in coblation-assisted and dissection and snare techniques of tonsillectomy.

2. Methodology

The current research was carried out as a prospective observational study on patients undergoing tonsillectomy at the Department of Otorhinolaryngology, Gandhi Medical College & Hamidia Hospital, Bhopal during 18-month period, from June 2023 to December 2024. All the patients

with chronic tonsillitis (7 or more episodes/year or 5 or more episodes/year for 2 years or 3 or more episodes/year for 3 years), Obstructive symptoms related to tonsillar hypertrophy, recurrent Tonsillitis causing otitis media were included whereas patients with bleeding and clotting disorder, peritonsillar abscess, age less than 6 years and more than 45 years and history of acute tonsillitis within 3 weeks before surgery were excluded from the study.

After obtaining ethical clearance from the institute's ethical committee, all the patients fulfilling the inclusion criteria were enrolled, and written consent was obtained. Data was obtained using the proforma regarding clinical history. Furthermore, all the patients were subjected to general, local and systemic examination, and findings were noted. Coagulation profile along with Blood grouping was done. All the patients were scheduled for tonsillectomy and technique of tonsillectomy which was being used was based on Surgeon's clinical judgement and patients were categorized into two groups based upon surgical procedure
Group A- Cold dissection and snare technique
Group B- Coblation technique

Cold dissection & snare technique-In this entering the peritonsillar area with curved Metzenbaum scissors, performing blunt dissection with a Mollison tonsillar dissector and pillar retractor, and removing the tonsil from the superior to inferior pole. Using a bipolar cautery at a setting of 30, hemostasis was achieved. A wire snare was used to separate the inferior pole during a dissection technique.

Coblation technique- Using the EVAC handpiece, subcapsular dissection along the tonsillar pillar mucosa was done to execute the coblation-assisted tonsillectomy while maintaining muscle integrity. Hemostasis was achieved on the coagulate 3 setting, and dissection was performed on the coblate 7 setting.

All patients received the same anesthesia and recovery room protocols. During the procedure, the following factors were evaluated:

- Operative Time:** time taken for the procedure in minutes and seconds using a stopwatch, starting from placement of mouth gag until its removal.
- Blood Loss:**
 - Cold Dissection and Snare Technique:** calorimetric method (swab weighing technique) was used. The weight of an unused swab was first recorded, and after

the procedure, the weight of the soaked swabs was measured. The difference in weight between the dry and soaked swabs was calculated to estimate blood loss. This amount, equivalent to 1 g=1 ml, was then added to the volume of blood collected in suction bottles, accounting for amount of saline used for suction (as done in the coblation technique).

- Coblation Technique:** By comparing the volume of irrigating fluid used with the collected fluid in the vacuum flask. The amount of saline used for irrigation was recorded, and after the procedure, the fluid collected in the suction canister was filtered to separate the tissue. The remaining fluid, composed of blood and irrigation fluid, was measured, and the blood loss was determined by subtracting the initial volume of saline from the final collected fluid.

During the postoperative period, the following were assessed:

- Recovery in Healing of Tonsillar Bed:** Slough formation was graded based on the extent of filling of the tonsillar fossa and the presence of slough outside the fossa (e.g., on anterior pillar or uvula).
- Postoperative Pain:** Pain was evaluated on postoperative days 1, 7, and 28 using the Visual Analog Scale (VAS), ranging from 0 to 10.
- Additionally,** the surgeon's perspective was evaluated through a surgeon's proforma, which included information about the grade of the tonsils, the completeness of the resection, and the depth of the resection. Surgeon satisfaction was also assessed.

Statistical Analysis: Data were compiled using MS Excel and analyzed with IBM SPSS (Statistical package for Social Science) version 20 (Illinois Chicago). Categorical data were expressed as frequency and proportion, while continuous data were presented as mean and standard deviation. Comparisons between the two groups were made using the chi-square test for categorical variables and the independent t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

3. Results

The present study was conducted on a total of 55 patients who underwent tonsillectomy at our study center during the study period. The findings of present study are tabulated as under-

Table 1: Comparison of baseline variables between two groups

Baseline variables		Group A (n=28)		Group B (n=27)		P value	
		N	%	n	%		
Age (years)	≤10	8	28.6	7	25.9	0.41	
	11-20	8	28.6	12	44.4		
	21-30	9	32.1	4	14.8		
	>30	3	10.7	4	14.8		
Gender	Male	10	35.7	14	51.9	0.23	
	Female	18	64.3	13	48.1		
Tonsillar hypertrophy	Right	Grade 2	1	3.6	2	7.4	0.72
		Grade 3	11	39.3	12	44.4	
		Grade 4	16	57.1	13	48.1	
	Left	Grade 2	1	3.6	2	7.4	0.82
		Grade 3	23	82.1	21	77.8	
		Grade 4	4	14.3	4	14.8	

Two groups were comparable with respect to baseline variables ($p>0.05$) (Table 1).

Table 2: Comparison of intra-operative time and blood loss between two groups

Intraoperative characteristics		Group A (n=28)	Group B (n=27)	P value
Intraoperative time (minutes)	Mean	37.82	19.85	0.001
	SD	5.735	4.026	
Blood loss (ml)	Mean	100.75	8.81	0.001
	SD	7.989	1.59	
Complications	Excessive bleeding	1 (3.6%)	0 (0)	0.011
	Posterior pillar erosion	7 (25%)	0 (0)	
	Nil	20 (71.4%)	27 (100%)	

The mean intra-operative time was found to be significantly higher in group A whereas mean blood loss was found to be significantly higher in dissection and snare tonsillectomy as compared to coblation technique ($p<0.05$). Intraoperative

complications such as excessive bleeding and posterior pillar erosion were found in significantly higher proportions of cases in group A ($p<0.05$) (Table 2).

Table 3: Comparison of Surgeon's perspective between two groups

Postoperative characteristics		Group A (n=28)		Group B (n=27)		P value
		N	%	n	%	
Completeness of resection of tonsil	Excellent	3	10.7	10	37.0	0.022
	Good	25	89.3	17	63.0	
Depth of resection	Adequate	23	82.1	25	92.6	0.245
	Shallow	5	17.9	2	7.4	
Surgeon's satisfaction	Average	2	7.1	0	0	0.123
	Good	24	85.7	21	77.8	
	Excellent	2	7.1	6	22.2	

The completeness of resection of tonsil was found to be significantly better in group B as compared to group A ($p<0.05$). Though depth of resection of tonsil as per operating surgeon was adequate in higher proportions of cases in group B as compared to group A (92.6% vs. 82.1%), the observed difference between two groups was found to be statistically insignificant ($p>0.05$). Surgeon's satisfaction was good in 85.7% cases in group A as compared to 77.8% cases in group B, but the observed difference in surgeon's satisfaction between two groups was statistically insignificant ($p>0.05$) (Table 3).

At postoperative day 1, mean VAS score in group A was 7.82 whereas mean VAS score in group B was 4.48 ($p<0.05$). Thus, coblation was associated with low postoperative pain immediately following surgery. At post operative day 7, mean VAS scores were 4.57 and 2 in group A and group B respectively and the observed difference was statistically significant ($p<0.05$). However, at Postoperative day 28, mean VAS score was 0.64 in group A and 0.04 in group B, with significant difference between two groups ($p<0.05$) (Figure 1).

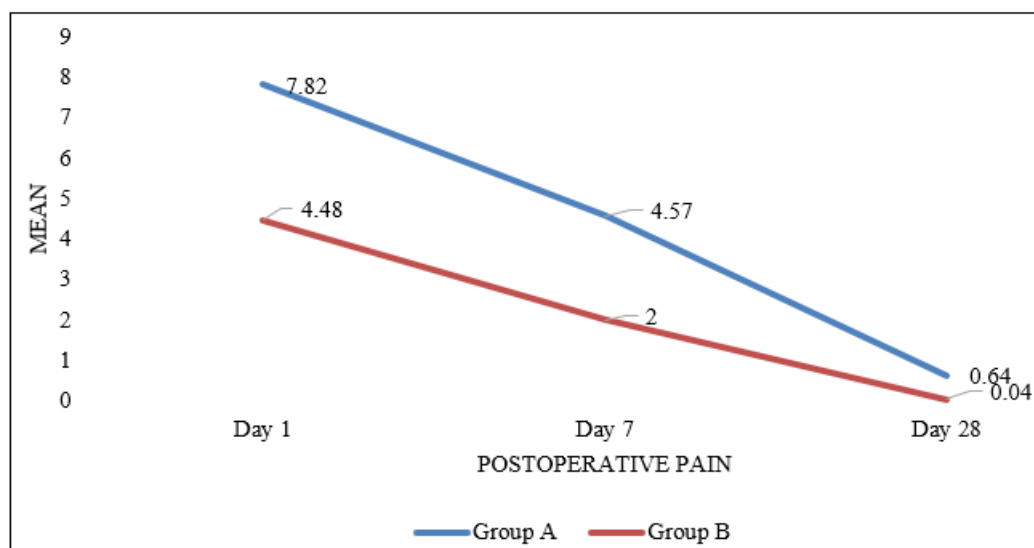


Figure 1: Comparison of postoperative pain between two groups

Table 4: Comparison of postoperative healing of tonsillar fossa between two groups

Postoperative healing		Group A (n=28)		Group B (n=27)		P value
		n	%	n	%	
Day 1	No slough in tonsillar fossa	0	0	0	0	0.001
	Slough partially filling tonsillar fossa	0	0	15	55.6	
	Slough completely filling tonsillar fossa	22	78.6	12	44.4	
	Slough also present outside tonsillar fossa	6	21.4	0	0	
Day 7	No slough in tonsillar fossa	0	0	15	55.6	0.001
	Slough partially filling tonsillar fossa	22	78.6	12	44.4	
	Slough completely filling tonsillar fossa	6	21.4	0	0	
	Slough also present outside tonsillar fossa	0	0	0	0	
Day 28	No slough in tonsillar fossa	22	78.6	27	100	0.01
	Slough partially filling tonsillar fossa	6	21.4	0	0	
	Slough completely filling tonsillar fossa	0	0	0	0	
	Slough also present outside tonsillar fossa	0	0	0	0	

As observed from table 4, we found a significantly better healing at all observations in group B as compared to group A ($p<0.05$).

4. Discussions

The present study was conducted at a tertiary care centre on a total of 55 patients undergoing tonsillectomy to study and compare the recovery in healing of Tonsillar Bed, intraoperative time, and blood loss, as well as postoperative pain in coblation-assisted and dissection and snare techniques of tonsillectomy. The study done by Budhiraja et al. found that the mean surgery duration was significantly less in the coblation method (6.92 minutes) than in the conventional cold dissection method (18 minutes) [8]. In a study done by Jat et al, the mean duration of surgery was found to be significantly shorter for the coblation group (18.24 ± 5.37 minutes) as compared to the conventional group (30.04 ± 7.08 minutes; $p<0.05$) [9]. In the present study, we found that the mean operative time was significantly lower in the coblation technique of tonsillectomy as compared to cold dissection and Snare technique (19.85 ± 4.026 minutes versus 37.82 ± 5.735 minutes, $p<0.05$).

Budhiraja et al documented the amount of intraoperative bleeding be significantly lesser in coblation group as compared to cold dissection method (2.75 versus 39.88 mL, $p<0.05$) [8]. Sasindran et al also found mean blood loss in coblation group (18.9 ± 15 ml) to be significantly lower as compared to dissection method (43 ± 33.1 ml) [4]. In the present study, Coblation-assisted tonsillectomy was associated with significantly lower blood loss as compared to the dissection and snare method (8.81 ± 1.594 ml versus 100.75 ± 7.989 ml; $p<0.05$).

The study done by Regmi et al found that the incidence of primary haemorrhage was 4.44% in the cold dissection group and none in the coblation group ($p>0.05$) [10]. However, Omrani et al observed primary hemorrhage in 2.12% of cases following the coblation technique and 4.26% of cases following conventional tonsillectomy, and the difference was insignificant ($p>0.05$) [11]. In the present study, the coblation technique was free of complications, whereas cold dissection and snare technique of tonsillectomy were associated with excessive bleeding in 3.6% and posterior pillar erosion in 25% of cases. Thus, intraoperative complications were significantly higher in cold dissection and snare group ($p<0.05$).

In the present study, we used the VAS scale to assess the post-operative pain in both the dissection and snare (Group A) and coblation tonsillectomy (Group B) at day 1, day 7, and day 28 following surgery. We found that immediately following surgery at day 1, the pain was significantly lower following coblation tonsillectomy as compared to cold dissection and snare method (4.48 versus 7.82; $p<0.05$). This difference in pain score was observed at 7th postoperative days as well, with a mean VAS score of 2 in the coblation group as compared to 4.57 in the cold dissection and snare method ($p<0.05$). On the other hand, at the 28th postoperative day, pain scores were comparable between the two groups (0.64 in group A and 0.04 in group B; $p>0.05$). Further, Easa et al found mean early (1 to 4 days) as well as late (4 to 15 days) pain to be significantly lower in the group managed with coblation tonsillectomy as compared to the cold dissection method ($p<0.05$) [12]. Similarly, Regmi et al observed mean pain scores at post-operative day 1 as well as day 3 to be significantly lower in cases following coblation tonsillectomy as compared to the cold dissection technique ($p<0.05$) [10].

Joshi et al found an absence of slough in both groups with smooth tonsillar fossa at the 3rd postoperative week [13]. Easa et al assessed postoperative healing by disappearance of postoperative membrane, and it was achieved significantly earlier following the coblation technique (6.48 days versus 8.5 days; $p<0.05$) [12]. In the present study, we found healing to be significantly better in the coblation group as compared to cold dissection and snare technique at all the follow-up ($p<0.05$). In coblation group, at postoperative day 1, slough partially filling tonsillar fossa was observed in 55.6% cases, by day 7, it was seen in 44.4% cases and by day 28, none of the patients in the coblation group had slough in the tonsillar fossa. While in Conventional group, at postoperative day 28, 21.4% cases had slough partially covering tonsillar fossa.

The present study had certain limitations, the study's sample size was small and only 55 cases were included in the present study. The study was conducted as a unicentric study; thus, the population may be homogeneous, limiting the generalizability of our research.

5. Conclusion

Coblation tonsillectomy demonstrates several significant advantages over the conventional cold dissection and snare technique. Specifically, the coblation method was less time-consuming, contributing to greater surgical efficiency and

potentially reducing overall operating room resource utilization. Additionally, it resulted in significantly lower intraoperative blood loss, thereby minimizing the risk of hemodynamic instability and enhancing patient safety during the procedure. The technique also provided excellent tissue resection with minimal trauma to surrounding structures, leading to a lower incidence of intraoperative complications. Postoperatively, patients who underwent coblation tonsillectomy reported reduced pain, which may lead to decreased reliance on analgesics and improved overall patient comfort. Furthermore, the coblation technique was associated with faster wound healing and a quicker return to normal diet and daily activities, which collectively support its clinical superiority.

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Key Message:

Coblation tonsillectomy significantly reduces intraoperative and postoperative morbidity, offering a safer and more comfortable surgical option compared to traditional cold dissection methods.