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A PROSPECTIVE OBSERVATIONAL STUDY COMPARING COBLATION ASSISTED TONSILLECTOMY WITH CONVENTIONAL TONSILLECTOMY

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ABSTRACT

BACKGROUND: *Worldwide, "tonsillectomy" is the most common operative procedure performed in otorhinolaryngology. Conventional dissection and snare tonsillectomy, although effective and cost-efficient, are frequently associated with significant intraoperative bleeding and postoperative pain. In the modern health care system, "coblation-assisted tonsillectomy" has introduced a promising alternative technique. It utilizes controlled radiofrequency energy for tissue dissection at lower temperatures, thereby minimizing collateral thermal injury. Hence, we compare the intraoperative and postoperative outcomes between coblation-assisted and conventional tonsillectomy techniques.*

METHODOLOGY: *We conducted a prospective observational study at a tertiary health care center in Mumbai over a period of 18 months. We enrolled a total of 40 patients with chronic tonsillitis, and these participants were randomly divided into two groups: conventional (n=20) and coblation-assisted tonsillectomy (n=20). Furthermore, outcomes such as operative time, blood loss, postoperative pain, hemorrhage, and recovery were assessed. Data were analyzed using SPSS version 20, with a p-value < 0.05 considered as statistically significant.*

RESULTS: *In this study, a total of 40 patients (19 males and 21 females with a mean age of 15.82 ± 8.44 years) were enrolled with no significant demographic difference between groups ($p > 0.05$). The coblation group showed significantly shorter operative time, less intraoperative blood loss, and lower postoperative pain scores on days 1, 2, and 7 ($p < 0.001$). Recovery was faster in the coblation group, with fewer postoperative complications and no bleeding episodes.*

CONCLUSION: *Coblation-assisted tonsillectomy was a superior, patient-friendly technique with less pain, minimal bleeding, and faster recovery, making it a preferred alternative to the conventional method.*

Key words: *Tonsillectomy; conventional dissection, snare tonsillectomy, coblation-assisted tonsillectomy, complications.*

INTRODUCTION:

In otorhinolaryngology, the majority of patients present with sore throat, difficulty in swallowing, and tonsillar swelling, collectively referred to as "tonsillitis." This condition is most commonly observed in pediatric patients, though it also occasionally occurs in juveniles and adults.[1] In this field, "tonsillectomy"

remains one of the most frequently performed operative procedures worldwide, primarily due to the persistent burden of recurrent tonsillitis and sleep-disordered breathing in both children and adults.[1] A report published in 2025 revealed that hundreds of thousands of tonsillectomies are performed annually, with more than half a million procedures carried out in children and adolescents in the United States alone, underscoring its continued public health significance.[2]

In 2019, a retrospective study reported an incidence of evidence-based indications for tonsillectomy as 4.2 per 1000 person-years, highlighting regional variations in clinical practice and demand.[3] In India, the prevalence of chronic tonsillitis was reported to be 17.82% among school-going children.[4] Similarly, another Indian study by S. Bismi et al. (2019) observed that approximately 77% of females were affected by tonsillitis compared to 22.9% of males. Among the respondents, 75% reported a history of tonsillitis, while 25% did not, emphasizing the considerable burden of the disease and its implications for healthcare resources.[5]

Despite being a routine surgical procedure, tonsillectomy continues to present challenges for clinicians, including postoperative pain, secondary hemorrhage, variable operative time, and differences in wound healing, all of which significantly impact patient recovery and healthcare utilization.[6] To address these challenges, newer techniques such as “coblation” have been introduced in otorhinolaryngology over the past two decades. According to the clinician’s perspective, coblation has gained popularity and acceptance due to its potential for early patient recovery. This technique employs radiofrequency bipolar electrical current to achieve tissue dissection. Several trials have suggested that coblation may reduce early postoperative pain compared with conventional cold-steel or electrocautery dissection. However, the evidence remains mixed, with concerns regarding cost, surgeon learning curve, and heterogeneity in outcome reporting, limiting widespread changes in clinical practice. [1,7]

We found there is a gap in literature regarding pragmatic, prospective observational studies comparing coblation-assisted tonsillectomy and conventional tonsillectomy in real-world clinical settings, especially in terms of patient-centered outcomes and safety parameters in India. To address this gap, the present study was conducted to compare these two surgical techniques at a tertiary health care center in Mumbai, Maharashtra, India.

METHODOLOGY

This prospective observational study was conducted in the Department of Otorhinolaryngology at a tertiary care centre in Mumbai over a period of 18 months. A total of 40 patients with recurrent or chronic tonsillitis were enrolled and randomly allocated into two groups: Group I, which underwent conventional tonsillectomy, and Group II, which underwent coblation-assisted tonsillectomy, with 20 patients in each group on the basis of following inclusion and exclusion criteria.

INCLUSION CRITERIA:

1) Chronic tonsillitis patients above 5yrs of age.
2) Paradise criteria for tonsillectomy (episodes of sore throat) – 7 or more episodes in the preceding year or 5 or more episodes in each of the preceding 2year or 3 or more episodes in each of the preceding 3 years.
3) Enlarged tonsils causing severe airway obstruction or dysphagia or sleep disorders.
4) Enlarged jugulodigastric lymph nodes.
5) Patients willing to give consent/assent for surgery.

EXCLUSION CRITERIA:

1) Bleeding disorders.
2) Patients less than 5 years of age.
3) Acute tonsillitis.
4) Unilateral asymmetrical enlargement of tonsil.
5) Grade 3 and 4 Adenoid hypertrophy patients.
6) Anemic patients. (Hemoglobin less than 10 gm%)
7) Patients not willing to get operated.
8) Menstruating female patients.

STUDY PROCEDURE:

All patients underwent preoperative evaluation, which included a detailed clinical examination, diagnostic nasal endoscopy in selected cases, and routine investigations such as complete blood count, coagulation profile, renal and liver function tests, blood sugar, serum electrolytes, calcium, HIV, HBsAg, HCV, chest X-ray, X-ray nasopharynx, and ECG. Written informed consent was obtained from all participants, and randomization into the two study groups was carried out using a computer-generated sequence.

All surgical procedures were performed by the same surgeon to minimize skill-related bias. The anesthetic technique was standardized across both groups, with induction using intravenous fentanyl, propofol (2 mg/kg), and atracurium (0.5 mg/kg), followed by maintenance with a mixture of nitrous oxide, oxygen, and propofol. Additional fentanyl boluses (25 mcg) were administered when intraoperative blood pressure or heart rate increased by more than 20%. No prophylactic antibiotics, topical anesthesia, or other adjunct medications were administered. In Group I, tonsillectomy was performed using the conventional cold steel dissection method, whereas in Group II, coblation-assisted tonsillectomy was performed using a coblator wand. Hemostasis was achieved with appropriate techniques, and postoperative analgesia was restricted to acetaminophen.

The outcome measures included duration of surgery, intraoperative blood loss, postoperative pain, postoperative hemorrhage, and the number of days required to return to normal daily activities. The duration of surgery was recorded from incision to complete hemostasis. Blood loss was calculated using

the swab weighing technique and the volume collected in the suction bottle, adjusted for saline used in coblation cases. Postoperative pain was assessed on the first, second, and seventh postoperative days using a Visual Analog Scale (VAS, 0–10), categorized as mild (0–3), moderate (4–6), and severe (7–10). Hemorrhage was classified as primary when occurring within 24 hours of surgery and secondary when occurring thereafter. The number of days taken by patients to resume normal activities such as pain-free swallowing, return to normal diet, daily routines, and undisturbed sleep were also recorded.

Follow-up was carried out in all patients by a second colleague to ensure blinding of the operating surgeon. Postoperative complications including hemorrhage, readmission and pain-related complaints were documented during follow-up visits.

STATISTICAL ANALYSIS:

Data were entered in Microsoft Excel and analyzed using SPSS software version 20. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation. The chi-square test was applied for categorical variables and the Student's t-test for continuous variables. A p-value of <0.05 was considered statistically significant.

RESULTS:

A total of 40 patients were recruited for this prospective observational study, and they were divided into two groups of 20 each; conventional and coblation. Of the 40 patients, 19 were men and 21 were women, as shown in Table 1. They ranged in age from 6 to 37 years old, with a mean age of 15.82 ± 8.44 years.

Table No. 1: Demographic characteristics of study participants

Variable	Conventional (n=20)	Coblation (n=20)	Total (n=40)	p-value
Age (Mean ± SD)	17.45 ± 9.44	14.20 ± 7.17	15.82 ± 8.44	0.228
Gender (M/F)	10/10	9/11	19 / 21	0.751

Table No. 2 compares the intraoperative parameters between conventional and coblation tonsillectomy. The mean duration of surgery was significantly longer in the conventional group (28.45 ± 3.56 minutes) as compared to the coblation group (20.65 ± 2.56 minutes) ($p < 0.001$). Similarly, the mean intraoperative blood loss was higher in the conventional group (44.50 ± 6.67 ml) than in the coblation group (19.50 ± 7.86 ml), and this difference was also statistically significant ($p < 0.001$).

Table No.2: Comparison of Intraoperative Parameters between Conventional and Coblation Tonsillectomy

Parameter	Conventional (n=20)	Coblation (n=20)	p-value
Duration of surgery (min)	28.45 ± 3.56	20.65 ± 2.56	<0.001
Intraoperative blood loss (ml)	44.50 ± 6.67	19.50 ± 7.86	<0.001

Table No. 3 presents the postoperative pain scores measured using the Visual Analog Scale (VAS) on postoperative days 1, 2, and 7. The mean VAS score on day 1 was significantly higher in the conventional tonsillectomy group (7.10 ± 1.25) compared to the coblation group (3.85 ± 0.75) ($p < 0.001$). On day 2, the conventional group had a mean score of 6.65 ± 1.04, whereas the coblation group had 3.70 ± 0.92 ($p < 0.001$). By day 7, pain scores decreased in both groups, but remained higher in the conventional group (3.80 ± 1.01) than in the coblation group (2.70 ± 0.87) ($p < 0.001$).

Table No. 3: Comparison of Postoperative Pain Scores (VAS) Between Conventional and Coblation Tonsillectomy

Day	Conventional (Mean ± SD)	Coblation (Mean ± SD)	p-value
Day 1	7.10 ± 1.25	3.85 ± 0.75	<0.001
Day 2	6.65 ± 1.04	3.70 ± 0.92	<0.001
Day 7	3.80 ± 1.01	2.70 ± 0.87	<0.001

Table No. 4 summarizes the postoperative recovery and complications in both groups. The mean duration required to return to normal activity was significantly longer in the conventional tonsillectomy group (7.95 ± 0.69 days) compared to the coblation group (6.55 ± 0.69 days) ($p < 0.001$). Postoperative bleeding was observed in 3 patients (15.0%) in the conventional group, whereas no cases were reported in the coblation group; this difference was not statistically significant ($p = 0.231$).

Table No. 4: Comparison of Postoperative Recovery and Complications Between Conventional and Coblation Tonsillectomy

Parameter	Conventional (n=20)	Coblation (n=20)	p-value
Return to normal activity (days)	7.95 ± 0.69	6.55 ± 0.69	<0.001
Postoperative bleeding	3 (15.00%)	0 (0.00%)	0.231

DISCUSSION:

This prospective observational study compared coblation-assisted tonsillectomy with conventional tonsillectomy in 40 patients, with each technique performed on opposite tonsils of the same individual to

minimize patient-related variations. In the present study, 21 were females and 19 were males. This was supported by Krishnan RR, et al. (2024).[7]

We found the duration of surgery was significantly longer in conventional dissection (28.45 ± 3.56 minutes) as compared to coblation dissection (20.65 ± 2.56 minutes) with a p-value < 0.001. Similarly, intraoperative blood loss was high in conventional dissection compared to coblation, with statistically significant differences between both groups. This represents that coblation is superior in terms of blood loss and surgery duration. Our study was further supported by the previous study by Agrawal R, et al., [8] (2021), who described that conventional tonsillectomy was associated with more blood loss. Furthermore, Nallasivam et al., (2017) reported that patients who underwent tonsillectomy via the conventional method suffered a larger mean blood loss (43.4 ml) compared to patients who were treated with coblation-assisted tonsillectomy (18.7 ml).[9]

In this study, postoperative pain was significantly lower in the coblation group across all follow-up days, with a marked difference on day 1, day 2, and day 7. This comparison was statistically significant with a p-value < 0.001. These findings were supported by Muthubabu K, et al., (2019), who stated that postoperative pain scores were significantly lower with the coblation method, which helps the patient resume their normal activities early.[10] Also, Jat SL, et al., (2022) revealed that postoperative pain was much higher in patients who underwent tonsillectomy via the conventional method.[11]

Our findings demonstrate that although coblation required longer operative time, it offered significant advantages in terms of reduced intraoperative bleeding, lower postoperative pain, faster recovery, and fewer hemorrhagic complications compared to conventional dissection. These results are largely consistent with the majority of published literature, though some variability exists across studies, likely influenced by surgical experience and patient factors. [1,6,7]

The present study has several limitations, including small sample size and short-term follow-up, which may not adequately capture long-term complications such as delayed hemorrhage or recurrence. In addition, the cost of coblation equipment and disposables, which can be a major limiting factor in resource-limited settings, was not evaluated. Therefore, while coblation appears to be a safe and effective alternative to conventional tonsillectomy, larger multicenter randomized controlled trials with longer follow-up are needed to establish its long-term outcomes and cost-effectiveness.

CONCLUSION:

The present study concluded that, coblation tonsillectomy is a safe and effective alternative to the conventional technique, which provides several advantages in terms of surgical and postoperative outcomes. Patients undergoing coblation tonsillectomy experienced significantly reduced intraoperative blood loss, shorter operative time, lower postoperative pain, and decreased need for analgesics. Furthermore, although the incidence of postoperative hemorrhage was not statistically significant

between the two groups, it was more frequent in the conventional method. Coblation was also associated with easier hemostasis, better patient tolerance and faster return to normal daily activities. Therefore, we reported that, coblation tonsillectomy demonstrated superior clinical outcomes and improved patient recovery compared to the traditional approach, supporting its use as a preferable technique in tonsil surgery.

Conflict of interest: None.

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Ethical approval: The Ethical approval was obtained from Institutional Ethical Committee (IEC) from a tertiary care medical college hospital, Mumbai, India, issued approval (Number: IEG/PG/184/May/2024; Dated: 15/05/2024).

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