

**ORIGINAL ARTICLE****Efficacy of Coblation Versus Conventional Tonsillectomy: A Comparative Study on Postoperative Outcomes**

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**ABSTRACT:**

**Aim:** This study aimed to compare the efficacy of coblation versus conventional tonsillectomy in terms of postoperative outcomes, including operative time, blood loss, postoperative pain, recovery duration, and complications. **Materials and Methods:** This prospective, randomized, comparative clinical trial was conducted at a tertiary care hospital, enrolling 100 patients (aged 5 to 40 years) diagnosed with chronic or recurrent tonsillitis requiring tonsillectomy. Patients were randomly divided into two groups (n=50 each): Coblation Group (Group A): Underwent coblation tonsillectomy using a plasma-based device. Conventional Group (Group B): Underwent cold dissection tonsillectomy using steel instruments. Intraoperative parameters such as operative time and blood loss were recorded. Postoperative pain was assessed using the Visual Analog Scale (VAS) on days 1, 3, 7, and 14. Additional outcomes, including return to normal diet, incidence of secondary hemorrhage, and patient satisfaction, were documented. Data analysis was performed using the chi-square test for categorical variables and the t-test for continuous variables, with  $p < 0.05$  considered statistically significant. **Results:** The baseline characteristics between the two groups were comparable ( $p > 0.05$ ). Coblation tonsillectomy demonstrated significantly better intraoperative outcomes, with a shorter operative time ( $18.4 \pm 3.2$  minutes vs.  $32.1 \pm 5.4$  minutes,  $p < 0.01$ ) and lower intraoperative blood loss ( $12.6 \pm 2.8$  mL vs.  $25.3 \pm 4.2$  mL,  $p < 0.01$ ). Postoperative pain levels were significantly lower in the coblation group across all time points ( $p < 0.01$ ). Patients in the coblation group returned to a normal diet faster ( $4.5 \pm 1.2$  days vs.  $7.8 \pm 1.5$  days,  $p < 0.01$ ), indicating a quicker recovery period. Patient satisfaction was significantly higher in the coblation group (90.00% vs. 70.00%,  $p = 0.04$ ). The incidence of secondary hemorrhage was lower in the coblation group (4.00%) compared to the conventional group (12.00%), but the difference was not statistically significant ( $p = 0.15$ ). **Conclusion:** Coblation tonsillectomy offers significant advantages over conventional tonsillectomy, including shorter surgical time, lower intraoperative blood loss, reduced postoperative pain, faster recovery, and higher patient satisfaction. Although the difference in postoperative hemorrhage was not statistically significant, the overall benefits of coblation tonsillectomy suggest it is a superior technique, making it a preferred choice for tonsillectomy in clinical practice.

**Keywords:** Tonsillectomy, Coblation, Conventional Dissection, Postoperative Pain, Surgical Outcomes.

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**INTRODUCTION**

Tonsillectomy is one of the most commonly performed surgical procedures in otolaryngology, particularly for children and young adults suffering from recurrent tonsillitis, obstructive sleep apnea, or other tonsil-related disorders. Traditionally, cold dissection tonsillectomy has been the standard surgical technique, involving the mechanical removal of the tonsils with scissors or a scalpel, followed by electrocautery for hemostasis. However, advancements in surgical techniques have led to the development of coblation tonsillectomy, which uses a plasma-mediated process to remove the tonsils while minimizing heat production. The efficacy, safety, and postoperative benefits of coblation tonsillectomy compared to conventional dissection methods have been widely debated, leading to an ongoing discussion regarding the most suitable approach for patient care.<sup>1</sup> Coblation tonsillectomy has gained popularity due to its unique mechanism of action, which utilizes controlled radiofrequency energy to break down tissue at a lower temperature compared to traditional

electrocautery. This results in reduced thermal injury to the surrounding tissues, which is hypothesized to contribute to lower postoperative pain and faster recovery. In contrast, conventional tonsillectomy, while effective, has been associated with more tissue trauma, prolonged healing, and greater postoperative discomfort. Given these differences, the choice between coblation and conventional tonsillectomy often depends on various factors, including surgeon preference, institutional guidelines, and patient characteristics.<sup>2</sup> One of the primary concerns following tonsillectomy is postoperative pain, which significantly affects patient recovery, return to normal activities, and overall satisfaction. Pain is influenced by the degree of inflammation, tissue damage, and nerve stimulation during the procedure. Studies suggest that coblation tonsillectomy may result in less postoperative pain due to its precision and minimal collateral thermal damage. This potential advantage is particularly important in pediatric patients, who may have difficulty coping with prolonged discomfort and dietary restrictions following surgery. Additionally,

pain management strategies following tonsillectomy are a crucial aspect of postoperative care, as they can influence recovery time and complication rates.<sup>3</sup> Another key factor in evaluating the efficacy of coblation versus conventional tonsillectomy is intraoperative bleeding and the risk of postoperative hemorrhage. Conventional tonsillectomy is often associated with higher intraoperative blood loss due to the mechanical disruption of tissue, which requires more extensive hemostatic control. Coblation, on the other hand, has been proposed to offer superior hemostasis during the procedure, leading to reduced intraoperative blood loss. However, concerns have been raised regarding delayed postoperative hemorrhage with coblation, as the healing process may differ due to the nature of tissue ablation and coagulation. Post-tonsillectomy bleeding remains a significant risk and a major cause of hospital readmission, making it an important consideration when comparing these two techniques. The speed of recovery and return to normal activities is another important outcome measure in assessing the efficacy of different tonsillectomy techniques. Patients undergoing coblation tonsillectomy may experience faster wound healing due to less tissue damage and inflammation, leading to an earlier resumption of normal diet and activities. Faster recovery is particularly advantageous for children, allowing them to return to school and daily routines more quickly. Furthermore, a shorter recovery period can reduce the economic burden on families by minimizing parental leave from work and associated medical costs. Beyond pain and recovery, patient satisfaction and overall experience with the surgical technique are essential considerations. A less painful and quicker recovery process often translates to higher patient and caregiver satisfaction. Parents of pediatric patients, in particular, are likely to prefer a procedure that minimizes distress and discomfort in their children. In addition, surgeons consider factors such as ease of use, precision, and control during the procedure when choosing between coblation and conventional tonsillectomy. The learning curve associated with coblation tonsillectomy, along with the availability and cost of equipment, can also impact its widespread adoption.<sup>4</sup> Despite the potential advantages of coblation tonsillectomy, debates continue regarding its long-term outcomes and safety profile compared to conventional methods. While some studies suggest that coblation offers significant benefits in terms of reduced postoperative pain and faster recovery, others indicate that the differences may not be clinically significant or that the technique may be associated with a higher risk of delayed bleeding. The variation in study findings highlights the need for further well-designed clinical trials to establish definitive conclusions regarding the efficacy and safety of coblation versus conventional tonsillectomy. This study aims to compare the efficacy of coblation and conventional tonsillectomy by evaluating key

intraoperative and postoperative outcomes, including operative time, blood loss, pain levels, recovery duration, and complications such as secondary hemorrhage. By analyzing these factors, this research seeks to provide valuable insights into the advantages and limitations of each technique, ultimately guiding clinical decision-making in selecting the most appropriate surgical approach for patients undergoing tonsillectomy. The findings of this study may contribute to refining surgical guidelines, improving patient care, and optimizing postoperative management strategies for individuals undergoing tonsillectomy.<sup>5</sup> The ongoing debate over the superiority of coblation versus conventional tonsillectomy underscores the importance of evaluating both techniques based on objective clinical outcomes. While coblation tonsillectomy offers potential advantages in reducing postoperative pain and facilitating faster recovery, concerns regarding its risk of delayed hemorrhage remain. Conversely, conventional tonsillectomy, though associated with higher intraoperative blood loss and postoperative discomfort, remains a well-established and reliable procedure. By systematically comparing these techniques, this study aims to provide evidence-based recommendations that can enhance surgical decision-making and improve patient outcomes.

## MATERIALS AND METHODS

This study was designed as a prospective, randomized, comparative clinical trial conducted at a tertiary care hospital to evaluate the efficacy of coblation versus conventional tonsillectomy in terms of postoperative outcomes. A total of 100 patients, aged 5 to 40 years, diagnosed with chronic or recurrent tonsillitis and indicated for tonsillectomy were enrolled in the study. The inclusion criteria included patients with recurrent episodes of tonsillitis as per Paradise criteria, obstructive sleep-disordered breathing due to tonsillar hypertrophy, or a history of peritonsillar abscess requiring surgical intervention. Patients with bleeding disorders, suspected malignancy, acute tonsillitis at the time of surgery, or a previous history of tonsillectomy were excluded from the study.

Patients were randomly assigned into two groups of 50 each using a computer-generated randomization sequence. Group A underwent coblation tonsillectomy using a plasma-based surgical device, while Group B underwent conventional cold dissection tonsillectomy using steel instruments. All surgeries were performed under general anesthesia by experienced otolaryngologists. Intraoperative parameters, such as operative time and intraoperative blood loss, were recorded. Postoperative pain was assessed using the Visual Analog Scale (VAS) on days 1, 3, 7, and 14. Other postoperative outcomes, including return to normal diet, incidence of secondary hemorrhage, and overall patient satisfaction, were documented.

Patients were followed up for two weeks postoperatively, with regular assessments for pain levels, healing status, and complications. Statistical analysis was performed using the chi-square test for categorical variables and an independent t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant. Ethical clearance was obtained from the Institutional Review Board, and informed consent was obtained from all participants or their guardians before enrollment.

## RESULTS

### Baseline Characteristics (Table 1)

The baseline characteristics of the study population indicate that both groups were well-matched in terms of demographic and clinical features, ensuring that differences in outcomes could be attributed to the surgical technique rather than pre-existing conditions. The mean age of patients in the coblation group was  $18.2 \pm 7.6$  years, while in the conventional group, it was  $18.5 \pm 7.8$  years ( $p=0.78$ ), indicating no significant age difference. The male-to-female ratio was similar, with 56.00% males in the coblation group and 52.00% in the conventional group ( $p=0.72$ ). The proportion of patients with recurrent tonsillitis was 80.00% in the coblation group and 84.00% in the conventional group ( $p=0.67$ ), while obstructive symptoms were present in 20.00% and 16.00%, respectively ( $p=0.59$ ). All p-values were  $>0.05$ , indicating that there were no statistically significant differences between the groups in baseline characteristics, confirming that the two groups were comparable.

### Intraoperative Parameters (Table 2)

The comparison of intraoperative parameters showed significant differences between the two surgical techniques. The mean operative time was significantly shorter in the coblation group ( $18.4 \pm 3.2$  minutes) compared to the conventional group ( $32.1 \pm 5.4$  minutes) ( $p<0.01$ ). This demonstrates that coblation tonsillectomy is a faster procedure, likely due to its controlled tissue dissection and minimal thermal damage, which reduces intraoperative handling time. Similarly, mean intraoperative blood loss was significantly lower in the coblation group ( $12.6 \pm 2.8$  mL) than in the conventional group ( $25.3 \pm 4.2$  mL) ( $p<0.01$ ). The reduced blood loss in coblation tonsillectomy is attributed to the plasma-mediated dissection technique, which minimizes trauma to surrounding tissues and seals small blood vessels more effectively than cold dissection methods. These findings suggest that coblation tonsillectomy is a more efficient and less traumatic surgical technique compared to conventional cold dissection.

### Postoperative Pain (Table 3)

Pain was assessed using the Visual Analog Scale (VAS) at different postoperative time points, and the results show that patients in the coblation group

experienced significantly lower pain scores across all time points compared to those in the conventional tonsillectomy group.

On Day 1, the VAS score in the coblation group was  $5.2 \pm 1.3$ , compared to  $6.7 \pm 1.5$  in the conventional group ( $p<0.01$ ). This trend continued on Day 3 ( $3.9 \pm 1.1$  vs.  $5.2 \pm 1.3$ ,  $p<0.01$ ), Day 7 ( $2.1 \pm 0.9$  vs.  $3.8 \pm 1.2$ ,  $p<0.01$ ), and Day 14 ( $0.8 \pm 0.6$  vs.  $1.5 \pm 0.8$ ,  $p=0.02$ ). The consistently lower pain levels in the coblation group are likely due to reduced thermal damage, less inflammation, and better preservation of surrounding tissue compared to the mechanical trauma associated with conventional tonsillectomy. These results indicate that coblation tonsillectomy is associated with significantly less postoperative pain, leading to improved patient comfort and a smoother recovery process.

### Postoperative Recovery and Complications (Table 4)

The postoperative recovery outcomes demonstrated faster healing and higher patient satisfaction in the coblation group. The mean time to return to a normal diet was significantly shorter in the coblation group ( $4.5 \pm 1.2$  days) compared to the conventional group ( $7.8 \pm 1.5$  days) ( $p<0.01$ ), indicating that coblation tonsillectomy allows for a quicker resumption of normal oral intake.

The incidence of secondary hemorrhage, one of the major complications of tonsillectomy, was slightly higher in the conventional group (12.00%) compared to the coblation group (4.00%), but the difference was not statistically significant ( $p=0.15$ ). Although the risk of postoperative bleeding exists in both techniques, the lower incidence in the coblation group could be attributed to its superior hemostatic properties during tissue removal.

Patient satisfaction was significantly higher in the coblation group (90.00%) compared to the conventional group (70.00%) ( $p=0.04$ ). The reduced pain, faster recovery, and minimal complications likely contributed to the higher satisfaction rate in the coblation tonsillectomy group.

### Overall Outcome Comparison (Table 5)

A comparison of overall postoperative outcomes highlights the superior advantages of coblation tonsillectomy over the conventional technique. Faster recovery was observed in 90.00% of patients in the coblation group, allowing them to return to normal activities sooner, compared to 70.00% in the conventional group ( $p=0.03$ ). Postoperative pain levels were significantly lower in the coblation group, with 86.00% of patients reporting reduced pain, while only 60.00% of patients in the conventional group experienced similar relief ( $p<0.01$ ). The coblation group also demonstrated significantly lower blood loss, with 92.00% of patients experiencing minimal bleeding, compared to 76.00% in the conventional group ( $p=0.02$ ), reinforcing the intraoperative findings

of reduced bleeding. Additionally, shorter surgery times were observed in 88.00% of the coblation group, compared to 66.00% in the conventional group ( $p < 0.01$ ), confirming that coblation tonsillectomy is a more efficient and less invasive procedure. These findings collectively suggest that coblation

tonsillectomy is a superior alternative, offering reduced operative time, lower blood loss, faster recovery, and improved postoperative comfort, making it a more favorable option for both patients and surgeons.

**Table 1: Baseline Characteristics of Study Population**

Characteristic	Coblation Group (n=50)	Conventional Group (n=50)	p-value
Age (Mean $\pm$ SD)	18.2 $\pm$ 7.6	18.5 $\pm$ 7.8	0.78
Male (%)	28 (56.00%)	26 (52.00%)	0.72
Female (%)	22 (44.00%)	24 (48.00%)	0.81
Recurrent Tonsillitis (%)	40 (80.00%)	42 (84.00%)	0.67
Obstructive Symptoms (%)	10 (20.00%)	8 (16.00%)	0.59

**Table 2: Intraoperative Parameters**

Parameter	Coblation Group (n=50)	Conventional Group (n=50)	p-value
Mean Operative Time (minutes)	18.4 $\pm$ 3.2	32.1 $\pm$ 5.4	<0.01
Mean Blood Loss (mL)	12.6 $\pm$ 2.8	25.3 $\pm$ 4.2	<0.01

**Table 3: Postoperative Pain (VAS Score)**

Time Point	Coblation Group (Mean $\pm$ SD)	Conventional Group (Mean $\pm$ SD)	p-value
Day 1	5.2 $\pm$ 1.3	6.7 $\pm$ 1.5	<0.01
Day 3	3.9 $\pm$ 1.1	5.2 $\pm$ 1.3	<0.01
Day 7	2.1 $\pm$ 0.9	3.8 $\pm$ 1.2	<0.01
Day 14	0.8 $\pm$ 0.6	1.5 $\pm$ 0.8	0.02

**Table 4: Postoperative Recovery and Complications**

Outcome	Coblation Group (n=50)	Conventional Group (n=50)	p-value
Return to Normal Diet (days)	4.5 $\pm$ 1.2	7.8 $\pm$ 1.5	<0.01
Secondary Hemorrhage (%)	2 (4.00%)	6 (12.00%)	0.15
Patient Satisfaction (%)	45 (90.00%)	35 (70.00%)	0.04

**Table 5: Overall Outcome Comparison**

Outcome	Coblation Group (%)	Conventional Group (%)	p-value
Faster Recovery (%)	90.00%	70.00%	0.03
Less Postoperative Pain (%)	86.00%	60.00%	<0.01
Lower Blood Loss (%)	92.00%	76.00%	0.02
Shorter Surgery Time (%)	88.00%	66.00%	<0.01

## DISCUSSION

The baseline characteristics of our study population indicate that both the coblation and conventional tonsillectomy groups were well-matched in terms of age, gender distribution, and clinical indications, ensuring comparability between the two groups. These findings align with the study by Oko et al. (2005), who emphasized that ensuring baseline similarity is crucial in comparative surgical studies to accurately assess postoperative outcomes.<sup>6</sup> Intraoperative parameters revealed that the mean operative time was significantly shorter in the coblation group (18.4  $\pm$  3.2 minutes) compared to the conventional group (32.1  $\pm$  5.4 minutes) ( $p < 0.01$ ). This finding aligns with the study by Omrani et al. (2012), which reported that coblation tonsillectomy significantly reduces surgical time compared to traditional dissection techniques due to its plasma-mediated dissection, which minimizes tissue trauma

and facilitates faster removal of the tonsils.<sup>7</sup> Regarding intraoperative blood loss, our study found that the coblation group experienced significantly less blood loss (12.6  $\pm$  2.8 mL) compared to the conventional group (25.3  $\pm$  4.2 mL) ( $p < 0.01$ ). This is consistent with the findings of Temple and Timms (2001), who demonstrated that coblation tonsillectomy reduces intraoperative bleeding due to its ability to simultaneously cut and coagulate tissues, leading to better hemostasis and minimal disruption of surrounding structures.<sup>8</sup> Postoperative pain assessment using the Visual Analog Scale (VAS) demonstrated that patients in the coblation group experienced significantly lower pain scores at all evaluated time points. On Day 1, the coblation group reported a VAS score of 5.2  $\pm$  1.3, while the conventional group reported 6.7  $\pm$  1.5 ( $p < 0.01$ ). This trend continued through Day 14, indicating sustained pain reduction. These results are in line with the study by Sasindran et

al. (2015), who found that coblation tonsillectomy significantly reduces immediate and late postoperative pain compared to dissection tonsillectomy due to its minimal thermal injury to surrounding tissues.<sup>9</sup> In terms of postoperative recovery, our study observed that the coblation group returned to a normal diet more quickly ( $4.5 \pm 1.2$  days) than the conventional group ( $7.8 \pm 1.5$  days) ( $p < 0.01$ ). This finding is supported by the study conducted by Belloso et al. (2003), which reported that patients undergoing coblation tonsillectomy resumed normal eating and daily activities earlier than those who underwent cold dissection tonsillectomy. This faster recovery is likely due to reduced postoperative pain and inflammation in the coblation group.<sup>10</sup> The incidence of secondary hemorrhage in our study was higher in the conventional group (12.00%) compared to the coblation group (4.00%), though this difference was not statistically significant ( $p = 0.15$ ). This finding is consistent with Parsons et al. (2006), who reported a similar trend of reduced secondary hemorrhage in coblation tonsillectomy, attributing it to better coagulation and reduced intraoperative bleeding. However, some studies, such as that by Mitchell et al. (2004), have suggested that coblation tonsillectomy may be associated with a slightly increased risk of delayed postoperative hemorrhage due to potential thermal injury to the tissue layers.<sup>11,12</sup> Patient satisfaction was significantly higher in the coblation group (90.00%) compared to the conventional group (70.00%) ( $p = 0.04$ ). The higher satisfaction rates in the coblation group are likely attributed to lower postoperative pain, faster recovery, and fewer complications. Similar findings were reported by Stromland et al. (2008), who found that patients who underwent coblation tonsillectomy had significantly higher satisfaction scores due to improved postoperative comfort and reduced medication requirements for pain management.<sup>13</sup> Overall, our findings suggest that coblation tonsillectomy offers several advantages over the conventional dissection method, including reduced operative time, less intraoperative blood loss, decreased postoperative pain, and faster return to normal activities. These benefits contribute to higher patient satisfaction and a better overall surgical experience. Similar conclusions were drawn by Shah et al. (2002), who emphasized that coblation tonsillectomy represents an advancement in tonsillectomy techniques, providing superior postoperative outcomes compared to the traditional method.<sup>14</sup>

## CONCLUSION

This study demonstrates that coblation tonsillectomy is a more effective and patient-friendly alternative to conventional tonsillectomy, offering significantly lower intraoperative blood loss ( $12.6 \pm 2.8$  mL vs.  $25.3 \pm 4.2$  mL,  $p < 0.01$ ), shorter operative time ( $18.4 \pm 3.2$  minutes vs.  $32.1 \pm 5.4$  minutes,  $p < 0.01$ ), and reduced postoperative pain across all time points

( $p < 0.01$ ). Patients undergoing coblation tonsillectomy experienced a faster return to normal diet ( $4.5 \pm 1.2$  days vs.  $7.8 \pm 1.5$  days,  $p < 0.01$ ) and higher satisfaction rates (90.00% vs. 70.00%,  $p = 0.04$ ). Although the incidence of secondary hemorrhage was lower in the coblation group (4.00% vs. 12.00%,  $p = 0.15$ ), it was not statistically significant. These findings suggest that coblation tonsillectomy is a superior technique, improving postoperative recovery and patient comfort, making it a preferred surgical option for tonsillectomy.

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