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ORIGINAL RESEARCH

A Comparative study of Coblation vs Conventional Tonsillectomy

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ABSTRACT

Introduction: Tonsils being affected by infectious diseases are common in otorhinolaryngological practice, whether in adults or children. Palatine tonsils are situated in the oropharynx, between the anterior and posterior pillars. Coblation tonsillectomy was introduced in 2001, and many studies show its efficacy regarding less complications. **Methodology:** This was a hospital-based prospective study on patients undergoing tonsillectomy in Shri B. M. Patil Medical College Hospital and Research Centre, Vijayapura, Karnataka, India. A total of 110 patients were selected and divided into two groups of 55 each. One group underwent coblation, and the other group underwent conventional tonsillectomy. The data were collected through clinical examination, time taken for surgery, intraoperative and postoperative blood loss, postoperative pain, and the time required to return to normal diet and activity. Patients were followed up after the procedure for five days with antibiotics and for 10 days to observe for hemorrhage/pain. **Results:** This study compared 55 coblation tonsillectomies and 55 conventional tonsillectomies. The conventional cold steel dissection and snare method took a mean time of 53.51 minutes, and coblation tonsillectomy took a mean time of 29.64 minutes. There was a significant difference between the mean times taken between the two groups, with a p-value of <0.05. The mean blood loss during coblation was 51.45 mL, while for dissection and snare, it was 88.89 mL. This difference was significant, with a p-value of <0.05. The postoperative pain score was higher for traditional tonsillectomy than for coblation tonsillectomy. The mean time required to return to regular diet and activity for the coblation method was 4.29 days, while for conventional tonsillectomy, it was 8.05 days. There was a significant difference in the mean time, with a p-value of <0.05. **Conclusion:** Coblation tonsillectomy is more advanced and better than the traditional dissection and snare method. It gives a bloodless field with less tissue damage than the conventional dissection and snare method. The operative time can be reduced, as surgery is performed by dissolution. Healing will be faster as there will be minimal tissue destruction, leading to more rapid patient recovery.

INTRODUCTION

Tonsils play a major part in the immunological protective mechanism of the body. Secretory IgA (antibody secretions) will help in the mucosal defense mechanism. This mechanism can fail and cause infection leading to throat pain, pyrexia, and other complications due to unknown etiology that require removal of the diseased tonsils [1]. Otorhinolaryngologists are keen to know about the complications such as intraoperative and postoperative bleeding caused by tonsillectomy, regardless of being the most standard and simplest surgery, as it can lead to shock and death. Patients after surgery may also experience difficulty in swallowing, throat pain, earache, nausea, vomiting, fever, dehydration, weight loss, and airway obstruction [1]. The risk of hemorrhage is very high in tonsillectomy because of the rich blood supply [2]. There is significant morbidity following tonsillectomy. It includes perioperative and postoperative hemorrhage and pain. The recovery is delayed, resulting in dehydration and prolonged hospital stay due to postoperative pain and difficulty in swallowing [2]. The procedure leaves the wound open to heal by secondary intention [3]. There are various methods in literature for tonsillectomy, such as cold steel dissection and snare, cryosurgery, guillotine, monopolar and bipolar diathermy dissection, and laser surgery [1]. Coblation tonsillectomy was initially introduced in 2001 [4], following which articles were published to confirm its efficacy. Coblation generates a low thermal effect of 40-70°C [1], with a probability of reduced collateral thermal damage to nearby tissues. Target tissue

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undergoes dissolution in coblation. Coblation involves passing a bipolar radiofrequency current through isotonic saline to convert it into an ionized plasma layer [1]. This disrupts the molecular bonds within the tissues, resulting in a vaporization effect. Coblation tonsillectomy is performed with assisted procedures such as the Evac70 ArthroWand (ArthroCare, Sunnyvale, CA) handpiece [1]. The thermal effect of conventional dissection and snare tonsillectomy using electrocautery reaches up to 400-600°C [5,6]. This causes more damage to tissues.

STUDY DESIGN AND PARTICIPANTS

It is a hospital-based prospective observational study conducted on patients undergoing tonsillectomy. The period of study was from September 2022 to March 2024. The Ethical Clearance Committee of Shri B. M. Patil Medical College Hospital and Research Centre, BLDE (Deemed to be university), Vijayapura, Karnataka, India, issued approval (IRB Number: BLDE(DU)/IEC/709/2022-2023 dated 30/08/2022).

INCLUSION CRITERIA

The study included patients with recurrent attacks of acute tonsillitis or chronic tonsillitis visiting the hospital.

EXCLUSION CRITERIA

Patients with bleeding and clotting disorders, adenoid hypertrophy, active peritonsillar abscess, or respiratory tract infection, those pregnant and lactating, those with uncontrolled chronic systemic illness, and those with serous otitis media were excluded.

DATA COLLECTION METHOD

A total of 110 patients were included and divided into two groups of 55 each. The coblation method was used in one group, and the dissection and snare method was used in the other group. After obtaining the history, a detailed examination of the ear, nose, and throat was performed. Informed consent was obtained, and fitness for surgery under general anesthesia was assessed. The same surgeon performed the tonsillectomy procedure either by the cold steel dissection and snare method or the coblation method using an Evac 70 coblation wand at a setting of 6 or 7. A single dose of intravenous antibiotic was given prior to surgery. The time taken for surgery was measured from the time of insertion of Boyle-Davis mouth gag to final hemostasis and removal of gag. Intraoperative blood loss was measured using the calorimetric swab weighing technique [7]. Patients were advised to take fluids and a soft diet after 4 hours. Intravenous analgesics were given according to age and weight. The patients were monitored for postoperative hemorrhage by observing for trickling of blood or active bleeding. The patients were also monitored for 24 hours for postoperative bleeding. Postoperative pain was assessed using the Wong-Baker Faces Pain Rating Scale [8]. The time required to return to normal diet and activity was measured using the Chang and Myatt questionnaires [9].

STATISTICAL ANALYSIS

The descriptive summary was done for all variables. Data were analyzed using the chi-square test or Fisher's exact test for age, sex, postoperative blood loss. The t-test and the Mann-Whitney U test were used for operative time, intraoperative blood loss, postoperative pain score, and to measure time required to return to normal diet and activity. The results were considered statistically significant if the p-value was less than 0.05. The formula used to calculate sample size was as per the study conducted by Sasindran et al. [1]

RESULTS

Out of the 110 patients, the total number of female patients in both coblation and dissection and snare tonsillectomy was 66 (60%) and that of male patients was 44 (40%). Both the coblation and dissection and snare methods had equal numbers of patients: 33 females (60%) and 22 males (40%). There were more females in our study, with an equal number of both sexes in each group (Table 1).

Table 1: Distribution of patients according to gender

Gender (male or female)	No. of patients in the coblation method (N%)	No. of patients in the cold steel dissection and snare method (N%)	Total (N=110)	p-Value
Female	33 (60.0)	33 (60.0)	66 (60.0)	1.000
Male	22 (40.0)	22 (40.0)	44 (40.0)	
Total	55 (100.0)	55 (100.0)	110 (100.0)	

The intraoperative time taken for coblation and dissection and snare tonsillectomy was compared. The mean operative duration in the coblation group was shorter than that in the dissection and snare group, with a statistically significant p-value (<0.05) (Table 3).

Table 3: Distribution depending on intraoperative time taken.

Mode of surgery	N	Mean operative time (in minutes)	SD	p-Value
Coblation method	110	29.64	7.352	0.0001

Conventional method (cold steel dissection and snare)	110	53.51	13.434	

The blood loss in dissection and snare tonsillectomy was more than that in the coblation method, with a statistically significant p-value (<0.05) (Table 4).

Table 4: Incidence of intraoperative blood loss

Mode of surgery	N	Mean blood loss during surgery (in mL)	SD	p-Value
Coblation method	110	51.45	12.521	0.0001
Conventional method (cold steel dissection and snare)	110	88.89	16.992	

The postoperative pain score was measured on postoperative day (POD) 1, POD 5, and POD 10. Postoperative pain was assessed using the Wong-Baker Faces Pain Rating Scale [8]. On POD 1, the coblation tonsillectomy had a mean pain score of 6.80, and dissection and snare tonsillectomy had a pain score of 8.25. On POD 5, the mean pain score for coblation tonsillectomy was 5.20 and that for the dissection and snare tonsillectomy was 5.89. On POD 10, the mean pain score for coblation tonsillectomy was 1.02 and that for the dissection and snare tonsillectomy was 3.31. There was a significant difference between the mean time p-value (<0.05). The postoperative pain score was more for dissection and snare tonsillectomy (Table 5).

Table 5: Postoperative day pain score

POD pain score	N	Coblation method		Conventional method		p-Value
		Mean pain score	SD	Mean pain score	SD	
POD 1	110	6.80	1.253	8.25	1.158	0.0001
POD 5	110	5.20	1.193	5.89	1.462	0.0001
POD 10	110	1.02	1.269	3.31	1.597	0.0001

The mean time required to return to regular diet and activity for coblation method was 4.29 days and that for dissection and snare tonsillectomy was 8.05 days. There was a significant difference between the mean time p-value (<0.05) (Table 6).

Table 6: Time taken to return to normal diet and activity (days)

Mode of surgery	N	Mean time taken to return to normal diet and activity (days)	SD	p-Value
Coblation method	110	4.29	1.165	0.0001
Conventional method (cold steel dissection and snare)	110	8.05	1.682	

There was no incidence of postoperative hemorrhage in both the coblation and cold steel tonsillectomy groups.

DISCUSSION

Out of the 110 patients who underwent tonsillectomy, the maximum number of patients were in the age group of 10-19 years and the least were in the age group of above 40 years. Coblation and dissection and snare had equal numbers of female and male patients. There was no demographic significance (Table 7).

_	Coblation method	Cold steel dissection and snare method	_
Mean intraoperative time (mins)			Significance
Our study	29.64±7.352	53.51±13.434	<0.05
Taher M et al. (2019) [10]	10.63±2.45	30.66±8.66	<0.001
Jat SL et al. (2022) [11]	18.24±5.37	30.04±7.08	<0.001
Mean intraoperative blood loss (ml)			Significance
Our study	51.45±12.521	88.89±16.992	<0.05
Muthubabu K et al. (2019) [2]	21	49	<0.001
Jat SL et al. (2022) [11]	82.79±21.13	150.4±37.91	<0.001

The incidence of postoperative hemorrhage was insignificant in both coblation and dissection and snare methods. There was minimal oozing of blood that was controlled by cold water gargles. Muthubabu et al. and Rakesh et al. showed that there was no incidence of postoperative haemorrhage [2,12]. Table 8 shows comparison of postoperative day pain scores.

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Table 8: Comparison of postoperative pain score with other studies

_	Coblation method	Cold steel dissection and snare method	_
Mean postoperative pain score			Significance
Our study			
POD 1	6.80±12	8.25±1.1	<0.05
POD 5	5.20±1.193	5.89±1.462	<0.05
POD 10	1.02±1.269	3.31±1.597	<0.05
Nallasivam M et al. (2017) [13]			
POD 1	4	8	<0.001
POD 2	4	6	<0.001
POD 7	3	4	<0.001

The mean time required to return to regular diet and activity in our study was 4.29 days for the coblation method and 8.05 days for the dissection and snare method. The p-value (<0.05) was statistically significant. Taher M et al. showed that the mean time required to return to a normal diet and general activity was shorter for the coblation group than for the conventional group [10]. The coblation method took a mean time of five days to return to a normal diet, and the conventional method took 10 days. The general conditions were restored by a mean time of 10 days for the coblation method and by 14 days for the conventional method. The study showed significant results [10].

LIMITATIONS

The study was done on a small group due to which the incidence of postoperative hemorrhage could not be assessed. This group lacked statistical power. The use of postoperative analgesics made it difficult to calculate the pain score. The dissection and snare method, despite being outdated, is done by most surgeons even though there are chances of more bleeding and injury to tonsillar pillars, uvula, and soft palate. The study was randomized. Coblation tonsillectomy was more expensive, as it required the use of disposable wands.

CONCLUSIONS

Coblation tonsillectomy is better than the dissection and snare method. It gives a bloodless field with less tissue damage than the conventional dissection and snare method. The operative time can be reduced, as surgery is done by dissolution. There is minimal tissue destruction, leading to more rapid patient recovery. This method decreased intraoperative blood loss and postoperative pain. A learning curve was needed, shorter than the dissection and snare method. The disadvantage is that the wand used for coblation is costly and can be used only once for optimal plasma generation required for tissue dissolution.

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