The Egyptian Journal of Hospital Medicine (January 2023) Vol. 90(2), Page 2014-2019

Comparative Study between Traditional Tonsillectomy and Tonsillectomy by Coblation

Sabry Habashy Easa, Talaat Mahrous Farghaly, Ahmed Adel Elsherbeiny Abdelmawla
Department of Otorhinolaryngology, Faculty of Medicine, Al-Azhar University, Assiut, Egypt
***Corresponding author:** Ahmed Adel Elsherbeiny, **Mobile:** (+20)1061576737, **E-Mail:** dr_alkashlan@yahoo.com

ABSTRACT

Background: One of the most frequent surgical operations carried out globally is a tonsillectomy. Tonsillectomy is performed using a variety of methods that have been developed throughout time. In an effort to improve the procedure's safety and reduce postoperative morbidity and complications, many procedures have developed over time.

Objective: The aim of the current study was to compare traditional tonsillectomy vs coblation tonsillectomy in terms of operation time, intraoperative blood loss, postoperative pain, and postoperative healing.

Patients and methods: This prospective study included a total of 100 cases of chronic tonsillitis undergoing tonsillectomy (50 cases by traditional tonsillectomy and 50 cases by coblation tonsillectomy), attending at Outpatient Clinic, Department of ENT, Al-Azhar University Hospital, Assiut. This study was conducted between January 2021 to June 2022.

Results: Considering operative time, there was statistically significant increase in the mean duration of operation (minutes) among the traditional tonsillectomy (26.86±6.59) in comparison with the coblation tonsillectomy group (14.16±2.96). This difference may be due to the immediate coagulation, and/or the immediate stopping of bleeding. Considering intraoperative blood loss there was statistically significant decrease in intraoperative hemorrhage among the coblation tonsillectomy group average (13 ml) in comparison with the traditional tonsillectomy group average (60ml). There was one case with reactionary hemorrhage in traditional group and none in coblation group. Regarding the self-satisfaction evaluation among the studied groups, the present study revealed a statistically non-significant difference in self-satisfaction among patients of the coblation tonsillectomy group.

Conclusion: It could be concluded that coblation tonsillectomy is a safe technique. The traditional method still has its advantages being less costly and having less incidence of secondary hemorrhage and availability and tools are present almost in all hospitals primarily in the Egyptian Ministry of Health hospitals.

Keywords: Traditional tonsillectomy, Tonsillectomy by coblation, Postoperative pain, Blood loss.

INTRODUCTION

One of the most often carried out operations on children across the world is a tonsillectomy [(1)]. While different procedures have developed throughout time, neither the criteria for tonsillectomy nor the post-procedure consequences have significantly altered [(2)].

Following the development of the "tonsillotome" by Physick in the nineteenth century, the procedure gains popularity [(3)].

The ideal tonsillectomy is quick, bloodless, and results in a quick, straightforward recovery [(4)]. A variety of methods have been employed, but the two most popular methods are cold dissection and electro dissection [(5)]. However, none has been demonstrated to be superior to the others [(6)].

Modern procedures have revolutionized tonsillectomy surgery, including the use of harmonic scalpels, coblation, bipolar scissor dissection, radio frequency excision with probes, microdebrider endoscopic tonsillectomy, laser tonsillectomy, and bipolar radio frequency ablation techniques [(7)].

In an effort to improve the procedure's safety and reduce postoperative morbidity and complications, many procedures have developed over time [(8)].

Hemorrhage is still a serious complication during and after tonsillectomy, and roughly 5% of individuals may experience this issue at any time from the first 24 hours to 2 or 3 weeks following surgery [(9)].

The two most popular methods for limiting bleeding during and after tonsillectomy are electrocautery and suture ligation, with varying degrees of success. Coblation reduces the amount of time needed to stop the bleeding even though technique involves using one hand to do both plasma coagulation and suction simultaneously [(10, 11)].

The aim of the current study was to compare traditional tonsillectomy versus coblation tonsillectomy in terms of operation time, Intraoperative blood loss, postoperative pain, postoperative healing, postoperative hemorrhage (primary and secondary), self-satisfaction, postoperative mouth odor and dysphonia and the cost for both patient and hospital.

PATIENTS and METHODS

This prospective study included a total of 100 cases of chronic tonsillitis undergoing tonsillectomy, attending at Outpatient Clinic, Department of ENT, Al-Azhar University Hospital, Assiut. This study was conducted between January 2021 to June 2022.

The age of the patients ranged from 5 to 18 years and their gender was male and female with slight female predominance.

The included subjects were divided into two groups according to the used technique.

Received: 09/09/2022
Accepted: 12/11/2022

Group 1 (cold) included 50 patients subjected to conventional tonsillectomy through dissection by cold instruments. **Group 2 (coblation) included** 50 patients subjected to coblation tonsillectomy.

In order to compare the two groups, data on each case's operative time, intraoperative blood loss (as determined by the amount of blood in the suction bottle after the procedure), recovery time (how long it took to resume normal activity and diet), and incidence of postoperative hemorrhage—whether reactionary or secondary—were collected for each case.
The same standardized anesthetic procedure was used for all tonsillectomies, which were carried out under general anesthesia.

All patients attended outpatient clinic by repeated attacks of tonsillitis and / or tonsillar hypertrophy with other variable symptoms.
There were some cases with associated morbidity e.g. adenoid hypertrophy and snoring.

Inclusion criteria:

1. Recurrent tonsillitis.
2. Peritonsillar abscess after 2 to 6 of medical treatment.
3. Hypertrophy of tonsil causing (sleep apnea and difficulty in deglutition and speech disorders)
4. Excision biopsy in unilateral tonsillar hypertrophy and suspicion of malignancy.
5. Chronic tonsillitis that doesn't respond to medication and has a poor taste and halitosis.
6. Age between 5 to 18 years old.
7. Sex both males and females.

Exclusion criteria:

1. Hemoglobin level less than 10 g/dl.
2. Presence of acute upper respiratory tract infection.
3. Children under 5 years.
4. Overt either membranous or boney or submucous cleft palate.
5. Presence of bleeding disorder.
6. Presence of uncontrolled systemic disease.
7. During the period of menses.
8. Patients with chronic Sinusitis and nasal allergy.

Every patient was subjected to the following:

1- Complete history taking.

2- General Examination.

3- Systemic examination: Respiratory system, Cardio vascular system, Gastro intestinal system, Central nervous system, and Genitourinary system.

4- Otorhinological Examination: Nose and para nasal sinuses, ear, and throat.

Investigations:

1. CBC to detect anemia, thrombocytopenia, or suspected leukemia.
2. Coagulation profile: PT, INR, and PTT
3. Blood grouping & Rh compatibility.
4. Erythrocyte sedimentation rate (ESR).
5. Fasting plasma sugar.
6. Urine analysis for albumin & sugar.
7. Liver and renal function tests if there was history suggestive hepatic or renal troubles.

Operative technique:

Under general anesthesia, endotracheal intubation was used during the surgical operation, and the Boyle Davis mouth gag was used as usual.

Hemostasis was accomplished with 1& 0 silk sutures in the tonsillar tissue dissection group by cutting with scissors from the superior to the inferior pole of the anterior tonsillar plica.

Following medialization of the tonsillar tissue, coblation tonsillectomy procedures were carried out in line with method from the upper to the lower pole and from the lateral to the medial. Coblation coagulation at 7 watts was used to stop tonsillar bleeding, and the lower pole was ablated without tying it.

***Ethical Consideration*:**

This study was ethically approved by Al-Azhar University Academic and Ethical Committee. Written informed consent of all the participants or the participants' parents was obtained. The study protocol conformed to the Helsinki Declaration, the ethical norm of the World Medical Association for human testing.

Statistical analysis: The Statistical Package for Social Science, IBM SPSS version 20, was used to enter, evaluate, and code the data. Numbers and percentages were used to represent quantitative data with a parametric distribution, whereas the median and interquartile range were used to represent quantitative data with a non-parametric distribution (IQR). The Fisher exact test was used in place of the Chi-square test when comparing two groups utilizing qualitative data and when any cell's expected count was less than 5. An independent t-test was used to compare two groups with quantitative data and a parametric distribution, and a Mann-Whitney test was used to compare two groups with quantitative data and a non-parametric distribution. The confidence interval was set at 95%, while the allowed margin of error was set at 5%. P value of 0.05 or less was considered significant.

RESULTS

There was no statistically significant deference between studied groups among gender. There was statistically significant increased age in coblation group. Also, there was statistically significant increased duration of operation in cold group (Table 1).

Table (1): Comparison between studied groups among gender, age and duration of operation (min)

		Group 1 (cold)		Group 2 (coblation)		Chi square test	
		No	%	No	%	X^2	P value
Gender	Female	27	54.0%	36	72.0%	3.475	0.062
	Male	23	46.0%	14	28.0%		
		Group 1 (cold)		Group 2 (coblation)		Independent t test	
						t	P value
Age (years)	Mean ±SD	8.18 ± 3.14		10.32 ± 3.48		3.226*	0.002
Duration of operation(min.)		26.86±6.59		14.16±2.96		-12.427	0.001

There was statistically significant decrease primary hemorrhage in coblation group. There was no statistically significant difference in secondary hemorrhage and reactionary hemorrhage among studied groups. There was statistically significant increased postoperative mouth odor (good) in coblation group. There was statistically significant decreased early postoperative pain in coblation group and there was statistically non-significant difference in late postoperative pain (Table 2).

Table (2): Comparison between studied groups among hemorrhage, postoperative mouth odor and early and late post operation pain.

		Group 1 (cold)		Group 2 (coblation)		Chi square test	
Hemorrhage		No	%	No	%	X^2	P value
Primary hemorrhage (ml)	Mean ±SD	60.82 ± 18.66		13.80 ±5.40		-17.118*	0.001
Reactionary hemorrhage (ml)	Yes (day1)	1	2.0%	0	0.0%	1.01	0.314
Secondary hemorrhage (ml)	Yes (day7)	0	0.0%	2	4.0%	2.041	0.153
Postoperative mouth odor	Bad	7	14.0%	0	0.0%	7.527	0.006
Late post operation pain						T	P value
Early (1-4 days) postoperative pain (from 10 degrees)	Mean ±SD	5.76±1.00		3.16± 0.55		-16.107	0.001
Late (4-15days) postoperative pain (from 10 degrees)	Mean ±SD	7±0.54		6.5± 0.90		2.87	0.01

There was statistically significant decrease postoperative Membrane appear and disappear (days) in coblation group. There was statistically significant decreased return to social activities (days) in coblation group (Table 3).

Table (3): Comparison between studied groups among postoperative Membrane appear and disappear (days), and return to social activities (days).

	Group 1 (cold)		Group 2 (coblation)		Independent t test	
	Mean	SD	Mean	SD	t	P value
Postoperative membrane appear (days)	2.00	0.00	1.64	0.49	-5.250	0.001
Postoperative membrane disappear (days)	8.5	0.58	6.48	0.81	-9.214	0.001
Return to social activities (days)	9	0.50	7	0.71	-16.460	0.021

There was no statistically significant difference in adenoid among studied groups. There was no statistically significant between self-satisfaction after 2 weeks (Table 4).

Table (4): Comparison between studied groups among adenoid and self-satisfaction.

		Group 1 (cold)		Group 2 (coblation)		Chi square test	
		No	%	No	%	X^2	P value
Adenoid		14	28.0%	12	24.0%	0.208	0.648
Self-satisfaction after 2 weeks	Satisfied (> 0.8 degree)	32	80%	34	85%	0.346	0.556
	Not satisfied (< 0.8 degree)	8	20%	6	15%		

There was no statistically significant difference in postoperative phonation & voice among studied groups (Table 5).

Table (5): Comparison between studied groups among postoperative Phonation & voice.

		Group 1 (cold)		Group 2 (coblation)		Chi square test	
		No.	%	No.	%	X^2	P value
Postoperative dysphonia	Dysphonia	2	4.0%	0	0.0%	2.041	0.153

DISCUSSION

The present study indicated that there were no significant differences between studied groups among gender. The present study showed that there was statistically significant increased age in coblation group. The mean age was 8.18 years in cold group and the mean age was 10.32 years in coblation group.

The present study indicated a statistically significant increase in the mean duration of operation (minutes) among the traditional tonsillectomy (26.86±6.59 min.) in comparison with the coblation tonsillectomy group (14.16±2.96 min.) (P value=0.001).

According to a study by **Sheet *et al.*** [12] on 25 patients, traditional tonsillectomy took an average of 31.2 minutes, with a standard deviation of 4.3, while coblation tonsillectomy took an average of 20.2 minutes, with a standard deviation of 4.7. It was statistically significant that these two techniques differed from one another.

Additionally, **Koirala *et al.*** [13] reported that the coblation technique group's mean surgery time was 16.77±2.7 minutes, compared to the traditional method group's mean surgery time of 37.84±3.1 minutes. This variation was statistically noteworthy.

Similarly, these results are consistent with the study by **El-Taher and Aref** [14] which showed that the mean operating time was 10.63±2.45 min in the coblation group and 30.66±8.66 min in the conventional group, meaning that the coblation group's mean operation time was much reduced.

The present study demonstrated nearly similar results as regard time needed for traditional tonsillectomy but the time recorded for coblation tonsillectomy was significantly lesser.

The quick coagulation, or immediate halting of bleeding, may be the cause of the apparent disparity in time. This facilitates the surgeon's task during the procedure and helps to expedite the healing process [14, 15].

The coblation tonsillectomy approach appears advantageous since small children who have restricted blood volume and a high risk of hypovolemic shock have less bleeding. This is in line with previous literatures that confirm our findings [14, 15].

The present study revealed a statistically significant decrease in Intraoperative hemorrhage among the coblation tonsillectomy group average (13 ml) in comparison with the traditional tonsillectomy group average (60 ml) (P value=0.001).

There was one case with reactionary hemorrhage in cold group and none in coblation group. There was Two cases with secondary hemorrhage in the coblation tonsillectomy group and none in the traditional tonsillectomy group, with no significant differences between both groups (P value=0.153).

Similar to this, **Sheet *et al.*** [12] found that the difference between the mean intraoperative blood loss among patients treated with coblation tonsillectomy and those treated by standard tonsillectomy was 23.3 ml, SD = 8.13, and that the difference was statistically significant.

Also, **El-Taher and Aref** [14] showed that whereas the incidence of secondary after tonsillectomy hemorrhage was greater in the coblation group, the incidence of intraoperative and reactionary post tonsillectomy hemorrhage was higher in the conventional group.

According to study by **Sheet *et al.*** [12], which examined 25 cases, there were no cases of reactionary bleeding within 24 hours for either type of operation (coblation tonsillectomy or cold steel dissection), but one patient experienced secondary bleeding within 10 days after the operation, whereas none occurred with traditional tonsillectomy.

The quick coagulation, or immediate stoppage of bleeding, may be the cause of the reduction in intraoperative blood loss. This adds to the operation taking less time and makes the surgeon's job simpler throughout the process.

Regarding postoperative pain, the present study indicated a statistically significant decrease in early and late post operation pain among the coblation tonsillectomy group (mean 3.16 early and 6.1 in late) in comparison with traditional tonsillectomy group (mean 5.76 early and 7.1 in late) (P value=0.001).

Similar to this, **Muthubabu *et al.*** [16] stated that although the coblation tonsillectomy approach caused substantially less pain than the standard tonsillectomy method, the pace at which the discomfort increased was the same in both procedures.

Additionally, **Sasindran *et al.*** [17] stated that the average postoperative pain score at 6 hours following surgery was 7.6 for coblation and 8.5 for standard tonsillectomy, with a significant p value of 0.002.

Additionally, according to **Sheet *et al.*** [12]**,** coblation tonsillectomy resulted in noticeably reduced discomfort on days 3 and 7 than cold dissection technique.

The present study indicated that there was a statistically significant decrease in the number of cases that have postoperative bad mouth odor and halitosis which was zero cases in coblation tonsillectomy and 7 cases in traditional tonsillectomy.

According to **El-Taher and Aref** [14]**,** the cause of this may be the dead tissue in surgical knots with cold dissection, which causes a higher incidence of inflammation and infection, especially in older cases, and which also leads to a decrease in postoperative pain with coblation. These factors together also lead to unchanged mouth odour.

El-Taher and Aref [14] found that there were 5 cases of post-tonsillectomy halitosis in traditional tonsillectomy patients and 1 case in coblation tonsillectomy cases.

The present study indicated that there was a statistically significant decrease postoperative membrane appear (mean 2 days in traditional group) and (1.6 days in coblation group) and disappear (mean 8.5 days in traditional and 6.4 days in coblation) (P value=0.001).

A statistically significant reduction post-op was shown by **Muthubabu *et al.*** [16]**,** in a manner similar to that. Membranes emerge and vanish in the group of coalescence.

The present study indicated shorter time among the coblation group to return to social activities (days)in comparison with the traditional group (6.92±0.71 vs. 9.10±0.50, respectively), however, no statistically significant difference was found (P value=0.096).

Patients who had Coblation tonsillectomy experienced quicker healing, return to regular diet, and activity levels due to reduced blood loss and less surrounding tissue damage.

Similar to this, a prior study by **Sasindran *et al.*** [17] found that conventional diets took an average of 7.0 days and coblation diets took an average of 6.4 days to return to a regular diet, with a p value of 0.078, which is not statistically significant. However, coblation took an average of 6.3 days and dissection took an average of 7.1 days to resume normal activity, with a significant p value of 0.024.

Additionally, **Rashid *et al.*** [18] showed that compared to the traditional procedure, the coblation tonsillectomy group recovered faster.

According to **Sheet *et al.*** [12]**,** using the conventional procedure, the mean time to resume a regular diet after a coblation tonsillectomy was 2.6 days, SD=0.64, as opposed to 1.4 days, SD=0.7. This difference was statistically significant.

Additionally, coblation tonsillectomy patients required 3.1 days, SD=1.2, resume usual activity, but cold steel dissection patients required 4.4 days, SD=1.8, and this difference was statistically significant.

Regarding the self-satisfaction evaluation among the studied groups, the present study revealed a statistically non-significant difference in self-satisfaction among patients of the coblation tonsillectomy group was (85%) and in comparison, with the conventional tonsillectomy group was (80 %) of the studied cases were satisfied more than 8 degrees out of ten (P value=0.029).

The self-satisfaction was depending upon the evaluation of pain regarding the patient and upon the cost and healing and return to social activities evaluated by the patient's family.

Similar findings were made by **Rashid *et al.*** [18]**,** who found that the coalescence group had higher self-satisfaction.

El-Taher and Aref [14] on the other hand stated that the coblation group was less satisfied with the procedure due to the increased expense.

According to the current study, there were two incidences of postoperative dysphonia in the cold dissection group whereas there was no postoperative dysphonia in the coblation group.

This could be because, in contrast to the coblation group, where there were no knots, ties, or tension over the soft palate and less discomfort, less postoperative dysphonia, was caused by the pain and tension of the surgical ties and knots over the tonsillar bed and the rigid mobility of the soft palate.

The classic tonsillectomy method has the benefit that all Egyptian hospitals have access to the necessary equipment, and it is simple to learn how to use it. In contrast, the coblation device is only accessible in specific locations.

Additionally, the classic tonsillectomy approach has the benefit of being less expensive for the patient and the hospital, which may improve patient satisfaction.

CONCLUSION AND RECOMMENDATION

It could be concluded that coblation tonsillectomy is a safe technique. The traditional method still has its advantages being less costly and having less incidence

of secondary hemorrhage and availability and tools are present almost in all hospitals primarily in the Egyptian Ministry of Health hospitals.

Coblation significantly reduces the operation time, the intraoperative blood loss and post operative pain and post operative healing time without increasing the postoperative morbidity.

Coblation is better in young children than in adults because of their lesser ability to bare pain and the less raw area after tonsil removal.

There is equal post operative self-satisfaction regarding to less pain in coblation and less cost in traditional tonsillectomy.

Therefore, coblation is recommended as a method for performing tonsillectomy in all patients, particularly in the pediatric age group and patients with other diseases unsuitable for long time anesthesia.

Supporting and sponsoring financially: Nil.
Competing interests: Nil.

REFERENCES

1. **Bicknell P (1994):** Role of adeno-tonsillectomy in the management of paediatrics Ear Nose and Throat infection. Paediac Infect Dis J., 13:575-78.
2. **Younis R, Lazar R (2002):** History and Current Practice of Tonsillectomy. Laryngoscope, 112: 3-5
3. **Brown P, Fowler S, Ryan R *et al.* (1998):** ENT day surgery in England and Wales: an audit by Royal College of Surgeons of England. J Laryngolotol., 112: 161-65.
4. **Gurgian R, Bhusal C, Adhikari P *et al.* (2010):** Intraoperative blood loss and operative time tonsillectomy. Electrodessication better? Nepalese J of ENT Head and Neck Surgery, 1 (1):6-7.
5. **Bukhari M, Al-Ammar A (2007):** Monopolar electro dissection versus cold dissection tonsillectomy among children. Saudi Med J., 28(10):1525–8.
6. **Burton M, Doree C (2007):** Coblation versus other surgical techniques for tonsillectomy. Cochrane Database Syst Rev., 3:CD004619. doi: 10.1002/14651858.CD004619.pub2.
7. **Homer J, Williams B, Semple P *et al.* (2000):** Tonsillectomy by guillotine is less painful than by dissection. Int J Pediatr Otorhinolaryngol., 52(1):25-9.
8. **Gendy S, O'Leary M, Colreavy M *et al.* (2005):** Tonsillectomy--cold dissection vs. hot dissection: a prospective study. Ir Med J., 98(10):243–4.
9. **Robert C, Yayarama Chandran S, Raine C (1992):** A postoperative study of factors, which may predispose to post operativetonsiller fossa haemorrhage. Clin Otolaryngol., 17: 13-7.
10. **Szeremeta W, Novelly N, Benninger M (1996):** Postoperative bleeding in tonsillectomy patients. Ear Nose Throat J., 75:373–376.
11. **Zwack G, Derkay C (1997):** The utility of preoperative haemostasis assessment in adenotonsillectomy. Int J Ped Otolaryngology, 39:67-76.
12. **Sheet M, Al-Banna A, Emanuel E *et al.* (2022):** CoblationVersus Cold Dissection Tonsillectomy: A Comparative Study. Indian Journal of Otolaryngology and Head & Neck Surgery, 22: 1-6.
13. **Koirala B, Shah R, Shrestha K *et al.* (2021):** Comparision of Coblation and Cold Dissection Techniques outcome among Tonsillectomy patients at Birat Medical College and Teaching Hospital. Nepal Medical College Journal, 23(3): 198-203.
14. **El-Taher M, Aref Z (2019):** Coblation versus conventional tonsillectomy: a double blind randomized controlled trial. Indian Journal of Otolaryngology and Head & Neck Surgery, 71(1): 172-175.
15. **Aldamluji N, Burgess A, Pogatzki-Zahn E *et al.* (2021):** PROSPECT guideline for tonsillectomy: systematic review and procedure-specific postoperative pain management recommendations. Anaesthesia, 76(7): 947-961.
16. **Muthubabu K, Rekha A, Thejas S *et al.* (2019):** Tonsillectomy by cold dissection and coblation techniques: a prospective comparative study. Indian Journal of Otolaryngology and Head & Neck Surgery, 71(1): 665-670.
17. **Sasindran V, Mathew N, Shabna A *et al.* (2018):** Comparison of coblation tonsillectomy vs dissection tonsillectomy. International Journal of Otolaryngology and Head & Neck Surgery, 8(1): 49-60.
18. **Rashid T, Saeed I, Riaz M (2018):** Coblation tonsillectomy versus cold dissection tonsillectomy. Journal of Fatima Jinnah Medical University, 12(1): 13-15.