

ORIGINAL ARTICLE

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Intracapsular coblation tonsillectomy versus extracapsular coblation tonsillectomy

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Abstract

Background: Recently, coblation technique is used in many neck surgeries; there are few studies dealing with coblation in the field of tonsillectomy either intracapsular or extracapsular tonsillectomy. The aim of this study is to evaluate the efficacy of using coblation in extracapsular tonsillectomy (preserving the capsule) over using it in intracapsular tonsillectomy (total).

Results: There is statistically difference between results of extracapsular tonsillectomy and intracapsular tonsillectomy as regards postoperative pain according VAS scale (4.36 ± 2.413 vs 3.6 ± 2.041 with p value 0.0001). Also postoperative dietary intake and daily activity all are significantly different in extracapsular tonsillectomy and these differences were recorded after the fifth day.

Conclusion: Extracapsular coblation tonsillectomy has less morbidity than intracapsular coblation tonsillectomy.

Keywords: Tonsillectomy, Tonsillotomy, Intracapsular, Extracapsular, Coblation

Background

Tonsillectomy is a very common surgery in children all over the world. The capsule of the tonsil is a thin fibrous tissue separating the tonsil from the underlying muscles of the pharynx. An extracapsular tonsillectomy means complete removal of the tonsil that leads to exposure of the muscle bed and blood vessels that lie within the pharynx. An intracapsular tonsillectomy involves removal of tonsil tissue without removing the capsule. So we can divide tonsillectomies into extracapsular tonsillectomy or total tonsillectomy (ET) and intracapsular tonsillectomy (IT) or partial tonsillectomy (tonsillotomy). Based on whether the tonsil is completely removed or we preserve the capsule, conventional tonsillectomy can be performed using variable techniques including cold dissection, electrocautery, microbipolar cautery, and more recently, radiofrequency, coblation, microdebrider, laser, and harmonic scalpel [1]. In ET, the tonsil tissue can be removed completely which prevent recurrence. In IT, the tonsillar capsule is preserved. This acts as a

biologic cover for the pharyngeal muscles, which can significantly reduce postoperative pain, allowing for rapid and easier recovery. It also reduces the incidence of postoperative hemorrhage [1, 2], but has the potential for regrowth of the tonsil [1].

Coblation is one of the most popular techniques used in tonsillectomy. It dissects tonsillar tissue at low temperatures, resulting in less pain and discomfort than some other techniques [3]. In past few years, a new technique called modified coblation intracapsular total tonsillectomy (CITT) was used, in which the tonsils can be completely removed while retaining the integrity of the capsule [4]. The advantages of coblation intracapsular tonsillectomy over coblation extracapsular total tonsillectomy are not well clarified.

Methods

During the period from February 2017 to January 2018, fifty patients (23 males and 27 females) were scheduled for coblation tonsillectomy. Their ages ranged from 5 to 16 years. Indications for surgery included repeated attacks of acute tonsillitis. All procedures and patient care were done at the ENT Department, Qena University

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Hospital. Patients enrolled in this study were divided into two groups. First group (25) underwent intracapsular coblation tonsillotomy, while second group (25) underwent extracapsular coblation tonsillectomy.

Surgical technique

All procedures performed were carried under general anesthesia with preoperative routine investigations. In both groups, the procedure was done using the coblator machine.

Intra capsular coblation tonsillotomy

Tonsils were dissected from the surface inward with the wand set at Coblate 9 setting. The wand skims the tonsil surface with continuous saline irrigation. Ablation was performed without penetrating the tonsillar capsule. Retraction of the tonsillar pillars is done to define the margins for near complete ablation. When the capsule is approached, the wand is turned down to Coblate 6 setting. Thin layer of tonsillar tissue is left to protect the capsule. Bleeding does not occur in most cases, but when it occurs, the wand was used in the Coagulat 5 setting for homeostasis.

Extracapsular coblation tonsillectomy

We use the EVAC 70 handpiece in ECCT. A Coblate setting of 6 was used for dissection of tonsillar tissue. The tonsil was pulled and dissected with the capsule; the active surface electrodes should face the tonsil rather than down into the fossa in order to minimize injury to the constrictor muscles. In case of bleeding, we use Coagulate 5 setting for hemostasis.

Assessment parameters

To compare between the extracapsular coblation tonsillectomy and intracapsular coblation tonsillotomy, several operative postoperative parameters were assessed.

Operative assessment data: estimated blood loss

The amount of blood included was calculated by subtracting the amount of saline used for irrigation from the total collected fluid volume.

Postoperative assessment data

The data were assessed twice the first time on day 1 or 2 and the second time on day 5 or 6.

- 1- Visual analogue scale (VAS) to evaluate postoperative pain: A score of 1 means "no pain", while a score of ten is "maximal pain".
- 2- The presence of upper gastrointestinal manifestations such as nausea and/or vomiting.
- 3- The amount of normal diet that patient was eating in percentage.

- 4- Return of normal daily activity.

Statistical analysis

Sample size was 50 patients. A comparison between the two groups was then carried. This was done based on the operative and postoperative values previously mentioned for assessment. Data will be analyzed using Statistical Package for Social Sciences (SPSS) software program (version 20). Qualitative variable will be recorded as frequencies and percentages and will be compared by chi-square test. Quantitative measure will be presented as means \pm standard deviation (SD) and will be compared by Student's *t* test. *P* value < 0.05 will be significant.

Results

This study included 50 patients; intra capsular tonsillectomy was done to 25 patients (first group) and extra capsular tonsillectomy was done to the other 25 patients (second group). Mean age for the first and second groups was 9.4 and 10.1, respectively. There were 23 males accounting for 46% totally and 27 females accounting for 54% totally. Mean weight was 30.3 kg and 32.1 kg. There were no statistically significant differences between both groups in any of these demographic characteristics.

Intraoperative blood loss

Estimated intraoperative blood loss was found significantly different between treatment groups, with a mean of 6.7 mL (SD, 6.4) for CETT and a mean of 4.8 mL (SD, 7.8) for CIT ($p = .011$) (Table 1).

Nausea and vomiting

Rates of nausea were 21% in the first group versus 23% in the second group and vomiting was 18% in the first group versus 23% in the second group, with no statistically significant difference.

There were no statistically significant differences in analgesic use between the two groups (Table 2).

Postoperative pain

Mean pain score in first and second days was 3.6 in the first group and 4.36 in the second group. By the fifth and sixth days, the first group reported significantly less pain than the second group (1.92 vs. 3.68); the difference was only statistically significant on the fifth and sixth days ($P < 0.05$).

Table 1 Intraoperative blood loss

	Extracapsular	Intracapsular	<i>P</i> value
Intraoperative blood loss	6.7 ml	4.8 ml	0.011

Table 2 Postoperative nausea and vomiting

	Extracapsular	Intracapsular
Postoperative nausea	21%	23%
Postoperative vomiting	18%	23%

Pain scores on the first and second days were very similar between both groups. However, by the fifth day, there were no patients in the first group with severe pain (score from 8 to 10), but the percent of patients in the second group with severe pain actually increased from first and second days to fifth and sixth days (from 8 to 18%) (Table 3).

Diet intake

First group of patients were able to eat more than the second group. On first and second days and on fifth and sixth days, mean percentage of usual diet was reported as 54.80% and 76.80% in the first group compared to 42% and 47.20% in the second group. This means statistical significance on days 1 and 2 ($P < .05$) and was highly statistically significant on days 5 and 6 ($P = 0.0001$) (Table 4).

Activity level

Activity levels were similar to the oral intake findings. On the first and second days and fifth and sixth days, mean percentage of usual activity level was reported as 64% and 82.4% in the first group of patients, compared with 50% and 63.4% in the second group of patients. This was statistically significant at both times ($P = 0.005$ and $P = 0.0001$) (Tables 5 and 6).

Discussion

Coblation tonsillectomy is an important technique for tonsillectomy in children and is now being used by some otolaryngologists [5]. According to Timms and Temple (2002), the use of this new technique in tonsillectomy received a considerable research interest [6].

Coblation tonsillectomy is introduced to compete with other surgical techniques to improve the surgical outcome. This includes faster healing, less pain, rapid recovery of swallowing function, and fewer incidences of complications. Several studies were done to demonstrate the advantages and disadvantages of coblation tonsillectomy.

In this study, the extracapsular coblation tonsillectomy was compared with relatively new intracapsular

Table 4 Postoperative diet intake at days 1–2

	Group	N	Mean	Std. deviation	P value
Diet 1–2 days	Intracapsular	25	54.80	12.117	0.001
	Extracapsular	25	42.00	12.666	

coblation method. Comparison included most of the surgical aspects, the operative and postoperative ones. By presenting the current results of this study and comparing them with those reported in literature, we aim to explain the exact features of this new technique.

This is done in an attempt to classify it among others listed for the commonly performed procedures for tonsillectomy.

Results of this study show minimal intraoperative blood loss in both coblation groups. The average blood loss was 6 ml (6.7 ml for extracapsular coblation tonsillectomy; 4.8 ml for intracapsular coblation tonsillectomy), which was similar to data reported by Walner with coblation instrument [5].

The Italian researcher Di Rienzo Businco and the Iranian researcher Omrani [7] reported that coblation was associated with less pain and quick return to normal diet and daily activity when compared with traditional surgery.

This study confirmed the same point of view. It showed significant improvement in the postoperative recovery in children who undergo intracapsular coblation tonsillectomy, when compared with children who undergo extracapsular coblation tonsillectomy.

A randomized study was performed by Arya and his colleagues [8] in children in which coblation was done in extracapsular approach on one side and intracapsular on the other. And there were no difference in pain in the first 24 h. These results are different from those of this study, as there was no improvement in pain scores observed until days 5 or 6.

In a randomized controlled study of coblation versus electrocautery tonsillectomy by Chang [9], the pain scores in the first and second days was 2.5 for patients subjected to intracapsular coblation; in this study, the pain score in the first and second days was 2.8 in the intracapsular coblation group. Also Chang recorded the pain score in the fifth and sixth days 1.5 compared to 1.7 in this study for intracapsular coblation patients in both studies [9].

Table 3 Postoperative pain

Pain score	Intra capsular	Extra capsular	P value
Pain 1–2 days	3.6 ± 2.041	4.36 ± 2.413	0.235
Pain 5–6 days	1.92 ± 1.077	3.68 ± 2.076	0.000

Table 5 Postoperative activity level at days 1–2

	Group	N	Mean	Std. deviation	P value
Activity level 1–2 days	Intracapsular	25	64.00	20.156	0.005
	Extracapsular	25	50.00	12.990	

Table 6 Postoperative activity level at days 5–6

	Group	N	Mean	Std. Deviation	P value
Activity level 5–6 days	Intracapsular	25	82.40	14.224	0.0001
	Extracapsular	25	63.40	10.774	

On the other hand, the extracapsular coblation group from this study had scores that were better than the electrocautery group from Chang study at first and second days (2.8 vs 4.6) and fifth and sixth days (3.2 vs 3.8). Although extracapsular coblation is not as favorable in recovery as intracapsular coblation on the fifth and sixth days, the results from this study still support that extracapsular coblation patients continue to have favorable recovery profiles compared with traditional electrocautery tonsillectomy. That shows the advantage to coblation over electrocautery tonsillectomy. As it is less thermal injury to the tonsillar fossa, any technique that minimizes tissue injury including cold dissection or very low power bipolar electrocautery will show recovery advantages when compared with a high thermal injury technique such as high power monopolar electrocautery [9].

This study recommends that studies of recovery after tonsillectomy should include both early (first and second days) and later (fifth and sixth days). Ideally, this study should ask about pain at ninth and tenth days to demonstrate complete recovery back to baseline.

Conclusion

Comparison in different parameters showed some advantages of the intracapsular coblation over the extracapsular coblation method. These advantages include fewer intraoperative bleeding, more rapid recovery as regards pain, diet intake, and activity level. Intracapsular coblation tonsillectomy proved to be safe and effective procedure.

Abbreviations

VAS scale: Visual analogue scale; ET: Extracapsular tonsillectomy; IT: Intracapsular tonsillectomy; CITT: Coblation intracapsular total tonsillectomy; SPSS: Statistical Package for Social Sciences

Acknowledgements

The authors would like to acknowledge the members of Ear, Nose and Throat Department, Faculty of Medicine, South Valley University, Egypt.

Authors' contributions

AA, AGA and UT had contributed in the concepts, design, definition of intellectual content, literature search, clinical studies, data acquisition, data analysis, statistical analysis, manuscript preparation, editing and review. AA is the guarantor. All authors have read and approved the final manuscript.

Funding

No

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study was approved by Qena Faculty of Medicine Ethics Committee. The reference number of the committee is not applicable.

Verbal informed consent to participate in the study was obtained from parents or legal guardians of all cases. The consent was verbal as most of our cases' parents or legal guardians were not educated. The Qena Faculty of Medicine Ethics Committee approved the verbal consent in our study.

Consent for publication

Not applicable

Competing interests

We declare that we have no competing interests.

Received: 25 March 2020 Accepted: 8 January 2021

Published online: 25 January 2021

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