

Comparison of Clinical and Functional Outcome of Cold Steel Dissection versus Coblation Technique in Tonsillectomy

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ABSTRACT

Background: To ameliorate the intra and post-op morbidities associated with newer techniques for tonsillectomy like coblation has been introduced in the recent past. This study was aimed to compare the cold steel dissection with the coblation technique with regards to its effectiveness and safety.

Methods: An observational comparative study was carried out in 90 patients undergoing tonsillectomy between July 2018 to December 2019. Forty-five patients in each group of cold steel dissection and coblation were compared between the operative time, intraoperative blood loss, post-operative pain, post-operative bleeding and return to work. Intraoperative blood loss was measured using a standard sized gauge piece whereas post-operative pain was measured using a visual analogue scale (0-10) at first and third day of surgery.

Results: The age and sex were comparable between the groups. The mean operation time (31.40 ± 4.52 min versus 17.02 ± 3.11 min), intraoperative blood loss (27.20 ± 7.16 ml vs 9.73 ± 5.52 ml), post-operative pain in day 1 (8.02 ± 1.27 vs 4.98 ± 1.03), post-operative pain in day 3 (4.80 ± 0.89 vs 2.76 ± 0.74) and time needed to return to work in days (10.31 ± 1.29 vs 6.76 ± 1.20) were statistically significant in coblation group ($p < 0.000$). Primary and secondary post-operative haemorrhage rate were similar in both the groups. There was no return to theatre for hemostasis.

Conclusions: Coblation tonsillectomy significantly reduces operation time, intraoperative blood loss, post-operative pain (day 1 and 3) and time required to return to work. This technique doesn't differ from cold steel dissection tonsillectomy in terms of primary and secondary post-operative hemorrhage.

Keywords: Coblation, cold dissection, tonsillectomy

INTRODUCTION

Tonsillectomy is one of the most commonly performed surgical procedure by otolaryngologists. Various methods like cold steel dissection, guillotine, diathermy, laser, harmonic scalpel, radiofrequency, cryosurgery and coblation are used to perform this procedure.¹ As there is no common consensus on the optimal method of performing tonsillectomy, they have been frequently compared in many studies.^{1,2}

The cold steel dissection method has remained the gold standard for tonsillectomy for more than a century.³ This traditional method is well renowned for its post-operative pain and risk of bleeding. Many attempts have been made to overcome these two conditions by the recently introduced techniques like Coblation.⁴

The aim of the study is to compare the cold steel dissection tonsillectomy with the coblation technique in terms of operative time, intraoperative blood loss, post-operative pain, post-operative bleeding and return to work.

METHODS

This observational comparative study was carried out in Kathmandu Medical College Sinamangal, Kathmandu Nepal between July 2018 to December 2019 after ethical approval taken from Institutional Review Committee.

All the patients who underwent tonsillectomy were divided into two groups according to the technique adopted for the surgery; group 1 included the patients subjected to conventional tonsillectomy using cold steel dissection

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instrument with bipolar haemostasis while group 2 included patients subjected to coblation tonsillectomy using Evac-70 Coblator Wand. The sample size calculated was 90 with 45 in each group using the prevalence of 13.6%.⁵ Patients having acute infection, bleeding diathesis, using steroid or NSAIDs, suspected malignancy or tonsillectomy as an approach to other procedure were excluded as these might affect the pain and bleeding. Ninety folded papers containing written numbers from 1 to 90 were enclosed in a box and every patient was requested to choose one before the day of surgery. Every odd number was taken for cold steel dissection whereas even for coblation technique. Informed written consent was taken before enrolment in the study.

All tonsillectomies were performed by the same surgeon under general anesthesia using the same standardized anesthetic and surgical technique. Operative time was measured from initiation of incision to complete hemostasis. Intraoperative blood loss was measured by a sterile single fold dry gauge piece sized 19cmx14 cm. The blood loss was 4 ml if the gauge piece was completely soaked and 2.5 ml if it was soaked partially.^{6,7}

Post-operative pain was assessed on day one and day three of surgery. It was done by visual analogue scale (0-10). Zero indicated no pain and 10 revealed an extreme pain.⁸ All the patients were prescribed with the same postoperative antibiotic, analgesics and antiseptic gargle. All were discharged on fifth post-operative day.

The data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. The results between the group were compared in terms of the operative time, intraoperative blood loss, post-operative pain, post-operative bleeding and time to return to work. The mean and standard deviation (SD) were computed. Means were compared using Student's t-test. The p value was considered statistically significant when it was less than 0.05.

RESULTS

Out of 90 patients, 45 underwent cold steel dissection tonsillectomy and 45 underwent coblation tonsillectomy. Mean and standard deviation of age was 23.93±11.22 years for cold steel and 22.27±10.90 years for coblation.

There was no significant difference between the mean ages and sex of the two groups. ($p>0.05$). The mean operative time was 31.40±4.52 minutes in cold steel dissection group whereas 17.02±3.11 minutes in coblation group. Mean operative time was thus

significant ($p<0.000$). Hence the coblation technique took lesser time for operation compared to cold steel. The mean intraoperative blood loss was 27.20±7.16 ml for cold steel and 9.73±5.52 ml in coblation technique ($p<0.000$). The post-operative pain in day 1 and day 3 in visual analogue scale (VAS) was less in coblation technique which was statistically significant ($p<0.000$). The mean time needed to return to work in day was significantly shorter in coblation group (6.76±1.209) compared to cold steel (10.31±1.294) ($p<0.000$). Two of the patients undergoing cold steel dissection tonsillectomy had primary post-operative haemorrhage whereas one in each group had secondary post-operative haemorrhage (p value = 1.00). All these cases were managed conservatively. There was no return to theatre.

Table 1. Comparison between cold steel dissection and coblation tonsillectomy with regards to different parameters.

Parameter	Mean ±SD		p value
	cold steel dissection (n=45)	Coblation (n=45)	
Operative time (min)	31.40±4.52	17.02±3.11	<0.001
Intraoperative blood loss (ml)	27.20±7.16	9.73±5.52	<0.001
Post op pain Day 1 (VAS)	8.02 ± 1.27	4.98±1.03	<0.001
Post op pain Day 3 (VAS)	4.80±0.89	2.76±0.74	<0.001
Time needed to return to work (days)	10.31±1.29	6.76±1.20	<0.001

Table 2. Post-operative haemorrhage.

Haemorrhage	Cold steel dissection (n=45)	Coblation (n=45)	p value
Primary	2 (4.44%)	0 (0%)	0.156
Secondary	1 (2.22%)	1(2.22%)	1.00

DISCUSSION

It is generally accepted that the ideal method of tonsillectomy should decrease the operative time, intraoperative blood loss, post-operative hemorrhage, post-operative pain and should return to the normal work early.⁹ Coblation technique has been introduced for tonsillectomy since 2001 to overcome the intra-operative and post-operative morbidities associated with cold steel dissection with bipolar haemostasis tonsillectomy.¹⁰ Coblation tonsillectomy involves passage of bipolar radiofrequency current through

isotonic saline which converts it into a plasma field of highly ionized sodium ions which disrupts intracellular bonds in the tissues thus vaporizes it substantially at low temperatures (40-70°C) compared to standard electrocautery where temperature of 400-600°C is reached.¹¹ Thus the collateral thermal damage to the surrounding tissue will be very less in the coblation technique. Apart from the coblation this device has got bipolar coagulation for hemostasis and suction functions.

With regards to the operative time, we found that the coblation tonsillectomy was significantly time saving than the cold steel dissection tonsillectomy. Although there is disagreement to this finding in quite a few publications, it was in accord with many previously published reports.^{1,2,12,13} The shorter operative time in coblation technique in our series might be due to the ability of it to cut and coagulate simultaneously, thus negating the need for further bipolar hemostasis.

Intraoperative blood loss was measured using a tool which was easy to adopt, practically feasible and successfully applied in previous researches.^{6,7} This study showed significantly less intra-operative blood loss in coblation group in comparison to the cold steel dissection group which was similar to other studies.^{1,2,14,15} Blood loss was less than 15 ml in almost all the cases in coblation group which was a similar finding to Stoker et al.¹⁵

Post-operative pain was measured in first and third day of surgery using a visual analogue scale and found that the result was significantly better for coblation group. This finding matches with the results of similar studies which concluded that coblation technique causes less collateral thermal damage to the surrounding tissue and healing is faster.¹⁶ Other reason could be decreased operative time implied less tissue handling thus resulting in less post-operative pain in coblation group. It is also noteworthy to mention that there is less post-operative pain in coblation group which may be due to better proficiency of the surgeons these days due to trainings and better adaptability of the technology.¹⁷

Primary post-operative haemorrhage was seen in 2 cases, both were in cold steel dissection group, whereas none of the patients in coblation group encountered this issue. Similarly, one case in both the group had secondary post-operative haemorrhage. Both the techniques were comparable in term of post-operative haemorrhage in this series. All the cases were managed conservatively and there was zero return to theatre rate which was a similar finding to Nithya et al¹⁸ and Divi et

al.¹⁹ Some researcher however, have observed a higher post-operative haemorrhage with the coblator.^{20,21}

Time needed to return to work was significantly better in the coblation group in our study. This might be due to reduction of the operative time, decreased intraoperative blood loss and less tissue handling in coblation group as compared to cold steel dissection group. Similar finding was observed in other studies.^{1,2,22}

There were several limitations of this study. First was the tool which was used to measure the blood loss. It was actually a compromise between the feasibility and accuracy to avoid the complexity of more accurate gravimetric measurement. Second was the intelligence of the patient to adopt the visual analogue scale. Though it was simple, we tried to overcome it by educating the patient the day before surgery. Third was the cost factor of the disposable wands used in coblation technique which might be beyond the financial capacity of many of our patients.

CONCLUSIONS

The newer technique of tonsillectomy using coblation offers a significant advantage over cold steel dissection method in terms of lesser operative time, intraoperative blood loss and post-operative pain at day 1 and day 3. Coblation is observed to early return to work. The primary and secondary post-operative haemorrhage rates are similar in both the techniques. Therefore, coblation tonsillectomy can be a safe and effective alternative to conventional cold steel dissection tonsillectomy.

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