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Original Article

Coblation tonsillectomy versus conventional tonsillectomy

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ABSTRACT

Objectives: The objective of this study was to compare the effectiveness of conventional tonsillectomy versus coblation tonsillectomy with respect to duration of surgery, amount of intraoperative bleeding, recovery time, and post-surgical pain.

Material and Methods: Sixty patients were divided into two groups. One group underwent conventional tonsillectomy while coblation tonsillectomy was performed in the second group. Duration of surgery, amount of intraoperative bleeding, recovery time, and postsurgical pain were measured. All patients were followed for 24 months.

Results: Comparing the coblation tonsillectomy group to the cold steel dissection tonsillectomy group, the mean duration of surgery was 6.92 versus 18 min, the amount of intraoperative bleeding was 2.75 versus 39.88 mL, and the difference on the post-operative pain scale between the two groups was statistically significant ($P < 0.005$). There was no recurrence of tonsillitis episodes in either of the two groups during the 2-year follow-up period.

Conclusion: After adequate training, the coblation technique is beneficial to both the surgeon and the patient, including the possibility to excise tissue and coagulate bleeding vessels with the same device. Post-operative morbidity and complications are lower as compared to the conventional cold dissection technique.

Keywords: Coblation, Tonsillectomy, Complications

INTRODUCTION

Tonsillectomy is the most routinely performed surgical operation in recent years.[1] There have been lots of controversies about tonsillectomy techniques to provide better conditions with more benefits and less complications. Multiple surgical techniques and instruments have been described to minimize intraoperative hemorrhage and reduce the operation time, post-operative pain, and incidence of comorbidities in patients undergoing tonsillectomy.[2,3] Coblation tonsillectomy has been shown to induce less post-operative pain, intraoperative hemorrhage, and surgical trauma and to provide quick recovery and a short hospitalization time.[4] Coblation is a technique that utilizes bipolar radiofrequency energy for soft-tissue dissolution. Two electrodes are immersed in a medium of normal saline, which produces a plasma field of sodium ions. Many highly ionized particles are contained in the plasma field, resulting in coagulation of vessels and vaporization of tissues. In contrast to electrocautery, which works at a temperature of up to 400°C, coblation

devices work at a temperature of 60°C.[5] Our study aimed to compare coblation and traditional tonsillectomy, regarding the post-operative morbidities and time required to regain the normal diet and activity with larger number of cases.

MATERIAL AND METHODS

A prospective study was performed in the Department of Otorhinolaryngology at ADESH UNIVERSITY, Bathinda, India, from August 2018 to December 2019. Informed consent was obtained from all patients and the study was approved by the Institution's Ethics Board. This study was comprised 60 patients of either sex planned for tonsillectomy. Informed and written consent was obtained from all patients included in this study.

Subjects were divided into two groups. Each group had distributed 15 even and 15 odd numbers. Those allocated with even numbers (coblation group) underwent radiofrequency ablation of the tonsil while those in conventional group underwent conventional tonsillectomy by cold dissection.

All patients with signs and symptoms of the upper airway obstruction due to tonsillar hypertrophy were included in this study. Patients with acute tonsillitis, bleeding disorders, neuropsychiatric disorders, and patients on long-term analgesics were excluded from this study.

Patients included as a part of this study underwent complete general physical and otorhinolaryngological examination. Intraoperative time, intraoperative hemorrhage, and post-operative pain were observed and documented between the two techniques.

Intraoperative time was recorded from insertion to removal of Boyle's Davis mouth gag using a stopwatch. Intraoperative blood loss was calculated by weighing the fossa swabs and measuring collection in suction canister. Post-operative pain was first assessed 6 h following surgery and 8th-hourly thereafter, up till the 3rd post-operative day.

RESULTS

The study population was comprised 60 patients between 4 and 25 years of age. Patients were divided into two groups with 30 patients in each group. The mean age of group 1 (coblation group) was 12.47 years (8–18), while in group 2 (conventional group), the mean age was 10 years (5–25). Group 1 was comprised ten females (33.3%) and 20 males (66.6%), while group 2 was comprised 17 females (57%) and 13 males (43.3%). The majority of the patients (51.67%) were <10 years of age. There were no significant differences in age distribution nor gender distribution (P = 0.450 and 0.482, respectively) [Table 1].

Symmetric tonsillar hypertrophy was present in all patients included in this study. Dysphagia was the associated symptom in 7 patients (11.67%). Fifty-five patients (91.66%) presented with grade III hypertrophy of the tonsil while 5 (8.33%) presented with grade II hypertrophy [Table 2].

The mean duration of surgery in group 1 was 6.92 min (4–8), while, in group 2, it was 18.08 min (12–32) [Table 3].

The mean perioperative blood loss in group 1 was only 2.75 mL (range 1.5–4.5) as compared to a mean blood loss of 39.88 mL (range 20–120) in group 2 [Table 4].

Patients in group 1 were completely free of pain from day 2 onward, while patients in group 2 complained of pain even at the end of the 3rd post-operative day.

DISCUSSION

In this study, we compared two techniques of tonsillectomy, the coblation and traditional. Some significant differences were shown between outcomes of these two methods. Tonsillectomy is one of the most common operations performed in otolaryngology worldwide.[6] Tonsillectomy with steel forceps (as traditional) consumes longer time than coblation tonsillectomy does as a slower dissection.

Coblation tonsillectomy has been proven safe and effective in the previous studies and is widely used for tonsillectomy in

Table 1: Age and sex distribution.

Groups	Age (in years)	Total number of patients	Male	Female
1	8–18 years	30	20 (30)	10 (30)
2	5–25 years	30	17 (30)	13 (30)

Table 2: Tonsillar hypertrophy.

Number of patients	Grade of tonsillar hypertrophy
55	Grade 3 hypertrophy
5	Grade 2 hypertrophy

Table 3: Time taken for surgery.

Groups	Time range for surgery	Mean time for surgery (mean)
1	4–8 min	6.92±1.23
2	12–32 min	18.08±3.45

Table 4: Blood loss during the surgery.

Groups	Perioperative blood loss range	Mean perioperative blood loss (mL)
1.	1.5–4.5	2.75±0.78
2.	20–120	39.88±2.45

both adults and children. In addition, coblation tonsillectomy is associated with better post-operative morbidity than are other techniques based on the pre-operative diet, post-operative pain, and use of post-operative analgesia. However, few data are available comparing coblation tonsillectomy to coblation tonsillectomy with ties based on the surgical time, bleeding, diet, and pain. This study compared coblation tonsillectomy to coblation tonsillectomy with ties based on the aforementioned variables in adults.

In our study, the mean duration of surgery in group 1 was 6.92 min (range 4–8) compared to 18.08 min (range 12–32) in group 2, which was statistically significant ($P < 0.0005$). Nelson[4] demonstrated that the total duration of operating time per tonsil for all ablations averaged 4.5 min, with a range of 1.9–9.4 min, which is similar to our study. Ardehali *et al*.[5] demonstrated that the mean operation time was 7.81 ± 2.56 min, which was consistent with our study.

First studies on coblation tonsillectomy have shown a significant decrease in post-operative pain scores comparing with traditional method with no more complications[4,7] that are compatible with our results. These promising results based up different studies revealed similar outcomes when comparing coblation and electrosurgery or ultrasonic tonsillectomy. On the other hand, there are some studies which reported no significant reductions in pain with coblation surgery comparing with cold dissection or electrosurgery.[6]

Hultcrantz *et al*. demonstrated a significantly higher hemorrhage rate in the coblation group comparing with diathermy (22.2% vs. 3.4%) from a study arranged for 64 patients.[8,9] Our data opposed this study as we found only 4.3% hemorrhage rate. Our study showed significant difference in post-operative morbidities in favor of coblation-assisted method.

Local pain after the operation is a major drawback of tonsillectomy. However, Babademaz *et al*.[7] showed a remarkable improvement in post-operative pain and return to normal food intake with coblation. Some other studies have since shown varying results. Erisson *et al*.[10] reported no significant difference in pain scores among 40 patients who underwent either electrocautery or coblation. However, Koltai *et al*.[11-13] found that the average pain values for each of the first 10 post-operative days were lower with coblation tonsillectomy than with cold dissection tonsillectomy.

Pfaar *et al*.[14] observed a significantly shorter mean duration of 6.82 min in comparison to 22.64 min for classical tonsillectomy.

Nemati *et al*.,[15] in their study, observed a total mean duration of 16.89 min for radiofrequency tonsil ablation surgery, which was significantly more than in our study.

However, a study reported by Morinière *et al*.[16] showed no statistically significant difference between the two groups in terms of mean operating time.

The mean perioperative blood loss was 2.75 mL (range 1.5–4.5) in group 1 compared with 39.88 mL (range 20–120) in group 2, which was statistically significant.

Friedman *et al*.[2] observed <20 mL to no blood loss in their study on radiofrequency tonsil volume reduction. Nelson[4] demonstrated that the operative blood loss for temperature-controlled radiofrequency tonsil reduction is estimated to be <1 mL. Blood loss for monopolar electrosurgical tonsil resection and plasma-mediated tonsil ablation in children has been reported to be 83.8 and 90.9 mL, respectively.[4] Given the minimal blood loss with temperature-controlled radiofrequency tonsil reduction, less stringent precautions for airway protection seem reasonable and the less invasive laryngeal mask airway seems to be a safe alternative to endotracheal intubation.

Pfaar *et al*.[14] also observed that perioperative blood loss was significantly lower and even absent in a considerable number of patients.

Perioperative blood loss is an important consideration in patients with coagulopathies, especially in small children where total circulating blood volume is smaller. None of the patients in our study underwent any damage to adjacent structures (anterior pillar, uvula, and soft palate) perioperatively. There was no case of postoperative hemorrhage in our study.

Pang *et al*.[17] reported a primary hemorrhage rate of 1.7% (1 child) in the dissection/snare group requiring hemostasis in the theater while both groups had 1 case of secondary hemorrhage due to infection, which was treated conservatively with intravenous antibiotics. Therefore, the post-operative hemorrhage rate for the dissection/snare group was 2.34% compared with the radiofrequency group.

There was a significant difference in mean pain intensity and duration between group 1 and group 2 from the day of surgery to the 3rd day postoperatively. The increase in pain morbidity in the dissection technique group was probably due to slower healing and the extent of dissection done.

In a study reported by Friedman *et al*.,[2] pediatric patients experienced pain for a mean period of 1.7 days following ablation and 7.1 following conventional tonsillectomy. In adults, the mean number of days for which patients experienced pain was 1.6 days following in our study, we also observed a statistically significant difference in analgesic requirement in the postoperative period over 3 days: in group 1, the mean analgesic requirement was 1.27 g (0.37–5.75) as compared to 5.25 g (2.5–10) in group 2 ablation and 9.4 days following tonsillectomy.

No patient presented to us with secondary hemorrhage or recurrence of tonsillitis among the 2 groups.

CONCLUSION

Mucosal-sparing, temperature-controlled radiofrequency tissue volume reduction is a safe and effective method for treating symptoms due to tonsillar hypertrophy in both the pediatric and adult population. Radiofrequency technique results in less operative blood loss, operative time, and post-operative pain as compared to conventional cold dissection tonsillectomy. Radiofrequency tonsil ablation also results in decreased analgesic demand in the postoperative period. After adequate training, the radiofrequency technique is beneficial to both the surgeon and patient, including the possibility both to excise tissue and coagulate bleeding vessels with the same device. Post-operative morbidity and complications are lower as compared to the conventional cold dissection technique.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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