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Coblation versus Cold Steel Adenotonsillectomy- A Comparative Study

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Abstract
Objectives: *To compare coblation adenotonsillectomy with conventional cold steel adenotonsillectomy*
Materials and Methods: *60 patients with bilateral tonsillar enlargement with adenoid hypertrophy were randomly assigned into two groups- one underwent coblation adenotonsillectomy and the other by conventional cold steel method, the operating surgeon being the same for both groups. The two groups were compared in terms of operating time, intra-operative haemorrhage, post-operative haemorrhage, pain, recovery time (ability to take solid foods), residual tissue.*
Results: *Coblation adenotonsillectomy required a significantly shorter operating time when compared to cold steel. The intra-operative blood loss was significantly less in Coblation adenotonsillectomy. There was no difference between the two procedures in terms of post-operative blood loss. There was significantly less post-operative pain in Coblation technique when compared to cold steel dissection method on the seventh post-operative day. However, no significant differences were found when documented at six hours and Day 1 post-operatively. Coblation adenotonsillectomy patients underwent faster recovery compared to the cold steel group. There was no difference between the two groups in terms of residual tissue remnant till 6 weeks follow-up.*
Conclusion: *Coblation adenotonsillectomy appears to be a good alternative to the conventional cold steel method provided adequate facilities of coblation setup is available and the operating surgeon is well-versed with the new technology.*
Keywords: *Tonsillectomy, adenoidectomy, coblation.*

Introduction

Sore throat is one of the most commonly encountered symptoms by an otorhinolaryngologist in the outpatient department every day. A significant proportion of the same is contributed by chronic tonsillitis. Similarly, adenoid hypertrophy is one of the most common causes of difficulty in breathing in children. Chronic tonsillitis and adenoid

hypertrophy significantly affect the quality of life in a patient owing to the number of hospital or clinic visits, cost of medication and absence from school or work. Although, the initial management is almost always conservative including a course of antibiotics, the clinician often has to resort to surgical intervention in the form of adeno-tonsillectomy. Conventional cold steel method of adeno-tonsillectomy has been the most commonly practiced surgical modality. Coblation technology, though not free of complications, has comparatively lesser post-operative morbidity.

The study is aimed at comparing the effectiveness of coblation adeno-tonsillectomy versus conventional cold steel adeno-tonsillectomy as surgical modalities.

Materials and Methods

60 patients attending the outpatient department of our institute between April 2017 to September 2018 were included in this parallel group open label randomized control trial. The inclusion criteria were:

- Age 7-14yrs
- Patient having Grade III or Grade IV bilateral tonsillar enlargement with adenoid hypertrophy, having received at least one course of antibiotics
- Symptoms hampering day-to-day activities of patient
- Patients willing to participate in the study after giving informed consent
- Patients having no other debilitating systemic disease

Those patients having unilateral tonsillar enlargement with or without HPE proved malignancy, grade I or grade II disease, adeno-tonsillectomy as a part of obstructive sleep apnoea (OSA) surgery and revision cases were excluded.

The patients were randomly assigned into two groups- one undergoing coblation adenotonsillectomy and the other by cold steel method. Randomization was done on the basis of a computer-generated random number list. Informed consent from all patients and institutional ethics committee approval were obtained. The parameters studied were:

- Intraoperative: -Operating time
  -Haemorrhage
- Post-operative: -Haemorrhage
  -Pain
  -Recovery time (ability to take solid foods)
  -Residual disease

Pre-operative investigations included routine blood examination e.g. Hb%, total and differential count, ESR, bleeding and clotting time, fasting and post-prandial blood glucose levels, urea, creatinine, chest X-ray, ECG etc. Special tests included ASO titre, Serum IgE level, X-ray of soft tissue nasopharynx (lateral view, extended neck).

All patients were operated under general anaesthesia with endotracheal intubation. For tonsillectomy (coblation and cold steel) and cold steel adenoidectomy, the patient was placed in Rose's position. For coblation adenoidectomy, the patient was placed in Trendelenburg's position, as for standard endoscopic nasal surgeries. Coblation tonsillectomy was done using EVac 70 wand and that for adenoidectomy was Procise max wand. The power setting for ablation was kept at 7 and coagulation 3. Red rubber catheter was passed through both the nostrils and delivered through oral cavity and tied for better visualization of nasopharynx during adenoidectomy. Haemostasis was secured. Paracetamol was used for analgesia in all cases.

Results

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 24.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Paired t-test was used for independent samples. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate. p-value ≤ 0.05 was considered for statistically significant.

In coblation adenotonsillectomy, the mean of age (mean±s.d.) of patients was 9.6667 ± 2.4259 years with range 7.0000 - 14.0000 years and the median was 9.0000 years. In cold steel adenotonsillectomy, the mean of age (mean±s.d.) of patients was 9.3000 ± 2.0367 years with range 7.0000 - 14.0000 years and the median was 9.0000 years. Difference of mean age in two groups was not statistically significant (p=0.5286) (Fig 1). In group- coblation adenotonsillectomy, 20(66.7%) patients had ≤10 years of age and 10(33.3%) patients had >10 years of age. In group- cold steel adenotonsillectomy, 22(73.3%) patients had ≤10 years of age and 8(26.7%) patients had >10 years of age. Association of age in two groups was not statistically significant (p=0.5731).

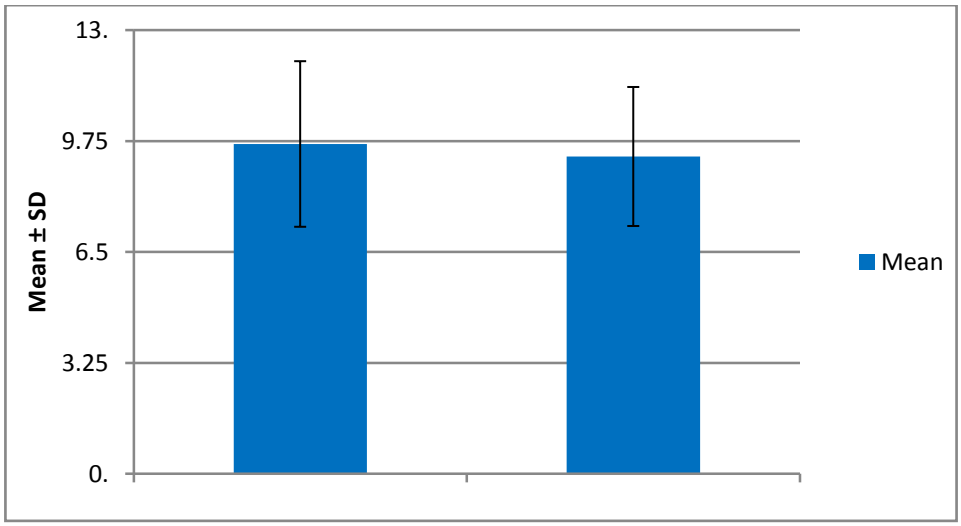

Fig 1: Age-Wise Distribution

In group- coblation adenotonsillectomy, 11(36.7%) patients had female and 19(63.3%) patients had male. In group- cold steel adenotonsillectomy, 11(36.7%) patients had female and 19(63.3%) patients had male. Association of sex in two groups was not statistically significant (p=1.0000).

In coblation adenotonsillectomy, the mean of operating time (mean±s.d.) was 38.9000 ± 7.1792 with range 30- 55and the median was 40. In cold steel adenotonsillectomy, the mean operating time (mean±s.d.) was 50.7000 ± 16.7356 with range 25- 90 and the median was 50. Difference of mean operating time in two groups was statistically significant (p=0.0008) (Fig 2).

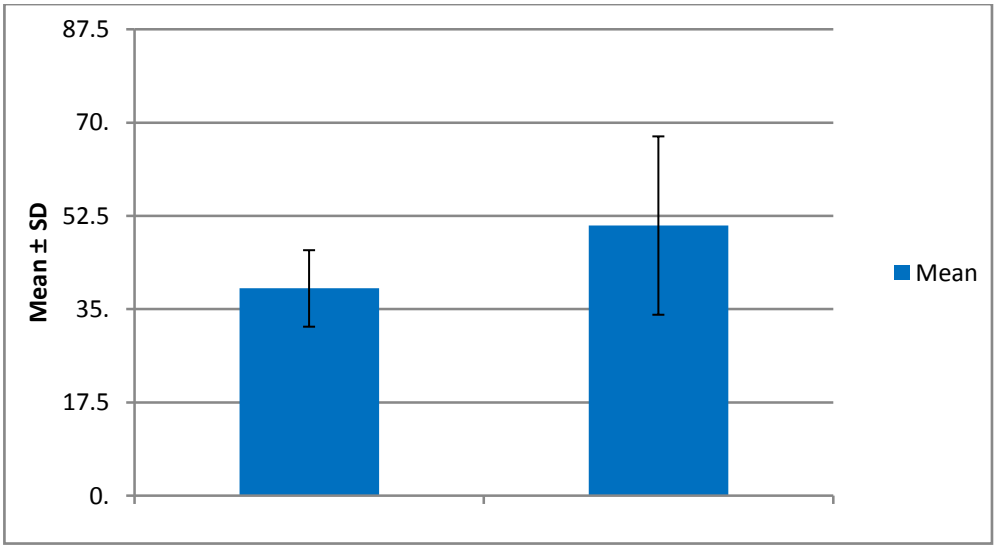

Fig 2: Mean Operating Time

In coblation adenotonsillectomy, the mean of intra op blood loss (mean±s.d.) of patients was 20.8667 ± 7.4821 with range 12- 42 and the median was 20. In cold steel adenotonsillectomy, the mean of intra op blood loss (mean±s.d.) of patients was 31.6333 ± 9.9186 with range 10- 55 and the median was 32. Difference of mean intra op blood loss in two groups was statistically significant (p<0.0001) (Fig 3).

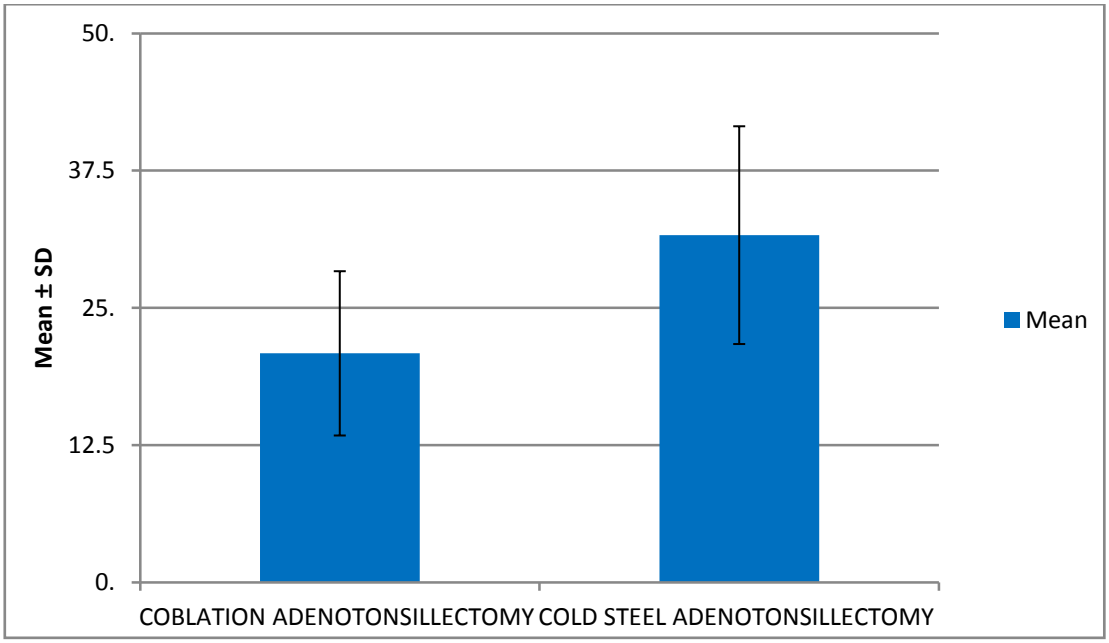

Fig 3: Intra-Operative Blood Loss

In coblation adenotonsillectomy, the mean of post op blood loss (mean±s.d.) of patients was 8.2333 ± 2.8969 with range 6.0000 - 18.0000 and the median was 7.0000. In cold steel adenotonsillectomy, the mean of post op blood loss (mean±s.d.) of patients was 8.1000 ± 2.8810 with range 6.0000 - 15.0000 and the median was 7.0000. Difference of mean post op blood loss in two groups was not statistically significant (p=0.8588) (Fig 4).

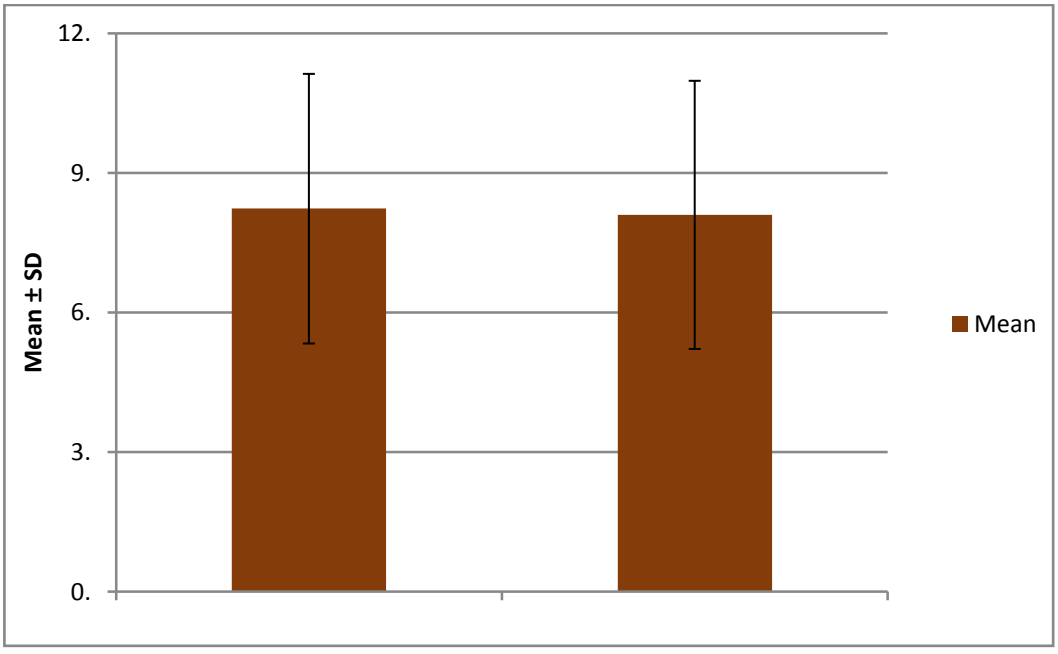

Fig 4: Post-Operative Blood Loss

The post-operative main was measured using the Visual Analogue Scale. The readings were taken at 6hrs, Day 1 and Day 7. No significant differences were found between the two groups when measured at 6hrs and Day 1. However, the pain scores measured on Day 7 showed in coblation adenotonsillectomy, the mean of pain (mean±s.d.) of patients was 4.9000 ± 1.4937 with range 2.0000 - 7.0000 and the median was 5.0000. In cold steel adenotonsillectomy, the mean of pain (mean±s.d.) of patients was 7.5667 ± 1.0400 with range 5.0000 - 9.0000 and the median was 8.0000. Difference of mean pain in two groups was statistically significant (p<0.0001) (Fig 5).

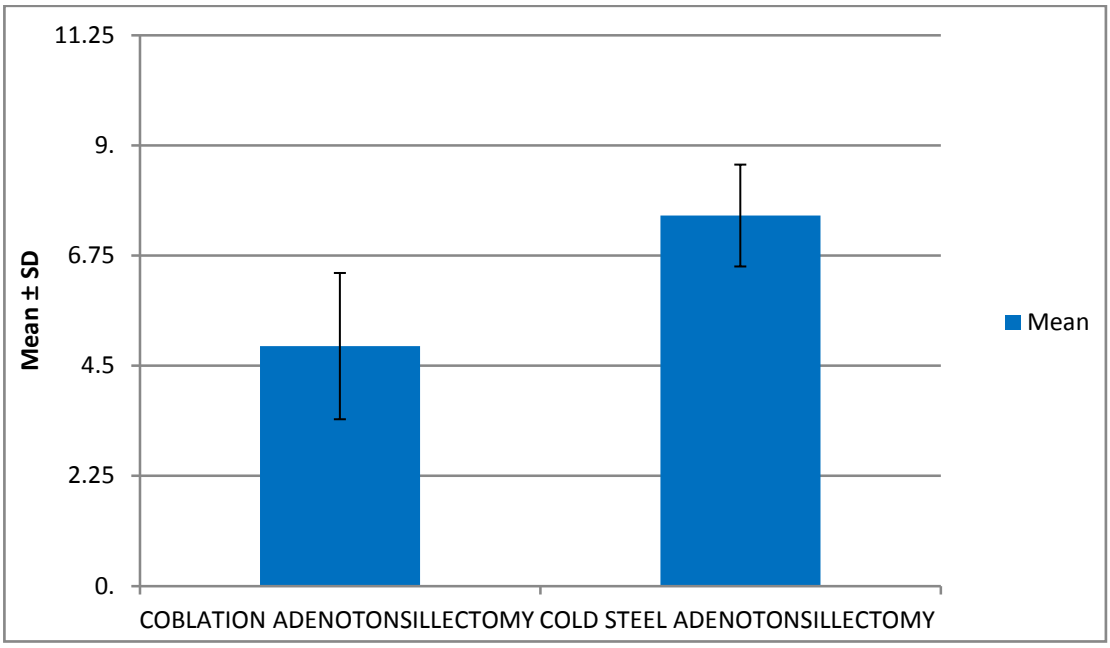

Fig 5: Post-Operative Pain (D7)

According to recovery time, in coblation adenotonsillectomy group, 3(10.0%) patients belonged to D0 EVE, 21(70.0%) patients D1 EVE, 3(10.0%) patients D1 MORN and 3(10.0%) patients D2 MORN. In cold steel adenotonsillectomy, 14(46.7%) patients belonged to D1 EVE, 2(6.7%) patients D1 MORN, 6(20.0%) patients D2 EVE and 8(26.7%) patients D2 MORN. Association of recovery time in two groups was statistically significant (p=0.0119) (Fig 6).

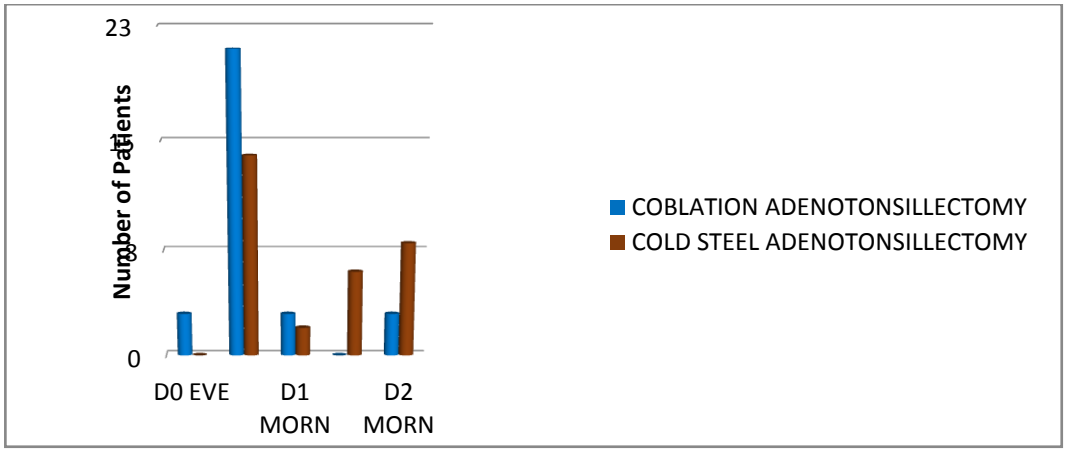

Fig 6: Recovery Time

In group- coblation adenotonsillectomy, 3(10.0%) patients had residual tissue and in group- cold steel adenotonsillectomy, 2(6.7%) patients had residual tissue. Association of residual tissue in two groups was not statistically significant (p=0.6404).

Discussion

Adenotonsillectomy is the routine surgical modality for treating chronic tonsillitis and adenoid hypertrophy in children not responding to conservative therapies. The procedure may be done in various ways of which the conventional cold steel adenotonsillectomy has stood the test of time. Of the newer modalities, coblation technology is nowadays a widely practiced tool for performing adenotonsillectomy.

The age group of the patients included in our study was 7-14 years. Difference of mean age in two groups was not statistically significant (p=0.5286). Hence, the two groups were comparable. The overall age wise distribution of our study is similar to that of Omrani et al and Nithya et al [1],[2].

In coblation adenotonsillectomy, the mean operating time (mean±s.d.) in minutes was 38.9000 ± 7.1792. In cold steel adenotonsillectomy, the mean operating time (mean±s.d.) in minutes was 50.7000 ± 16.7356. Difference of mean operating time in two groups was statistically significant (p=0.0008). Hence, coblation adenotonsillectomy took lesser time than the conventional cold steel dissection. Magdy et al. and Shapiro et al. reported similar findings in their studies[3],[4]. However, in a study conducted by Singh et al. the time taken in coblation was greater than that in case of conventional method[5].

Paramasivan VK et al, in their study reported that operative time was more in dissection method compared to coblation technique[6]. Behrouz Barati et al, in their study, reported that the mean operation time was 31 ± 5.4 minutes (ranging from 20-45 minutes) in the traditional tonsillectomy group and 27.3 ± 4.8 minutes (ranging from 18-42 minutes) in the coblation group. The mean operation time was significantly less in the coblation group ($p < 0.001$)[7].

In our study, the mean intra operative blood loss (mean±s.d.) in ml was 20.8667 ± 7.4821 in coblation adenotonsillectomy. In cold steel adenotonsillectomy, the mean of intra operative blood loss (mean±s.d.) in ml was 31.6333 ± 9.9186. Difference of mean intra operative blood loss in two groups was statistically significant (p<0.0001). Sung Moon H et al. and Nithya V et al have reported lesser blood loss in coblation adenotonsillectomy when compared with conventional dissection methods[8], [2].

The post-operative blood loss was not found to be significant in the two groups in our study. Belloso et al. compared the benefits of coblation technique with conventional tonsillectomy techniques. They found that coblation tonsillectomy was associated with a lesser incidence of delayed haemorrhage, significantly in the paediatric population. They found that secondary re-bleed rate with coblation was 2.25% versus 6.19% in the control group. Secondary haemorrhage rate in children following coblation was 0.95% versus 4.77% in the control group which was statistically significant. Secondary haemorrhage rate in adults following coblation showed evidence of a lower prevalence of secondary haemorrhage in the coblation group (4.40%) versus the control group (8.81%)[9]. Shah and Divi have found postoperative haemorrhage rates for coblation assisted surgery to be similar to cold steel surgery[10],[11]. Some researchers however, have found a higher bleeding rate with the coblator, and this issue remains a concern for some[12].

The post-operative main was measured using the Visual Analogue Scale. The readings were taken at 6hrs, Day 1 and Day 7. No significant differences were found between the two groups when measured at 6hrs and Day 1. However, the pain scores measured on Day 7 showed, in coblation adenotonsillectomy, the mean pain (mean±s.d.) of patients was 4.9 ± 1.4937 with range 2- 7 and the median was 5. In cold steel adenotonsillectomy, the mean pain (mean±s.d.) of patients was 7.5667 ± 1.04 with range 5- 9 and the median was 8. Difference of mean pain in two groups was statistically significant (p<0.0001). Similar results have been reported in literature[13]. On comparing the pain scores in the immediate postoperative evening after 06 hours of

surgery there was no statistically difference in the pain scores between the two groups. These findings were in consonance with other authors such as Magdy, Shah & Parker D[3],[10],[14].

We measured the recovery time based on the ability to take solid food post-operatively. Association of recovery time in two groups was statistically significant (p=0.0119), the recovery time being quicker in coblation group. Mitic et al. found in their study that patients of coblation adenotonsillectomy had quicker return to normal diet, quicker return to normal activity, and less use of analgesics over a 10-day period than patients undergoing dissection tonsillectomy[15]. Burton in a Cochrane review titled 'coblation versus other surgical techniques for tonsillectomy' concluded that in terms of postoperative pain and speed and safety of recovery, there is inadequate evidence to determine whether coblation tonsillectomy is better or worse than other methods of tonsillectomy [16].

Residual tissues if any were assessed at regular follow-ups till 6 weeks. In our study, no statistically significant differences were found between the two groups. Not much has been documented in literature about the same. Regular Diagnostic Nasal Endoscopy (DNE) and routine oral examination at follow-ups were sufficient to monitor for any residual tissues after healing has occurred and post-operative edema has completely subsided.

Amongst all the parameters, the post-operative blood loss in the form of secondary haemorrhage appears to be a serious concern in case of coblation technology. Several studies point towards this as a complication of coblation adenotonsillectomy[17],[18]. However, Mösges et al. in their study stated that the above-mentioned finding is highly operator dependant and is likely with any other new surgical modality [19].

A few limitations of the study were small sample size, short follow-up period. Hence, study on larger scale needs to be conducted to better understand the advantages of coblation technology.

Conclusion

Coblation adenotonsillectomy appears to be a good alternative to the conventional cold steel method provided adequate facilities of Coblation setup is available and the operating surgeon is well-accustomed to the new technology. However, more comprehensive studies are required to establish the long-term outcomes of this technology.

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