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Research Article

A Comparative Study Between Conventional Tonsillo-adenoid Resection Versus Coblator Assisted Tonsillo-adenoid Resection

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Abstract

Background: Tonsillectomy and Adenoidectomy are one of the most common surgical procedures performed by an ENT Surgeon. The surgical methods have evolved from Cold steel to Harmonic scalpel and Coblation which is one of the latest and emerging method for tonsilloadenoidectomy.

Methods: This is Prospective Interventional study carried out in the department of ENT and Head-Neck surgery Medical College Baroda between January 2020 till December 2021 amongst 22 patients aged 3-15 years of age comparing the operative time, intra-operative blood loss, post operative pain and time of return to oral feeds.

Results: The average duration of Tonsillectomy by Conventional and Coblator method was 17.4 ± 2.57 min and 9.5 ± 1.91 min respectively, while for adenoidectomy was 14.4 ± 2.065 min and 7.2 ± 1.183 min for conventional and coblation method. The p values for tonsillectomy and adenoidectomy was <0.0001 which was statistically significant.

The average blood for for tonsilloadenoid resection by conventional and Coblation method was 49.54 ± 11.64 ml and 41 ± 8.1 ml respectively. In this study, we observed that in the Coblation group (Group B), 7 out of 11 patients (63.63%) had pain scale <5 on the 1st Post operative day. Whereas, in the Conventional group (Group A), 5 out of 11 patients (45.45%) had pain scale of <5 on the 1st Post operative day suggesting that the Coblation group was associated with lesser post operative pain. Out of the total 11 patients in the Group A (Conventional), all 11 (100%) of them could take Liquid Feeds on the 1st Post operative day. Whereas, only 9 (81.81%) could resume Solid feeds on the 1st Post operative day. In the Group B (Coblation), all 11 (100%) patients started Liquid feeds on the 1st Post operarative day. Whereas, 10 out of 11 patients (90.9%) resumed Solid feeds on the 1st Post operative day.

Conclusions: Coblation is a quicker method of surgery for tonsilloadenoid resection, is associated with less intraoperative blood loss and lesser post operative pain. Also the return to oral feeds is quicker than the conventional method.

Keywords: Tonsillectomy; Adenoidectomy; Coblation; Outcome Measures

Introduction

The palatine tonsils are dense compact masses of lymphoid tissue situated in the lateral wall of the oropharynx, bounded by the palatoglossus muscle anteriorly and the palatopharyngeus and superior constrictor muscles posteriorly and laterally [1]. The adenoids is a median mass of mucosa-associated lymphoid tissue located in the roof and posterior wall of the nasopharynx [2].

A Danish physician Meyer first described adenoids in his paper "Adenoid Vegetations in the Nasopharyngeal Cavity" [3].

Both tonsils and adenoid are part of the Waldeyer ring, which is situated in the posterior part of pharynx and is involved in the production of immunoglobulins and the development of both B cells and T cells [1].

Tonsillectomy and adenoidectomy remain one of the most common surgical procedures performed by an ENT surgeon**.** Since the first tonsillectomy which was performed by Cornelius Celsus in the first century before Christ by dissection using his fingers, numerous surgical techniques were described, most notably in the 20th

century [4]. From the standard procedure of blunt dissection with Cold Steel method to laser tonsillectomy, all have their own set of complications. Amongst these the challenging ones however, remain that of post operative pain and bleeding. Coblation being an emerging technique is rapidly gaining demand due to its advantages in minimizing blood loss and post operative pain and has become the treatment of choice for adenotonsillectomy in today's era.

Aims and Objectives

- To compare the safety and efficacy of Coblator assisted tonsilloadenoid resection versus the Conventional method in a case of Chronic tonsilloadenoiditis.
- To compare the parameters like Intraoperative blood loss, total resection time, postoperative pain, resumption to feeds along with the type of feeds, postoperative complications like uvular edema and secondary bleeding, total days of hospitalization between these two technique.

Materials and Methodology

The study was carried out in Department of ENT and Head – Neck Surgery, Baroda Medical College and SSG Hospital Vadorara between the time period of May 2019 to December 2022.

22 Patients of age group 5-25 years attending the ENT OPD in SSG Hospital, Medical College, Baroda with complaints of recurrent throat pain, recurrent nasal obstruction, mouth breathing were included in the study. The study design was Prospective Interventional Study and randiomisation was done by lottery method. Patients with age group <5 and >25 years, with orofacial abnormalities, congenital anomalies, cervical spine anomalies, systemic diseases and those not willing for surgery were excluded. The study patients underwent Preoperative assessment including history of nasal obstruction, mouth breathing, snoring, recurrent throat pain, Clinical examination of Ear, Nose and Throat, Telescopic examination of nose to look for the grades of adenoids and Radiological evidence in the form of Xray soft tissue neck lateral view. Patients were randomly divided into 2 groups -Group A) Convenional Tonsilloadenoid resection was done Group B) Coblator assisted Tonsilloadenoid resection was done.

Comparison was made on the criteria of Intraoperative time, intraoperative blood loss, postoperative pain, post operative complications like secondary hemorrhage and time for return to oral feeds along with the type of feeds, days of hospitalization. Regular Follow up of the patients was done on the 1st, 2nd and 7th post operative day and after 1 month of surgery.

Results

Our Study shows that the majority of the patients in Group A as well as in Group B were in the age group of 6-10 years. Amongst the total of 22 patients who participated in the Study, 13 were Males and 9 were females. Of the total 22 patients included in the study, 20 patients underwent tonsilloadenoid resection whereas 2 patients underwent Tonsillectomy alone.

Most of the patients that were included in the study presented with Recurrent throat pain (81.81%), followed by Nasal obstruction and Snoring (77.27%) and Mouth Breathing (45.45%).

Most of the patients had Grade 3 Tonsillar hypertrophy (72.27%), followed by Grade 2 (18.18%) and Grade 4 ± (9%).

Table 1: Distribution of Chief Complaints in the study participants.

Complaints	Number (N = 22)
Nasal obstruction	17 (77.27%)
Snoring	17 (77.27%)
Mouth breathing	8 (45.45%)
Recurrent throat pain	18 (81.81%)

Majority of patients with Adenoid hypertrophy (17 out of 22) had Grade 3 Adenoid.

Hypertrophy (58.8%). While, the rest of them had Grade 2 Adenoid Hypertrophy (41.17%).

Average duration of surgery

In total 22 patients duration of surgery was measured from the time of handling of the Tonsils and adenoids by the Surgeon till hemostasis is achieved after the Tonsillectomy and Adenoidectomy respectively.

The p value for Tonsillectomy is <0.0001 (Independent T test). This is statistically significant for Coblation tonsillectomy as a quicker method.

Table 2: Distribution of Preoperative tonsillar grade in the study participants.

Tonsillar Grade	Number N = 22
Grade 1	0
Grade 2	4 (18.18%)
Grade 3	16 (72.27%)
Grade 4	2 (9%)

Table 3: Mean duration of Tonsillectomy and Adenoidectomy in Group A and B.

	Tonsillectomy (Average Duration) Mean ± Standard Deviation	Adenoidectomy (Average Duration) Mean ± Standard Deviation
Group A (Conventional Method)	17.4 ± 2.57 min	14.4 ± 2.065 min
Group B (Coblation Method)	9.5 ± 1.91 min	7.2 ± 1.183 min

The p value for Adenoidectomy is <0.0001 (Independent T test). This suggests that the Coblator assisted Adenoidectomy as a quicker method is statistically significant.

Total blood loss during surgery

Blood Loss was measured from amount of blood collected in suction machine + weight of blood collected from soaked roller pack and cotton balls which was used during surgery to pack the nasopharynx.

The post surgery weight was subtracted from the amount of saline used to flush during the surgery.

Table 4: Average blood loss during surgery in Group A and B.

	Average blood Loss during the Surgery
Group A (Conventional method)	49.54 ± 11.64 ml
Group B (Coblation Method)	41 ± 8.1 ml

The p value is 0.0595 (Independent t test). Thus, P value for blood loss in Coblator assisted Tonsilloadenoid resection is not statistically significant.

The average Blood loss in Group A was 49.54 ml on an average and in Group B was 41 ml on an average.

Post operative pain

The Pain was measured postoperatively on Day 1, Day 2 and Day 7 using a visual and numbered scale that depict the degree of pain starting from 1-10. In this study, we have used the Wong Baker's Pain scale as it is easy to communicate the level of pain by the children. Post operative analgesia was restricted to oral Paracetamol.

In this study, we observed that in the Coblation group (Group B), 7 out of 11 patients (63.63%) had pain scale <5 on the 1st Post operative day. Whereas, in the Conventional group (Group A), 5 out of 11 patients (45.45%) had pain scale of <5 on the 1st Post operative day suggesting that the Coblation group was associated with lesser post operative pain. The pain scores on 2nd and 7th post operative days were similar in the Group A and B (Pain scale less than 5 were 63.63% and 72.72% in A and B respectively on post operative day 2 and 100% on post operative day 7 in both the groups).

Table 5: Post operative Pain scores in Group A and B.

Wong Baker's pain Scale on	Group A (Conventional)	Group B (Coblation)
POD1	<5 = 5 (45.45%) >5 = 6 (54.54%)	<5 = 7 (63.63%) >5 = 4 (36.36%)
POD2	<5 = 7 (63.63%) >5 = 4 (36.36%)	<5 = 8 (72.72%) >5 = 3 (27.27%)
POD 7	<5 = 11 (100%) >5 = 0	<5 = 11 (100%) >5 = 0

Uvular edema

Uvular edema was seen in 3 out of 11 patients (27.27%) of Group A (Conventional). Whereas, 2 out of 11 patients (18.18%) of Group B (Coblation) had Uvular edema.

Table 6: Uvular edema in Group A and B.

Uvular Edema	Group A (Conventional)	Group B (Coblation)
Present	3 (27.27%)	2 (18.18%)
Absent	8 (72.72%)	9 (81.81%)

Return to oral feeds

Out of the total 11 patients in the Group A (Conventional), all 11 (100%) of them could take Liquid Feeds on the 1st Post operative day. Whereas, only 9 (81.81%)could resume Solid feeds on the 1st Post operative day.

Table 7: Return to oral feeds on the 1st post operative day in Group A and B.

Return To Oral feeds on 1st POD	Group A (Conventional)	Group B (Coblation)
Return to liquids	11 (100%)	11 (100%)
Return to solids	9 (81.81%)	10 (90.9%)

In the Group B (Coblation), all 11 (100%) patients started Liquid feeds on the 1st Post operarative day. Whereas, 10 out of 11 patients (90.9%) resumed Solid feeds on the 1st Post operative day.

In this Study, we found that the Coblation group (Group B) could return to Solid feeds better than the Conventional group (Group A).

Days of hospitalization

Table 8: Total days of Hospitalization in Group A and B

	Group A (Conventional)	Group B (Coblation)
Days of Hospitalization	3.36 ± 0.5 days	4.27 ± 0.9 days

The p value is 0.0083 (Independent T test) which states that Conventional tonsillectomy results in less duration of hospital stay is statistically significant.

In this study it was found that the Average days of Hospitalization in group A was 3.36 days on an average and 4.27 days in Group B.

Post operative bleeding

None of the 22 patients that were included in this study had Post op Bleeding.

Nasal obstruction and snoring

8 out of 11 patients in Group A complained of Nasal obstruction and Snoring. Whereas, 9 out of 11 patients complained of Nasal obstruction and Snoring in Group B. These patients were followed up post tonsilloadenoid resection by Conventional and Coblation method respectively at 1 week and 1 month. In the Group A (Conventional), 5 out of 8 patients (62.5%) revealed symptomatic improvement in Nasal obstruction and Snoring after the surgery. In Group B (Coblation) the symptoms of 4 out of 9 patients (44.44%) improved post operatively.

Discussion

Tonsillectomy and Adenoidectomy constitute one of the most common procedures carried out in the 1st and 2nd decade of life. The most common indication for the procedure in children is to reduce the frequency of recurrent episodes of throat pain.

The optimal method depends upon the various parameters like Intraoperative time, Intraoperative Blood Loss, Secondary bleeding, Return to oral feeds and duration of post operative Hospital stay. The various methods of Tonsillo-adenoid Resection include Conventional dissection, Diathermy, LASER, Microdebrider, Coblation and Cryotherapy.

The most common postoperative complication is pain and hemorrhage. The pain is the result of disruption of the underlying muscle and irritation of the glossopharyngeal nerve fibres. This causes subsequent inflammation and spasm of the muscle causing ischemia and protracted cycle of pain that also causes dysphagia. When electrocautery is used for hemostasis or dissection, it produces intense heat that adds to the tissue damage. The pain inhibits swallowing and chewing which leads to dehydration and lassitude leading to poor and delayed recovery and increased duration of hospital stay. After tonsillectomy, healing of the tonsillar fossa by the healthy mucosa occurs within 2-3 weeks. Infection of the tonsillar fossa leading to disruption of the blood vessels causes Secondary Hemmorrhage post surgery.

Coblation is the rapidly growing modality of choice for Tonsilloadenoid resection over the last years gaining popularity over the world. The main advantages of Coblation is reduced operative loss, less intraoperative blood loss, early restoration of oral feeds and minimal postoperative pain.

Our study included 22 subjects undergoing tonsilloadenoid resection out of which 11 underwent Conventional resection and the other 11 were operated by the Coblation method. Out of the 22 participants 2 underwent only tonsillectomy.

In our study, the majority of the patients in both the groups were in the age group of 6-10 years. (8 out of 22 patients). Out of 22 patients, 13 were males and 9 were females, whereby indicating a male preponderance in the study.

Majority of the patients had presenting complaints of Recurrent throat pain (18 out of 22), Nasal obstruction (17 out of 22), Snoring

(17 out of 22) and Mouth breathing (8 out of 22).In the study, out of the 22 patients, majority of the patients had Grade 3 tonsillar grade (16 out of 22) followed by Grade 2 (4 out of 22) and Grade 4 (2 out of 22).

The mean surgical time in our study for the Conventional group was 17.4 min for tonsillectomy and 14.4 min for Adenoidectomy. In the Coblator group, the mean operative time for tonsillectomy was 9.5 min and 7.2 min for adenoidectomy. The p values for tonsillectomy and adenoidectomy were < 0.0001 which is highly statistically significant. The results were similar to the study by Zaki.M.F.2017 where the average operative time was 30.66 ± 8.66 minutes in the traditional group as compared to 10.63 ± 2.45 minutes in the coblation group. Thep value for the Coblation group was <0.000 which was statistically significant. In a study by D Lodh in 2020 the mean duration of surgery in the Coblation group 1 was 9.7 ± 2.3 minutes, while in the Conventional group, it was 18.4 ± 4.1 minutes. This difference was statistically significant ($p < 0.001$) which was similar to our study. As with any new surgical technique there is a learning curve to Coblator assisted Tonsilloadenoid resection. Initially the surgery appears to take more time but our results demonstrate a trend towards decrease in the time of a procedure with experience.

The average blood loss in our study in the Group A (Conventional group)was 49.54 ml and in the Group B (Coblation group) was 41 ml. The p value was 0.0595 which was not statistically significant for the Coblation group. Zaki. M.F. 2017 showed that the blood loss was 65.06 ± 8.73 ml in the coblation group as compared to 174.31 ± 43.98 ml in the conventional group thus leading to a p value of <0.000 which was statistically significant for the coblation group.

In our study, we observed that in the Coblation group (Group B), 7 out of 11 patients (63.63%) had pain scale <5 on the 1st Post operative day. Whereas, in the Conventional group (Group A), 5 out of 11 patients (45.45%) had pain scale of <5 on the 1st Post operative day suggesting that the Coblation group was associated with lesser post operative pain. In a study by Lodh., *et al*. 2020 postoperative pain scores were evaluated for both Conventional and Coblation group by using Visual Analog Scale (VAS). Mean pain average over 10 days was 3.66 in the Coblation group and 6 in in the Conventional group. Lower postoperative pain score in the Coblation group was statistically significant ($p < 0.001$). Amongst the total 11 patients in the Group A (Conventional), all 11 (100%) of them could take Liquid Feeds on the 1st Post operative day. Whereas, only 9 (81.81%) could resume Solid feeds on the 1st Post operative day. In the Group B (Coblation), all 11 (100%) patients started Liquid feeds on the 1st Post operarative day. Whereas, 10 out of 11 patients (90.9%) resumed Solid feeds on the 1st Post operative day. This was attributed to the lesser pain scores in the Coblator group which led to the patients resuming solid feeds earlier. In the study by Lodh., *et al*. the diet recovery period was significantly shorter in the Coblation group (4.7 vs. 7.2 days $p< 0.001$) which was consistent with study conducted by Zaki. M.F. 2017.

The days of hospitalization for the Conventional group was found to be 3.36 days on an average and 4.27 days in Group B. The p value was 0.0083 which was statistically significant for the Conventional group. The Longer hospital stay in the Coblation group could be attributed to the duration of post operative monitoring for complications and patient factors such as longer time to initiate oral feeds.

None of the 22 participants that were included in the study had post operative hemmorhage.

However, 3 out of 11 patients in the Group A (Conventional) and 2 out of 11 patients in the Group B (Coblation) had Uvular edema. This may be associated with the higher post operative pain scale and in turn delayed initiation of oral feeds in the Conventional group. The patients with Uvular edema still had a pain score of 2 at the end of a week post-surgery which improved subsequently. Belloso., *et al*. compared the complication rates in coblation versus conventional tonsillectomy methods. In their study, coblation tonsillectomy was associated with a lesser incidence of delayed hemorrhage, more significantly in the pediatric population. Behrouz Barati., *et al*. (2012) reported that postoperative secondary hemorrhage rate (1 versus 5) was slightly higher in traditional group than the coblation group. Noon and Hargreaves who conducted a clinical study on 36 adults who underwent coblation tonsillectomy, and found a significant increase in the rate of the secondary haemorrhage (22% as compared to 3.4% in the dissection method).

The main Limitation of the Coblator method is the high cost of the wands with one time use requiring the need to frequently replace it during the next procedure. A higher learning curve also adds to the drawback along with the non -availability of the specimen for the histopathological examination.

Conclusion

- Coblator assisted Tonsilloadenoid resection is an effective method which results in lesser intraoperative time, lesser intraoperative blood loss,lesser post operative pain and better tolerability and earlier return to normal diet.
- The High cost of equipment, replacement cost of the wands and expertise in technique and lack of resected tissue for histopathological examination are limiting factors of the Coblator assisted Tonsilloadenoid resection.
- The main limitation of our study is the small sample size accounting to the time -bound nature of this study.
- Thus, Coblator assisted Tonsilloadenoid resection needs to be acknowledged as a safe alternate to conventional Tonsilloadenoid resection.

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