Coblation versus Traditional Tonsillectomy: A Double Blind Randomized Controlled Trial

Zaki Mohammed Farouk*

Department of Otorhinolaryngology, Qena University Hospital, South Valley University, Egypt

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*Corresponding author: Zaki Mohammed Farouk, Department of Otorhinolaryngology, Qena University Hospital, South Valley University, Egypt

Abstract

Background: Coblation tonsillectomy is a recently introduced surgical technique. To measure its benefits against traditional tonsillectomy techniques regarding their advantages and complications.

Aim of work: The study aims to identify differences in time consumption during operation, amount of lost blood during operation, immediate postoperative pain, postoperative haemorrhage whether primary or secondary and time needed to return back to the normal activity and diet.

Study Design: Prospective observational cohort study.

Methods: Comparing 507 coblation tonsillectomies with a control group of 497 traditional tonsillectomies performed by blunt dissection regarding time consumption during operation, amount of lost blood during operation, immediate postoperative pain, postoperative haemorrhage whether primary or secondary and time needed to return back to the normal activity and diet. Each patient had preoperative blood investigations regarding haemoglobin concentration, prothrombin time & concentration to exclude any coagulation disorder. Postoperative analgesics and broad spectrum antibiotics were administered by all patients.

Results: Mean operation time was 10.63±2.45 minutes in coblation group and 30.66±8.66 minutes in traditional group. The mean operation time was thus significantly less for coblation group (p < 0.000). Intraoperative blood loss turned out to be 65.06±8.73 ml for the coblation and 174.31±43.98 for the traditional group (p < 0.000). Mean return to normal diet period was significantly shorter in the coblation group (5.00±1.41 vs. 9.95±1.98 days) (p < 0.000). Otherwise, return to normal behavior was earlier in the coblation group (10.30±2.80 vs. 13.59±3.74 days) (p < 0.000). Postoperative primary hemorrhage rate was higher in traditional group (0.8 %) than coblation group (0.2%). However, secondary hemorrhage rate was higher in coblation group (1.2%) than traditional group (0.2%).

Conclusion: In this study, the new technique using tissue coblation for tonsil dissection offers significant advantages in the operation time compared with dissection tonsillectomy. Coblation is associated with early return to daily activities. Coblation tonsillectomy was associated with a higher incidence of secondary hemorrhage.

Keywords: Coblation tonsillectomy; Traditional tonsillectomy

Introduction

Tonsillectomy is the most routinely performed surgical operation in the recent years. There have been lots of controversies about tonsillectomy techniques to provide better conditions with more benefits and less complications [1]. For more than a century, traditional dissection tonsillectomy has remained the gold standard for tonsil removal [2]. Traditional tonsillectomy leaves the wound open to heal by secondary intention, thus causes pain and bleeding as two major postoperative complications. This is the reason pioneers usually concentrate to decrease these two problems with comparing various techniques [3]. Considering the mentioned morbidities, attempts have been made to improve the outcome by developing new techniques with less postoperative pain and short recovery period. Available techniques include cold-knife dissection, guillotine excision, electrocautery, cryosurgery, the harmonic scalpel, laser tonsillectomy, bipolar diathermy dissection, radiofrequency and coblation methods [4].

Coblation (Controlled ablation), pronounced as plasma technology was recently used in tonsillectomy as it is minimally invasive and low thermal technique. When current from radiofrequency probe pass through saline medium it breaks saline into sodium and chloride ions. These highly energized...
ions form a plasma field which is sufficiently strong to break organic molecular bonds within soft tissue causing its dissolution [5]. Coblation tonsillectomy was initially introduced in 2001 following which a great amount of articles have been published either to confirm its efficacy or to reject that because of unsatisfactory or unproven outcomes with undesirable cost-effectiveness [6,7]. However, more studies are still required to reveal a clear conclusion. Even though some former studies showed a reduced postsurgical pain and no significant morbidity like postoperative hemorrhage, they have not been considered due to their small sample size. Quick return to normal diet was also reported [8,9]. A study observed healing process of the tonsillar bed in 10 patients and concluded that coblation method would be more preferable than bipolar dissection [10]. A recent study defended use of coblation surgery because of decreased bleeding and pain, but cases in the study were only 14 patients [11].

Another study in the UK found no benefits for coblation method comparing with conventional tonsillectomy indicating that traditional tonsillectomy is superior to coblation method. The NICE guidelines have suggested that coblation is probably associated with decreased postoperative pain comparing with bipolar diathermy, however, the outcomes may be different for that of the monopolar diathermy or cold dissection [12]. This study compares coblation and traditional tonsillectomy techniques regarding their advantages and complications.

Materials and Method

A prospective double-blind randomized controlled trial, we tried to find out whether coblation technique decreases the postoperative morbidity compared to traditional tonsillectomy. The study was recruited between 2012 and 2015, comparing 507 coblation tonsillectomies with a control group of 497 traditional tonsillectomies performed by blunt dissection within 24 hours after surgery and secondary hemorrhage, and readmission. On discharge, the patients were advised to call the medical group for any complications especially bleeding.

The primary hemorrhage was defined as bleeding occurring within 24 hours after surgery and secondary hemorrhage as bleeding after 24 hours postoperatively. Each of patients completed a questionnaire concerning the time to return to normal activity. Data were entered into a database and analyzed using SPSS software (SPSS, Windows, version 16). Chi-squared tests were used to compare graded scores for pain. Data of day of return to work and normal diet were analyzed using student’s t-test.

Results

There was no significant difference between the mean age of two groups (p > 0.05). Intraoperative blood loss turned out to be 65.06±8.73 ml for the coblation and 174.31±43.98 ml for the traditional group (p < 0.000). Operation time was thus significantly less for coblation group (p < 0.000). Mean return to normal diet period was significantly shorter in the coblation group (5.00±1.41 vs. 9.95±1.98 days) (p<0.000). Otherwise, return to normal behavior was earlier in the coblation group (10.30±2.80 vs. 13.59±3.74 days) (p < 0.000) as shown in (Table 1). Furthermore, it was revealed that postoperative primary hemorrhage rate was higher in traditional group. However, secondary hemorrhage rate was higher in coblation group than traditional group (Table 2). During follow up period, no other major or minor complications occurred in our study.
Table 1: Operation time, blood loss and Postoperative diet intake and regaining the normal behavior of patients.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Coblation</th>
<th>Traditional</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Time (min)</td>
<td>10.63±2.45</td>
<td>30.66±8.66</td>
<td>0.000</td>
</tr>
<tr>
<td>Blood Loss (ml)</td>
<td>65.06±8.73</td>
<td>174.31±43.98</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-operative diet intake, days</td>
<td>5.00±1.41</td>
<td>9.95±1.98</td>
<td>0.000</td>
</tr>
<tr>
<td>Return to normal Behavior, day</td>
<td>10.30±2.60</td>
<td>13.59±3.74</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 2: Comparison between postoperative hemorrhage in patients.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Coblation (507 Patient)</th>
<th>Traditional (497 Patient)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary hemorrhage</td>
<td>0.2 %</td>
<td>0.8 %</td>
<td></td>
</tr>
<tr>
<td>Secondary hemorrhage</td>
<td>1.2 %</td>
<td>0.2 %</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Tonsillectomy is one of the most common operations performed in otolaryngology worldwide. Coblation tonsillectomy is a recently introduced dissecting technique with few reports in the literature. 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 with steel forceps (as traditional) consumes longer time than coblation tonsillectomy does as a slower dissection [13]. Several studies were done to demonstrate the advantages and disadvantages of coblation tonsillectomy. This study was done to compare between the commonly used dissection tonsillectomy and the relatively new coblation method. Comparison included most of the surgical aspects, the operative and postoperative ones.

As regard the operative time, tonsillectomy is considered to be one of the most common surgical procedures performed in the field of otolaryngology. In fairly experienced hands, the conventional (cold) tonsillectomy takes considerably short operative time. In our study, the time was measured from insertion till removal of mouth gag. The operation time was longer with traditional method than in the coblation method. The mean score for the operative time was 30.66±8.66 minutes in the traditional group as compared to 10.63±2.45 minutes in the coblation group. The mean operation time was thus significantly less for coblation group (p < 0.001).

Furthermore we agree with Van der Meulen and Lowe [22] who reported higher incidence of postoperative hemorrhage when coblation is used. They confirmed need for appropriate caution.

Behrouz Barati et al. (2012) who conducted a study on 94 patients 47 in each group and they 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).

As regard the intra-operative blood loss, some studies showed results in favor of coblation tonsillectomy while other studies reported that there is no significant difference in the intra-operative blood loss between the two methods. In our study, the estimated loss was 65.06±8.73 ml in the coblation group as compared to 174.31±43.98 ml in the conventional. This reflects a considerable difference between the two methods in this particular aspect. We agree with Temple and Timms [16] who stated that the average blood loss is less with coblation. Also we agree with O’Leary and Vorrath (2005) reported higher blood loss in the traditional method than that obtained with coblation method. But we disagree with Pall et al. [17] and Chang KW [18] that showed no difference in blood loss between the two methods.

As regard the postoperative haemorrhage we disagree with Bellosio et al. [19] who 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. And disagree with Behrouz Barati et al. (2012) who reported that postoperative secondary hemorrhage rate (1 versus 5) was slightly higher in traditional group than the coblation group. But we agree with Noon and Hargreaves [20,21] 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). They concluded that the problem is more significant when it comes to adults. The incidence of post tonsillectomy hemorrhage apparently increases among adults operated upon using the coblation technique.

Also we agree with Van der Meulen and Lowe [22] who reported higher incidence of postoperative hemorrhage when coblation is used. They confirmed need for appropriate caution.
and proper training on the coblation method. Furthermore we agree with Windfuhr, Deck and Remmert [4] who reported higher incidence of post tonsillectomy hemorrhage in adults and children who underwent coblation tonsillectomy. Secondary hemorrhage was 7.9% with coblation versus 0.8% with the conventional method. They stated that the conventional tonsillectomy remain to be the method of choice. On the other hand Divi and Benninger [23] started their experience with coblation tonsillectomy at their institution in Detroit, USA. They found no significant difference in postoperative bleeding in both methods. However, they stated that a learning curve could be identified when using postoperative bleeding as an outcome measure for coblation tonsillectomy.

In order to evaluate the return to normal activities, the patients were asked in the postoperative days if they would be able to return to work. Another factor which assessed the clinical recovery was retrieving normal diet. The results were significantly different, mean return to normal diet period was significantly shorter in the coblation group (10.30±2.80 vs. 13.59±3.74 days) (p<0.000), return to normal behavior was 9.95±1.98 days) (p<0.000), return to normal activities was 9.95±1.98 days) (p<0.000), return to normal activity period was significantly shorter in the group (5.00±1.41 vs. 9.95±1.98 days) (p<0.000), return to normal behavior was earlier in the coblation group (10.30±2.80 vs. 13.59±3.74 days) (p<0.000). In our study, the reduction of intraoperative blood loss and operation time in coblation tonsillectomy was obvious and early return to normal diet and activities were clinically and statistically significant. Furthermore, it was revealed that postoperative primary hemorrhage rate was higher in traditional group. However, secondary hemorrhage rate was higher in coblation group than traditional group [24,25].

Conclusion

The new technique using coblation for tonsillectomy offers significant advantages in the operation time and intra operative blood loss compared with dissection tonsillectomy. Coblation is associated with early return to daily activities and normal diet. Also, coblation tonsillectomy is associated with a higher incidence of secondary hemorrhage. Therefore, we believe that the traditional method of tonsillectomy remain to be the method of choice.

References
