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Original Research Article

A retrospective comparative study of postoperative bleeding after coblation tonsillectomy versus noncoblation tonsillectomy in North Indian population

Abdul R. Khan*

Department of Otorhinolaryngology, NIMS Medical College, Jaipur, Rajasthan, India

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***Correspondence:**
Dr. Abdul R. Khan,
E-mail: Arkhan2004@gmail.com

ABSTRACT

Background: This study was done to look at the difference in incidence of postoperative bleeding after tonsillectomy using coblation or noncoblation.
Methods: A review of all the cases of tonsillectomy done at NIMS Medical college from January 2019 to September 2022 was done to ascertain type of tonsillectomy performed and the presence of postoperative bleeding. Statistical analysis was done by chi-square test to determine a statistical difference between the postoperative bleeding rate of coblation and noncoblation method. The Cochraine-Armitage test of linear trend was done to measure change in the postoperative bleeds. The tested term was divided into two-month durations, and the coblation postoperative bleeds were checked for every 2-month period.
Results: 238 tonsillectomies were performed. The postoperative bleed rate for noncoblation tonsillectomy was 3.4% (8/238) and 5/238 (2.1%) in coblation tonsillectomy. No statistical difference (p=0.93) was found between bleed rates for coblation versus noncoblation techniques. There was no difference seen in the need for operative intervention to control postoperative bleeding: 8 (5.4% of only non coblated patients and 3.4% of all tonsillectomy patients) for noncoblation procedure and 5 (5.6% of only coblated patients and 2.1% of all tonsillectomy patients) for coblation procedures (p=0.25). Postoperative bleed rates in coblation patients for the 2-month periods did not reveal an increasing or decreasing trend in the bleed rate (p=0.49).
Conclusions: Coblation tonsillectomy is a safe method for performing tonsillar surgery with no significant difference in postoperative bleeding from previous techniques and no increased need for operative intervention to control postoperative bleeding.

Keywords: Bleeding rates, Coblation, Postoperative tonsillectomy bleed

INTRODUCTION

Everywhere tonsillectomy is a commonly performed procedure. Since many years multiple technological advances have been used in tonsillectomy like laser, coblator and electrocautery, with advantages and disadvantages of each. Coblation method for tonsillar surgery was introduced by the Henry Ford Medical Group (HFMG), in January 2001. In this method tissue destruction is done by the radio-frequency, in which electric current runs through a stream of saline, resulting in the sodium ion's polarization, causing tissue destruction at the tip of the wand. Coblation is less destructive to the adjacent tissue as it produce heat of 60° Celsius versus monopolar cautery, which operates at around 400° Celsius, destroying the collateral tissue more. This protection of the adjacent tissue is also complemented by the saline which is used for local heat propagation and prevents peripheral soft tissue injury. The coblation tonsillectomy is

apparently comparable with other common techniques for tonsillectomy, but there is still no strong evidence to suggest that it possesses any definitive benefits.[1] Three types of tonsillectomy usually done are; Dissection tonsillectomy by steel instruments, Radiofrequency intracapsular tonsillectomy, and coblation tonsillectomy. Tonsillectomy is defined as removal of the tonsil from the underlying tonsillar fossa. In tonsillotomy, the instrument cuts through the tonsillar tissue to remove only the protruding parts of the tonsil medial to the faucial pillars and stops the reduction at a thin layer of lymphoid tissue on the muscular bed of the size of 1 Brodsky. CO2-LASER, radiofrequency (Coblator), monopolar needle, cold scissor, and a surgical knife all have been applied for this purpose.[2,3] There are studies for post tonsillectomy pain control after using different techniques but not much studies are done in India to study difference in post tonsillectomy bleeding difference between coblator and cold steel surgeries.

Aim and objectives

The aim of this study is to compare cold steel versus coblation techniques for postoperative bleeding rates in North India, and to determine if there exists a learning curve with regards to post-tonsillectomy bleeding when senior surgeons use this new technique and tool.

METHODS

This retrospective study was performed from the date of installation of coblator January 2019 till the 31st may 2022. All the patients of tonsillectomies done at NIMS Medical College Jaipur were observed and simple random sampling was done to include cases for the study. Sample size was calculated by data analysis using odds ratio. Google charts analysis was done to analyze data and all patient related information was registered, especially the operative report and case sheet for each patient.

Postoperative bleeding was assessed by examining the records for mention of bleed in a period of 15 days after operation. All case sheet notes were reviewed for possible treatment of postoperative bleeding. Any entry of bleeding was counted as a postoperative bleed, but mention of blood-streaked spit only was not counted as a post-tonsillectomy bleed. In the absence of postoperative follow-up patients were missed. Also, its concocted for this study that those patients who missed follow-up most likely had a favorable outcome and so they were placed in the non-bleed category.

For each bleeding episode, type and mode of treatment utilized was recorded, any operative intervention used was also recorded and compared between the different techniques. Chi-square test was used to compare the coblation and non coblation groups to know statistically significant difference. Hospital stay duration was also noted in both the groups. For tonsillectomy by conventional methods duration of stay was 3.2 days but in coblation methods duration was less than 2.4 days. Flinders secondary post tonsillectomy haemorrhage management protocol was followed at every level. [4]

Inclusion and exclusion criteria

All the patients in which tonsillectomy was performed from the date of Coblator installation, January 2019 till 31 May 2022 were included. Patients in which bleeding was just few spitting or stained tongue or single episode of blood in vomiting, were excluded.

RESULTS

In the 3 years 9 month period of the study, from January 2019 to September 2022, 238 tonsillectomies were performed. Out of which 149 were performed with noncoblation cold steel technique, 2 by coblation tonsillotomy, and 87 by coblation tonsillectomy. In 8; 5.4% (8/149) of only non coblated patients and 3.4% (8/238) of all tonsillectomy patients) of these patients who received noncoblation tonsillectomy postoperative bleeding was seen. There were 1 of the coblation tonsillotomy and 4 coblation tonsillectomy patients identified with bleeding, and calculated as a group of coblation procedure (5.6% of only coblated pts and 2.1% of all tonsillectomy pts). Chi-square test was used to determine whether a statistically significant difference was present. We used the null hypothesis that there was no difference in the postoperative bleed rate for the various tonsillectomy techniques. The p value was 0.93, which does not allow rejection of the null hypothesis, therefore there was no statistically significant differences in these rates. The two types of coblation procedures were then collapsed into one group (5/238, 5.6% bleed rate) and compared against the noncoblation group. The p value here was 0.93, again failing to reject the null hypothesis (Table 1).

Table 1: Contingency table when all postoperative bleeding patients were included.

Parameters	Steel	Coblator	Marginal row totals
Bleed	8 (8.14)	5 (4.86)	13
No bleed	141 (140.86)	84 (84.14)	225
Marginal column totals	149	89	238 (grand total)

Operative intervention to treat postoperative bleeding was also analyzed whether it was much needed or not. There were 8 noncoblation bleeds, in 6 (4.0%) operative intervention was required while in 4 of the 89 (4.5%) coblation tonsillectomies operative intervention was done (Table 2). When analyzed with a Chi-square test, p was 0.24, so no statistical difference existed for operative intervention in post tonsillectomy bleed. The Chi-square statistic is 0.0067, the p value is 0.934851, not significant at $p<0.05$.

Table 2: Contingency table when only postoperative bleeding patients in which operative intervention was done were included.

Parameters	Steel (p value)	Coblator	Marginal row totals
Bleed	6 (6.26) (0.01)	4 (3.74) (0.02)	13
No bleed	143 (142.74) (0)	85 (85.26) (0)	225
Marginal column totals	149	89	238 (grand total)

The Chi-square statistic with Yates correction is 0.0454. The p value is 0.831305, not significant at p<0.05. The Chi-square statistic is 0.0303. The p value is 0.861905, not significant at p<0.05. The Chi-square statistic with Yates correction is 0.0256. The p value is 0.872943, not significant at p<0.05. Learning curve for coblation tonsillectomy at our institute was also explored. For that the coblation tonsillectomy done by all the staff were assembled and listed in timely order. It was then fragmented into 5-month intervals, and a postoperative bleed rate was calculated for each time frame. The bleed rates over the 9 time intervals are 9.2%, 6.9%, 5.2%, 4.7%, 4.2%, 5.8%, 5.1%, 4.0%, and 4.1%. Linear trend was studied for this data with the Cochraine-Armitage test, p value was calculated for this, and it was 0.49. So, increasing or decreasing linear trend not existed over the examined time period. The number of coblation procedures performed varied from 12 to 56 over the time intervals. The bleed rates for the periods examined (I–X) is shown in (Figure 1).

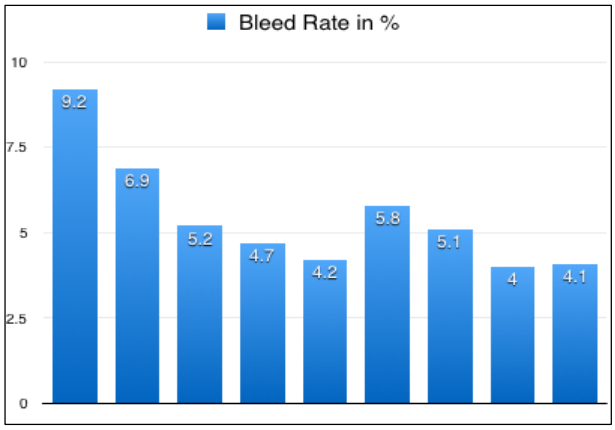

Figure 1: Post-operative bleeding rates during a 5-month period, Y-axis postoperative bleed rate; X-axis 5-month intervals.

DISCUSSION

Radiofrequency coblation is a relatively new technology that has founding favour as a method for performing tonsillectomy. Among its many benefits include reduced pain and postoperative morbidity however there is some controversy regarding possible increased postoperative bleeding rates as mentioned in the cochrane database of systematic Reviews 2007.[5] But in other studies there was further support that coblation tonsillectomy is a reliable and safe procedure with a relatively low incidence of intraoperative and postoperative bleeding.[6] Coblation tonsillectomy technique provides simultaneous ablation of tissue and hemostasis which is one of its most important advantage. Technique of Intra-capsular tonsillectomy by coblation is seldom used, effective and safe procedure that provides rapid post-operative recovery with minimal analgesic requirements. This method deserves more application in treating upper airway obstruction due to tonsillar hypertrophy in children.[7] It also used for a number of other ENT and Head and neck procedures procedures, like Obstructive sleep apnea surgery, Juvenile Nasopharyngeal Angiofibroma Excision surgery, Skull base surgery and also for Inferior Turbinate reduction. In many earlier studies assessments of the use of coblation for tonsillectomies was focused mainly on the reduced amount of pain with this technique. In some studies, it was established that patients who had coblation tonsillectomy complained of lesser postoperative pain and rapid healing when compared with a routine bipolar technique. In other studies it was demonstrated that in coblation tonsillectomy there was reduced incidence of postoperative bleeding. In this study there was no statistically significant difference in postoperative bleeding after the coblation tonsillectomy versus other methods. Also, there was no difference in the bleeding rates between coblation tonsillectomy and tonsillotomy but as tonsillotomy procedure was not done in many patients it was not statistically commendable.[8] The noncoblation techniques used were monopolar electrocautery and steel instruments dissection. Tonsil bleed requiring operative intervention were considered more serious. There were a slightly higher percentage of Non coblation procedures requiring operative management, but this difference was statistically insignificant. In most of the studies there was lack of difference between the two groups which indicate the relative safety of the new technique as compared to earlier used methods. The incidence of post tonsillectomy bleeding varies substantially in the literature from 2.7% to 15.9%, mostly rates lower than 10%.[9-13] In our institution bleeding rate of 5.5% was observed with the accurate data collection provided after analysis of electronic database used by the health system compiled by all clinical, surgical, post-surgical and emergency department. This documentation from all of these locations is channeled into the central database. Studies from these departments may sometimes skip mild ooze visits when the records are retrospectively analyzed and may report an artificially low bleed rate, to avoid this any mention of bleeding in tonsillectomy patient was searched thoroughly. Another

important reason for this bleeding rate is the definition used in this study. Patients were included not only if they had a hospital visit for bleeding or an active bleeding episode was identified in the emergency department but were also identified if they were seen with any bleeding at any time in the postoperative period. Such rigid criteria for bleeding was not used in majority of studies. In some techniques different techniques were assessed to detect bleeding rates in per operative patients, but no difference was found in different techniques.[14] Usually different procedures have a well-observed learning curve which is determined by a reduction of complications incurred as a surgeon becomes increasingly familiar with a new technique. This has been demonstrated for stapes surgery by Hughes.[15] In our study we found absence of a learning curve when examining post tonsillectomy bleeding for the coblation procedures, as surgeons are familiar with the anatomy and technique of tonsil surgery, which is not altered by the use of a new tool.

Limitations

Author acknowledges some limitations in study like surgeon's skill, which can't be generalized or quantified for the research. Though postoperative tonsillectomy bleeding may make it a poor marker when attempting to determine the presence of a learning curve due to its random nature, but still, our study makes this important point as otolaryngologists adopt this coblation technique, no substantive learning curve is expected. There is scope of studies which can look into the length of operative time, post operative pain, scarring as well as amount of anesthetic used to more accurately determine the presence of a learning curve with a new tonsil surgery technique. Coblation is a safe method for tonsillectomy with low complication rates when performed by an experienced surgeon. The Flinders modification of the Stammberger criteria for post-tonsillectomy haemorrhage provides a simple system for data comparison.

CONCLUSION

Coblation is very safe technique when used to perform tonsil surgery, without any significant increase in postoperative pain and bleeding. The technique is very easy to learn, as evidenced by the lack of a learning curve in this study.

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