Original Article

Incidence of Secondary Hemorrhage after Tonsillectomy by Dissection Method and Diathermy (Unipolar) Method

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ABSTRACT

Introduction: *Tonsillectomy remains one of the most commonly performed surgical procedures worldwide, addressing a spectrum of conditions ranging from recurrent tonsillitis to obstructive sleep apnea. The choice between surgical techniques, namely the dissection and diathermy methods, is often contingent upon surgeon preference, patient characteristics, and institutional protocols. This study aims to provide valuable insights into the comparative effectiveness and safety profiles of these two surgical techniques.* ***Methods & Methods:*** *This comparative study delved into patient records spanning from January 2023 to January 2024 at the Department of Otolaryngology and Head Neck surgery in Dhaka National Medical Institute Hospital scrutinizing the outcomes of tonsillectomy procedures performed via the dissection and diathermy (unipolar) methods. Descriptive statistics were harnessed to*

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illuminate demographic characteristics and complication rates within the dissection and diathermy(unipolar) method groups. Analysis of data was carried out by using a statistical package for social science (SPSS) 22.0 for Windows. ***Results:*** *Demographics were similar between groups. Secondary hemorrhage incidence was 15.1% for diathermy and 11.3% for dissection method. Conservative management was predominant (11.3% dissection, 9.4% diathermy). Regarding complications dissection method group: infections 3.8%, velopharyngeal insufficiency 1.9%, postoperative pain 18.9%. Diathermy method group: infections 9.4%, velopharyngeal insufficiency 7.5%, postoperative pain 37.7%.* ***Conclusion:*** *In tonsillectomy the incidence of secondary hemorrhage is slightly higher in the diathermy (unipolar) method group. Moreover, the dissection method shows superiority over diathermy (unipolar), with fewer complications and higher patient satisfaction. Clinicians should consider these factors when choosing surgical techniques, prioritizing patient satisfaction alongside clinical efficacy.*

Keywords: *Tonsillectomy, Dissection method, Diathermy method, Secondary hemorrhage, Patient satisfaction*

INTRODUCTION

Tonsillectomy is among the most common surgical operations. It is one of the most frequently performed procedures in otolaryngology, accounting for about 20%-40% of surgeries in this specialty. "Hot" tonsillectomy methods, such as diathermy and coblation, are widely used, but there is limited evidence to show that they are superior to the traditional "cold steel" dissection with only packing or ties for hemostasis[1,2]. Post-tonsillectomy hemorrhage episodes are unpredictable and can sometimes be life-threatening. Secondary hemorrhage, which occurs on or after the second postoperative day, is one of the most common complications of tonsil surgery, often requiring medical intervention and potentially being life-threatening. Bleeding rates vary widely across different studies, ranging from 0.3% to 15%, due to variations in populations, study designs, and definitions of postoperative bleeding[3-5]. Various tonsillectomy techniques have been developed and refined to enhance safety, reduce operative time, minimize intraoperative blood loss, and lower postoperative morbidity and complications[6]. Diathermy allows for precise removal of the tonsil from its bed, but the risk of hemorrhage after tonsillectomy depends on the exposure of blood vessels in the bed. Using unipolar diathermy can lead to a larger area of necrosis and a higher risk of secondary hemorrhage. Conversely, employing bipolar diathermy to target the bleeder rather than the muscle of the bed results in less muscular injury to the tonsillar bed. The effectiveness of "Hot Tonsillectomy" compared to "Cold Tonsillectomy" is a subject of debate in many studies[7]. In modern otolaryngology, various methods are available for performing tonsillectomy, including dissection, cryosurgery, ultrasonic removal, laser tonsillectomy, and monopolar and bipolar diathermy tonsillectomy. Ideally, the chosen technique should be quick, safe, painless, bloodless, and associated with a swift recovery[8]. Several studies have been showed that, there was significant decrease secondary hemorrhage using conventional

dissection method compared to diathermy[9]. When evaluating the data, it is crucial to clearly define and classify the different types of post-tonsillectomy bleeding (PTB) and the factors linked to an increased risk of PTB. Recent audits of a substantial number of tonsillectomies show consistent PTB rates: 1% for early PTB and 2.5% for delayed PTB; 10% for anamnestic PTB, 2% for objective PTB, and 2% for re-operation PTB[10]. Generally, there are studies where haemorhage rates are higher in hot techniques/electrocautery. Conversely, some studies have reported higher hemorrhage rates associated with cold dissection. Additionally, other studies have found no impact of the surgical technique on the hemorrhage rate[11-13].

OBJECTIVE

General Objective:

- To compare the incidence of secondary hemorrhage between tonsillectomy performed via the dissection and diathermy methods.

Specific Objectives:

- Evaluate the demographic profile of patients undergoing tonsillectomy by both dissection and diathermy methods.
- Determine the incidence of postoperative complications, including secondary hemorrhage, infection, velopharyngeal insufficiency, and postoperative pain, in patients undergoing tonsillectomy by each method.
- Assess the management strategies employed for secondary hemorrhage following tonsillectomy, comparing conservative approaches to surgical interventions.
- Investigate patient-reported outcomes, particularly satisfaction with surgical outcomes, following tonsillectomy performed via the dissection and diathermy methods.
- Offer important perspectives on the relative effectiveness and safety profiles of the dissection and diathermy techniques in tonsillectomy procedures.

METHODS & MATERIALS

This comparative study delved into patient records spanning from January 2023 to January 2024 at the Department of Otolaryngology and Head Neck surgery in Dhaka National Medical Institute Hospital scrutinizing the outcomes of tonsillectomy procedures performed via the dissection and diathermy (unipolar) methods.

Inclusion Criteria:

- Eligible participants were adults, aged 18 years or older.
- Patients who underwent tonsillectomy using either the dissection or diathermy method.
- Complete medical documentation encompassing demographic data, surgical specifics, and comprehensive follow-up information.

Exclusion Criteria:

- Patients with fragmented medical records or missing crucial data points.
- Exclusion of individuals whose tonsillectomies were performed for indications other than recurrent tonsillitis, obstructive sleep apnea, or peritonsillar abscess.
- Individuals with a documented history of bleeding disorders or coagulopathies were excluded from the study cohort.

An exhaustive review of electronic medical records facilitated the extraction of a myriad of variables including demographic descriptors (such as age, and gender), surgical intricacies (methodology employed for tonsil removal, primary indication for surgery), postoperative complications (comprising secondary hemorrhage, infection, velopharyngeal insufficiency, and postoperative pain), strategies employed for secondary hemorrhage management (whether conservative or surgical), and subjective evaluations of patient satisfaction concerning the surgical outcome. Robust statistical analyses were conducted employing a diverse array of methodologies. Descriptive statistics were harnessed to illuminate demographic characteristics and complication rates within the dissection and diathermy (unipolar) method groups. Analysis of data was carried out by using a statistical package for social science (SPSS) 22.0 for Windows. After analysis, the data were presented in tables. Ethical clearance was taken from the ethical committee of Dhaka National Medical Institute Hospital. Informed written consent was obtained from the participants.

RESULTS

Table I: Demographic Characteristics of Study Population (*n*=106)

Characteristic	Dissection Method (*n*=53)	Diathermy Method (*n*=53)
Mean Age (years)	25.4 ± 6.8	26.1 ± 7.2
Gender (Male/Female)	27/26	28/25
Indication for Tonsillectomy		
Recurrent Tonsillitis	35 (66.0%)	32 (60.4%)
Obstructive Sleep Apnea	12 (22.6%)	14 (26.4%)
Peritonsillar Abscess	6 (11.3%)	7 (13.2%)

The mean age of patients undergoing tonsillectomy via the dissection method was 25.4 years, with a standard deviation of ±6.8 years. In comparison, those undergoing the diathermy method had a slightly higher mean age of 26.1 years, with a standard deviation of ±7.2 years. Regarding gender distribution, the dissection method group comprised 27 male and 26 female patients, while the diathermy method group consisted of 28 male and 25 female patients. Both groups thus totaled 53 patients each. The indications for tonsillectomy varied within each surgical technique group. In the dissection method group, the most common indication was recurrent tonsillitis, accounting for 66.0% of cases, followed by obstructive sleep apnea (22.6%) and peritonsillar abscess (11.3%). Similarly, in the diathermy method group, recurrent tonsillitis remained the predominant indication (60.4%), followed by obstructive sleep apnea (26.4%) and peritonsillar abscess (13.2%). [**Table I**]

Table II: Incidence and Severity of Secondary Hemorrhage (*n*=106)

Group	Secondary Hemorrhage (*n*)	Incidence (%)
Diathermy Method	8	15.1%
Dissection Method	6	11.3%

For patients subjected to the diathermy method, 8 individuals encountered secondary hemorrhage, yielding an incidence rate of 15.1%. Conversely, among those undergoing the dissection method, 6 patients experienced secondary hemorrhage, constituting an incidence rate of 11.3%. [**Table II**]

Table III: Management of Secondary Hemorrhage (*n*=106)

Group	Conservative Management	Surgical Intervention
Dissection Method	6 (11.3%)	1 (1.9%)
Diathermy Method	5 (9.4%)	2 (3.8%)

Among patients who underwent tonsillectomy using the dissection method, conservative management was the preferred approach for 6 cases of secondary hemorrhage, accounting for 11.3% of this subgroup. Surgical intervention was required in 2 instances, representing 3.8% of the diathermy method group. Similarly, within the diathermy method group, 5 cases of secondary hemorrhage were managed conservatively, comprising 9.4% of this cohort. One case necessitated surgical intervention, constituting 1.9% of the dissection method group. [**Table III**]

Table IV: Incidence of Postoperative Complications (*n*=106)

Group	Infection	Velopharyngeal Insufficiency	Postoperative Pain
Dissection Method	2 (3.8%)	1 (1.9%)	10 (18.9%)
Diathermy Method	5 (9.4%)	4 (7.5%)	20 (37.7%)

The dissection method group experienced fewer complications across all measured categories. Specifically, infections were reported in 2 patients (3.8%) in the dissection method group, compared to 5 patients (9.4%) in the diathermy method group. Velopharyngeal insufficiency was noted in only 1 patient (1.9%) undergoing the dissection method, whereas 4 patients (7.5%) in the diathermy method group were affected. Additionally, postoperative pain was significantly lower in the dissection method group, with 10 cases (18.9%), as opposed to 20 cases (37.7%) in the diathermy method group. [**Table IV**]

Table V: Patient Satisfaction with surgical outcome (*n*=106)

Group	Very Satisfied	Satisfied	Neutral	Dissatisfied
Dissection Method	45 (84.9%)	7 (13.2%)	1 (1.9%)	0 (0.0%)
Diathermy Method	30 (56.6%)	12 (22.6%)	8 (15.1%)	3 (5.7%)

This study indicated a higher satisfaction rate among patients who underwent the dissection method. In this group, 45 patients (84.9%) reported being very satisfied with their surgical outcome, while 7 patients (13.2%) expressed satisfaction. Only 1 patient (1.9%) felt neutral, and none reported dissatisfaction. Conversely, in the diathermy method group, 30 patients (56.6%) were very satisfied, and 12 patients (22.6%) were satisfied. However, a higher number of patients, 8 (15.1%), felt neutral, and 3 patients (5.7%) were dissatisfied. [**Table V**]

DISCUSSION

Tonsillectomy, a common surgical procedure, is performed for various indications including recurrent tonsillitis, obstructive sleep apnea, and peritonsillar abscess. The choice of surgical technique, either dissection method or diathermy (unipolar) method, often depends on surgeon preference, patient characteristics, and hospital protocols. In this study, we evaluated the demographic characteristics, incidence of complications, management of secondary hemorrhage, and patient satisfaction associated with both dissection and diathermy methods of tonsillectomy. The demographic characteristics of the study population were similar between the two surgical technique groups. The mean age was slightly higher in the diathermy method group, but the difference was not statistically significant[14,15]. Gender distribution was also comparable between the two groups. The primary indications for tonsillectomy, including recurrent tonsillitis, obstructive sleep apnea, and peritonsillar abscess, were consistent with previous literature[16,17]. Secondary hemorrhage is a known complication of tonsillectomy and can occur in both the dissection and diathermy methods. In this study, the incidence of secondary hemorrhage was slightly higher in the diathermy method group compared to the dissection method group. *O'Leary S. et. al*.and *Walker P et al.* also compared these two methods after tonsillectomy. Their results showed a slightly higher incidence of secondary hemorrhage in the diathermy method group which was similar to the current study[18,19]. Conservative management was the preferred approach for most cases of secondary hemorrhage in both groups, with surgical intervention required in a small percentage of cases. These findings align with previous studies indicating that secondary hemorrhage rates are relatively low and can often be managed conservatively[20,21]. The dissection method group experienced fewer complications across all measured categories. Specifically, infections were reported in 2 patients (3.8%) in the dissection method group, compared to 5 patients (9.4%) in the diathermy method group. Velopharyngeal insufficiency was noted in only 1 patient (1.9%) undergoing the dissection method, whereas 4 patients (7.5%) in the diathermy method group were affected. Additionally, postoperative

pain was significantly lower in the dissection method group, with 10 cases (18.9%), as opposed to 20 cases (37.7%) in the diathermy method group. A similar study that compares postoperative complications between dissection and diathermy methods is highlighted in the Cochrane review by Pinder et al. The review found that patients who underwent tonsillectomy with the dissection method experienced fewer postoperative complications compared to those who underwent the diathermy method. Specifically, the dissection method was associated with lower rates of pain and other complications, although diathermy showed reduced intraoperative bleeding [22]. This study indicated a higher satisfaction rate among patients who underwent the dissection method. In this group, 45 patients (84.9%) reported being very satisfied with their surgical outcome, while 7 patients (13.2%) expressed satisfaction. Only 1 patient (1.9%) felt neutral, and none reported dissatisfaction. Conversely, in the diathermy method group, 30 patients (56.6%) were very satisfied, and 12 patients (22.6%) were satisfied. However, a higher number of patients, 8 (15.1%), felt neutral, and 3 patients (5.7%) were dissatisfied. These results are similar with to another study[23].

Limitations of the Study:

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion:

In tonsillectomy the incidence of secondary hemorrhage is slightly higher in the diathermy (unipolar) method group. Moreover, the dissection method shows superiority over diathermy (unipolar), with fewer complications and higher patient satisfaction. Clinicians should consider these factors when choosing surgical techniques, prioritizing patient satisfaction alongside clinical efficacy.

Recommendation:

Based on our findings, we suggest that surgeons consider the dissection method for tonsillectomy as a viable option, factoring in patient characteristics, surgeon experience, and hospital protocols. While the incidence of secondary hemorrhage is slightly higher in diathermy (unipolar) method. Surgeons should weigh factors such as complications and patients satisfaction carefully when selecting the appropriate method, aiming to minimize the risk of postoperative complications and optimize patient outcomes. Additionally, further research may be beneficial to explore long-term outcomes and refine surgical techniques for tonsillectomy.

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