

Bipolar Diathermy Versus Ligation for Hemostasis in Conventional Tonsillectomy: A Comparative Study

Bipolar
Diathermy with
Ligation
Techniques

Javed Iqbal¹, Zahid Mahmood Raahat², Kamran Chaudhry¹, Asif Alam Gul³,
Zaheer Ul Hassan⁴ and Rizwana Akhtar¹

ABSTRACT

Objective: The purpose of this study was to compare the efficacy of Bipolar Diathermy with Ligation techniques in hemostasis, the duration of operation, postoperative pain and incidence and severity of postoperative reactionary hemorrhage.

Study Design: A Prospective Comparative Study

Place and Duration of Study: This study was conducted at the Sughra Shafi Medical Complex, Narowal from June 2018 to December 2020.

Materials and Methods: 98 patients with chronic tonsillitis were included and randomly assigned two groups A and B. 49 patients of group A underwent conventional tonsillectomy under general anesthesia and hemostasis was achieved by Ligation of vessels with 1/0 silk and in 49 patients of group B Bipolar Diathermy was used for hemostasis. The duration of surgery, incidence and severity of Postoperative hemorrhage, severity of post-operative pain was recorded during the stay in the ward and at weekly follow ups for two weeks.

Results: The duration of operation in group B was much less as compare group A. The overall incidence of postoperative haemorrhage was 10.2% with no significant difference in the two groups. The incidence of postoperative pain was recorded in the ward and follow up. Statistically, the difference was not significant with a slight preponderance of pain in group A

Conclusion: Both techniques are equally effective in hemostasis. The bipolar diathermy technique is faster, resulting in saving the time of surgeon and anesthetist and also cost-effective. It is also found to be less painful to the patient on follow ups.

Key Words: Tonsillectomy, Ligation, Bipolar Diathermy, Haemostasis

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INTRODUCTION

Tonsillectomy is one of the most common surgical procedures performed all over the world by ear nose throat surgeons. It is generally considered a safe and simple operation. It is in fact a major surgery because of peri and post-operative haemorrhage and anaesthesia complications. The bleeding may be life-threatening if not timely and efficiently managed.

It has been a challenge to secure haemostasis in tonsillectomy since the first operation performed by Aulus Cornelius Celsus almost 2,000 years ago who enucleated tonsil from its bed by fingertip and waited for haemostasis to occur on its own. Galen was the first to use a snare for the lower pole in tonsillectomy. In the 7th century, Paulus Aegineta described in detail the technique of tonsillectomy. Peter Lowe in 1600 AD introduced the technique of tonsillectomy using tonsil holding forceps and snare. He applied ligatures to control bleeding. In the early years of the 20th century, Blunt Dissection Tonsillectomy became a standard technique in Baltimore by Worthington⁽¹⁾ in 1907 and London by Waugh⁽²⁾ in 1909. Ligation of bleeding vessels was done on regular basis by all surgeons and since then it is considered an effective technique for haemostasis. The use of the Diathermy technique to secure haemostasis was introduced by Hasse and Noguera⁽³⁾ in 1962 and then by Jhonson⁽⁴⁾ in 1962 as an alternative suitable and easy method for haemostasis. However, according to Murty and Watson⁽⁵⁾, the use of Diathermy to secure haemostasis remains controversial in the UK and some other countries, thinking it's

¹. Department of ENT, Sahara Medical College, Narowal.

². Department of ENT, CMH Lahore Medical & Dental College, Pakistan.

³. Department of ENT, CMH Muzaffarabad.

⁴. Department of ENT, CMH Peshawar.

Correspondence: Javed Iqbal, Assistant Professor ENT, Sahara Medical College, Narowal.

Contact No: 03334209388

Email: jikahlon@gmail.com

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increased post-operative haemorrhage rates and morbidity. Many studies have been done to address this issue with particular regard to the safety and speed of this technique. Two types of diathermy are available, Unipolar and Bipolar. Bipolar is an effective and safer mode of haemostasis, whereas, with unipolar diathermy, it is difficult to control depth of tissue coagulation and subsequent devitalization of tonsillar tissue and adjacent vital structures, resulting in variable post-operative pain. With Bipolar Diathermy, area of tissue coagulation is localized between the fine tips of Diathermy forceps causing less tissue damage which results in less post-operative pain and better early healing. Bipolar diathermy is found to be quite effective to achieve satisfactory haemostasis in a spurting vessel from the deep tissue of the tonsillar bed. Ligation does not cause deep tissue damage but may catch muscle fibers in the floor of the tonsil fossa resulting in more postoperative pain. The ligation technique is relatively difficult particularly for bleeding in the lower pole and has a chance of knot slip with tonsillar bleeding.

MATERIALS AND METHODS

This comparative study was carried out at Sughra Shafi Medical Complex/ Sahara Medical College, Narowal from June 2018 to December 2020. The surgeons performing these procedures were experienced in both techniques and had been performing tonsillectomy for more than last 15 years.

Inclusion Criteria: A complete medical history was recorded and a detailed ENT (ear,nose,throat) examination was performed before including patients in this study. All patients suffering from chronic tonsillitis (Acute tonsillitis, with more than 6-7 episodes in one year, five episodes per year for two years, or three episodes per year for three years) were included in this study till a total of 98 patients were operated. There were 68 males and 30 females. These 98 patients were randomly assigned in two groups of 49 each. Each group consisted of 15 females and 34 males.

Exclusion Criteria:

1. Patients with hemoglobin below 10 g/dl or with any bleeding disorder.
2. Patients unfit for general anaesthesia for any reason.
3. Patients not willing for admission and stay in the ward for at least 4 days.

In both groups' conventional tonsillectomy (Dissection method) was performed and hemostasis in group A was secured by Ligation method and in group B by Bipolar diathermy. The efficacy of both techniques in securing hemostasis, duration of surgery, post-operative pain during the stay in the ward and on follow-ups were compared. The incidence of primary and secondary hemorrhage was also compared.

RESULTS

Out of 98 patients, 52 belonged to the age group of 5 to 10 years and 36 were between 11 to 20 years of age. The youngest patient being 5 and the eldest being 40 years of age as shown in Table I.

The success of haemostasis: Both techniques were equally effective in controlling bleeding during the operation. During operation Bipolar Diathermy (**group B**) failed to achieve adequate hemostasis in 1 out of 48 cases and Ligation was unsuccessful in 2 out of 48 cases. Bipolar Diathermy failed to control active spurting blood from the deep vessel, whereas Ligation could not achieve hemostasis of diffuse oozing from tonsillar fossa. In case Diathermy failed, hemostasis was obtained by Ligation. The diffuse tonsillar ooze was controlled by the application of Diathermy. Postoperatively patients were observed in the recovery room when fully conscious and shifted to the ENT ward. In the ward, the incidence of postoperative bleeding was observed as shown in table II.

Cases with postoperative haemorrhage were immediately attended by the operating surgeon. Minor bleeding was controlled by ice cold gargles and simple observation of the patient. Moderate degree bleeding was treated IV fluids, removal clot from tonsillar fossa and IV antibiotics. One case of major bleed was transferred to operation theatre and under general anesthesia the bleeding vessel was ligated. The patient was transfused one unit of whole blood and placed on IV antibiotics as shown in Table III.

Post-Operative Pain: All patients in both groups received paracetamol in appropriate dosage. Incidence of post-operative pain is shown in Table III. Statistically, the difference is not significant and there is as light preponderance of pain in group A. Pain and discomfort were taken as a refusal of the patient to take ice cream/fluids on the first day and semifluid diets the next day and onwards as shown in Table IV.

Table No.1: Age wise distribution

| Age Group (Years) | Diathermy | Ligation | Total Cases |
|-------------------|-----------|----------|-------------|
| 5-10 | 26 | 26 | 52 |
| 11-20 | 15 | 15 | 30 |
| 21-30 | 6 | 6 | 12 |
| 31-40 | 2 | 2 | 4 |

n(98)

Table No.2: Incidence of Post-Operative Hemorrhage

| Incidence | Diathermy | Ligation |
|----------------------|-----------|----------|
| No Hemorrhage | 43 | 43 |
| Primary Hemorrhage | 4 | 3 |
| Secondary Hemorrhage | 1 | 2 |

n(98)

Table No.3: Severity of Post-Operative Hemorrhage

| Severity | Diathermy | Ligation |
|----------|-----------|----------|
| Minor | 3 | 4 |
| Moderate | 1 | 1 |
| Major | 0 | 1 |

n(10)

Table No.4: Post-Operative Pain

| Post Op Day | Diathermy | Ligation |
|-------------|-----------|----------|
| 1 | 48 | 48 |
| 2 | 40 | 36 |
| 3 | 15 | 20 |
| 4 | 4 | 7 |

DISCUSSION

Peri and post-tonsillectomy hemorrhage are the most serious and fatal complication of tonsillectomy⁽⁶⁾. It is always frightening for both, patient and the surgeon. Minor bleeding does not need any active measure but major bleeding necessitates prompt attention, evacuation to operation theatre, exploration of bleeding area and control of bleeding. Primary haemorrhage is generally considered to be related to surgical technique whereas, secondary haemorrhage is due to factors that influence wound healing. Mortality from bleeding is 2 in 10,000 tonsillectomies⁽⁷⁾.

This study aimed to compare the efficacy of Bipolar Diathermy and Ligation in haemostasis during a tonsillectomy, duration of time consumed during tonsillectomy in each technique, post-operative pain experienced by the patient during the stay in the ward. The results of our study have shown that both techniques are equally effective for the control of haemostasis. The use of Bipolar Diathermy is easy and takes less time than Ligation, resulting in shorter operation and anaesthesia time. We assessed our patients in the ward for complaints of post-operative pain and discomfort and their willingness to take ice cream/fluids orally, there was no significant difference in both groups with regards to their pain. Many local and international have been reviewed and results compared. Papangelou⁽⁸⁾, Ritter & Fank⁽⁹⁾, Goycoolea⁽¹⁰⁾ in their respective studies, found little difference in the incidence of postoperative haemorrhage rates but Diathermy has produced much-reduced pain. Roye⁽¹¹⁾ studied 370 cases and found no difference in haemorrhage cases but found a 40% reduction in operative time with Diathermy. However, in this series there was increased pain, they used zonal coagulation with Unipolar Diathermy. Malik⁽¹²⁾ conducted a trial in 450 cases and found no difference in haemorrhage cases but Diathermy was faster than Ligation. Watson⁽¹³⁾ conducted a prospective randomized study of 1,036 cases and found no difference in postoperative haemorrhage with either technique however, operation time was shorter in Diathermy cases. In one study conducted by P.K.

Moonka⁽¹⁴⁾, Diathermy failed to achieve adequate haemostasis in 4 out of 188 cases and Ligation was unsuccessful in 6 out of 188 cases. He concluded that Bipolar is as effective as Ligation in control of haemorrhage. Arif Raza Khan⁽¹⁵⁾ and colleagues conducted a study at a tertiary care hospital of Peshawar, they reported no difference at all in the rate of primary Hemorrhage (6.66%) whether haemostasis was achieved by Bipolar Diathermy or Silk Ligation. In a large series of 1,500 patients studied in Karachi, Rafiq Gudda⁽¹⁶⁾ and colleagues observed only 2 patients with major reactionary Hemorrhage necessitating a return to the operation theatre. In another study by Adel S⁽¹⁷⁾ and colleagues in Iraq noted primary bleeding in 6 patients (2.4%) with bipolar diathermy haemostasis as compared to 13 patients (5.2%) with silk ligation Shiv Kumar⁽¹⁸⁾ and colleagues in India conducted a study of 100 cases, they found that incidence of primary Hemorrhage was same using Diathermy and Ligation as the method of haemostasis. Roberts⁽¹⁹⁾ studied 1,090 cases prospectively & found slight excess of primary bleeding associated with ligation and a slight excess of secondary haemorrhage with Diathermy.

CONCLUSION

Our study has shown that Bipolar Diathermy is equally effective as Ligation for haemostasis during tonsillectomy. Bipolar Diathermy is easier to use and consumes less time so it is cost-effective. Bipolar Diathermy is not significantly more painful postoperatively. It is not quite effective to control haemostasis in spurting blood vessel. The spurting blood vessel needs Ligation. In case of diffuse oozing from a scarred tonsillar fossa where ligation is unable to achieve satisfactory haemostasis, Diathermy is useful. However, it is recommended that all ENT surgeons must be expert to tie ligature in tonsil fossa as the situation may arise when it is necessary e.g., profuse spurting blood vessel, failure of Diathermy equipment or power failure.

Author's Contribution:

| | |
|----------------------------|---|
| Concept & Design of Study: | Javed Iqbal |
| Drafting: | Zahid Mahmood Raahat, Kamran Chaudhry |
| Data Analysis: | Asif Alam Gul, Zaheer Ul Hassan, Rizwana Akhtar |
| Revisiting Critically: | Javed Iqbal, Zahid Mahmood Raahat |
| Final Approval of version: | Javed Iqbal |

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