

## Comparison between bipolar diathermy and silk ligation technique during tonsillectomy

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### Abstract:

**Objective:** to compare the use of bipolar diathermy and silk ligation in tonsillectomy with respect to operative time and post op hemorrhage, in our setting. **Study design:** randomized controlled trial. **Place and duration of study:** nishtar hospital, multan from May 2016 to May 2018. **Methodology:** After consent, 234 patients of chronic tonsillitis of 5 to 35 year of age were selected as per inclusion and exclusion criteria. They were randomly divided in to two groups by using lottery method. In group A, tonsillectomy was done and suture ligation was applied for hemostasis. In group B, tonsillectomy was done and bipolar diathermy was used for hemostasis. Data was entered and analyzed by using SPSS software. **Results:** In our study, mean age was  $13.84 \pm 5.83$  years. Majority of patients 55.13% were between 5-15 years of age. Out of 234 patients, 71.37% were male and 28.63% were females. The mean operative time in group A was  $29.45 \pm 9.71$  minutes and in group B was  $16.37 \pm 4.38$  minutes with p-value  $<0.0001$ . Secondary hemorrhage was seen in 2.56% patients in group A (suture ligation group) and 10.56% patients in group B (Bipolar diathermy group) with p-value of 0.016. **Conclusion:** bipolar diathermy method of hemostasis in tonsillectomy is fast but associated with statistically increase risk of secondary hemorrhage compared to silk ligation.

**Keywords:** tonsillectomy, silk ligation, bipolar diathermy, operative interval, secondary hemorrhage.

### INTRODUCTION

Tonsillectomy stands to be one of the ancient, controversial and a common childhood surgical procedure(1). Recent revolution of technology has led to an ongoing debate about the best method, technique and instruments used in tonsillectomy. Out of many parameters like duration of procedure, easy availability of instruments, post op pain, hospital stay, control of haemorrhage is a major parameter used to distinguish the best technique available(2, 3).

Despite enjoying a probable distinguished position in body immune system in childhood, recurrent infection, apnea, enlarge size causing hindrance in swallowing, speech, breathing and Eustachian tube dysfunction leave us with the only choice of tonsillectomy(3, 4). After narration of recent technique of dissection by Worthington - Waugh and diathermy(electro-dissection) by Remington-Hobbs for tonsillectomy, we have indulged in to an ongoing discussion about the best technique(2, 5, 6). Though harmonic scalpel, cryosurgical technique, electrocautery, coblation, plasma mediated ablation, debrider and laser use in the tonsillectomy have aided to the ongoing debate of best technique but cold dissection snare with ligation for haemorrhage control and bipolar diathermy enjoys the reputation of being most debated techniques(7-9).

Though tonsillectomy is a simple and common procedure but still it is categorized as major surgical procedure owing to the risk of postoperative haemorrhage and anaesthesia complications (10). The intraoperative and postoperative considerable loss of blood is reported in up to 18% and 10% of cases respectively (11). Mortality in tonsillectomy, rarely reported, is related mostly to the haemorrhage(12). Diluted adrenaline, silver nitrate and tannic acid have been used tropically for the containment of postoperative bleeding(13). EACA (epsilon amino caproic acid) is associated with considerable decrease in intraoperative blood loss(14). Moreover, the fear of life threatening blood loss during surgery has led us to use bipolar diathermy, laser, ionic coblation and cryosurgery.

### Material and method:

Study was conducted in nishtar hospital, multan from May 2016 to May 2018 after taking permission from ethical committee. A total number of 234 patients of 5 to 35 years of age were selected who were admitted in ENT department with chronic tonsillitis. Patients with chronic tonsillitis who had at least 4 acute exacerbations

in a year and those with hypertrophic tonsils causing obstructive symptoms were included in our study. Patients with acute tonsillitis, acute respiratory infection, bleeding disorders, uncontrolled medical illness, eagle syndrome, malignancy and those who were not willing to be included in study were excluded. Proper ENT examination and baseline investigations (like complete blood count, viral markers by screening, PT and APTT, x-ray nasopharynx, ECG) were done for each patient. After informed consent patients were divided in to two groups A and B by lottery method. Tonsillectomy was performed under general anesthesia in both groups. After tonsillectomy, Suture ligation and bipolar diathermy was used for hemostasis in group A and B respectively. Both groups were observed post-operatively and follow up was done after 2 weeks. All the information (mean operative time, complain of secondary hemorrhage) was recorded on a pre-designed Performa. All the data was entered and analyzed by using SPSS software. Frequency and percentage was calculated for categorical variables. Effect modifiers like age and gender were controlled by stratification and Chi-square test was applied to see effect of these on secondary hemorrhage and t test was applied to see their effect on mean operative time. P value of < 0.05 was considered significant.

**Results:**

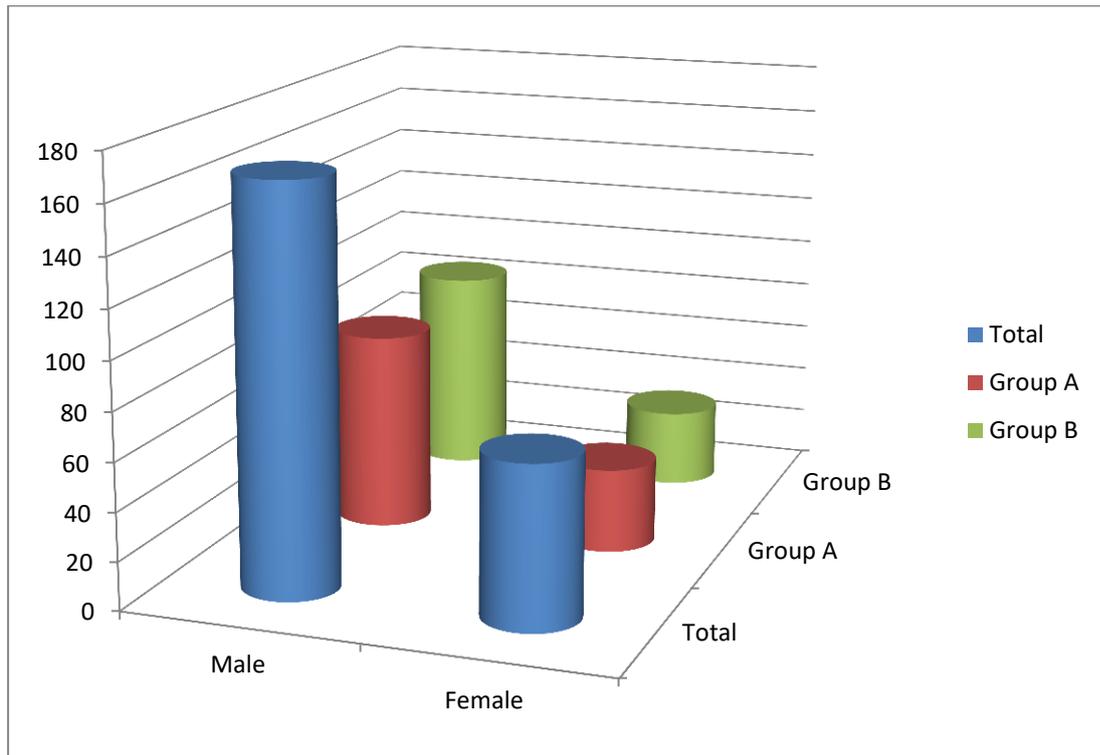
Age range in this study was from 5 to 35 years with mean age of  $13.84 \pm 5.83$  years. the mean age of patients in group A was  $13.58 \pm 5.32$  years and in group B was  $12.97 \pm 5.75$  years. majority of patients 129 (55.13%) were between 5-15 years of age as shown in table 1. out of 234 patients, 167 (71.37) were male and 67 (28.63%) were females with ratio of 2.49:1(Figure V).

The mean operative time in group A was  $29.45 \pm 9.71$  minutes and in group B was  $16.37 \pm 4.38$  minutes with p-value <0.0001 which is statistically significant (figure VI). Secondary hemorrhage was seen in 03 (2.56%) patients in group A (suture ligation group) and 12 (10.56%) patients in group B (Bipolar diathermy group) with p-value of 0.016 as shown in Figure VII. Stratification of age of patients and gender with respect to operative time has shown in Table II & III respectively while Table IV & V have shown stratification of age and gender respectively with respect to secondary hemorrhage in both groups.

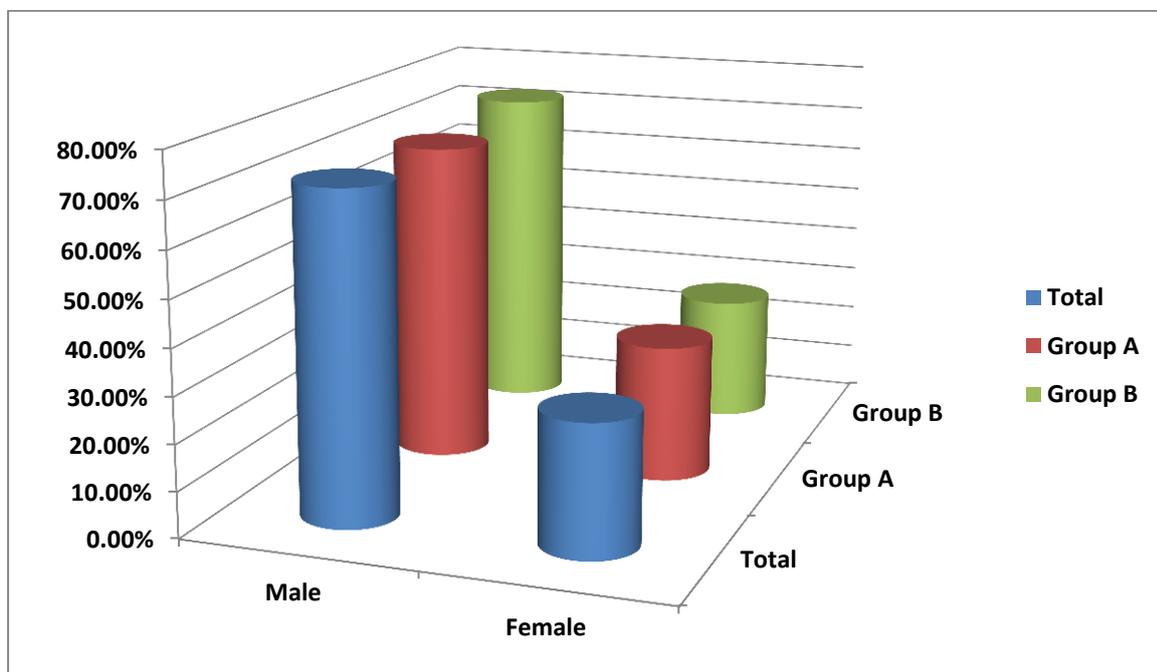
**Table -I: Age distribution for both groups (n=234):**

| Age (years)                     | Group A          |       | Group B          |       | Total (n=234)    |       |
|---------------------------------|------------------|-------|------------------|-------|------------------|-------|
|                                 | No. of patients  | %age  | No. of patients  | %age  | No. of patients  | %age  |
| <b>5-15</b>                     | 64               | 54.70 | 65               | 55.56 | 129              | 55.13 |
| <b>16-25</b>                    | 33               | 28.21 | 34               | 29.06 | 67               | 28.63 |
| <b>26-35</b>                    | 20               | 17.09 | 18               | 15.38 | 38               | 16.24 |
| <b>Mean <math>\pm</math> SD</b> | $13.58 \pm 5.32$ |       | $12.97 \pm 5.75$ |       | $13.84 \pm 5.83$ |       |

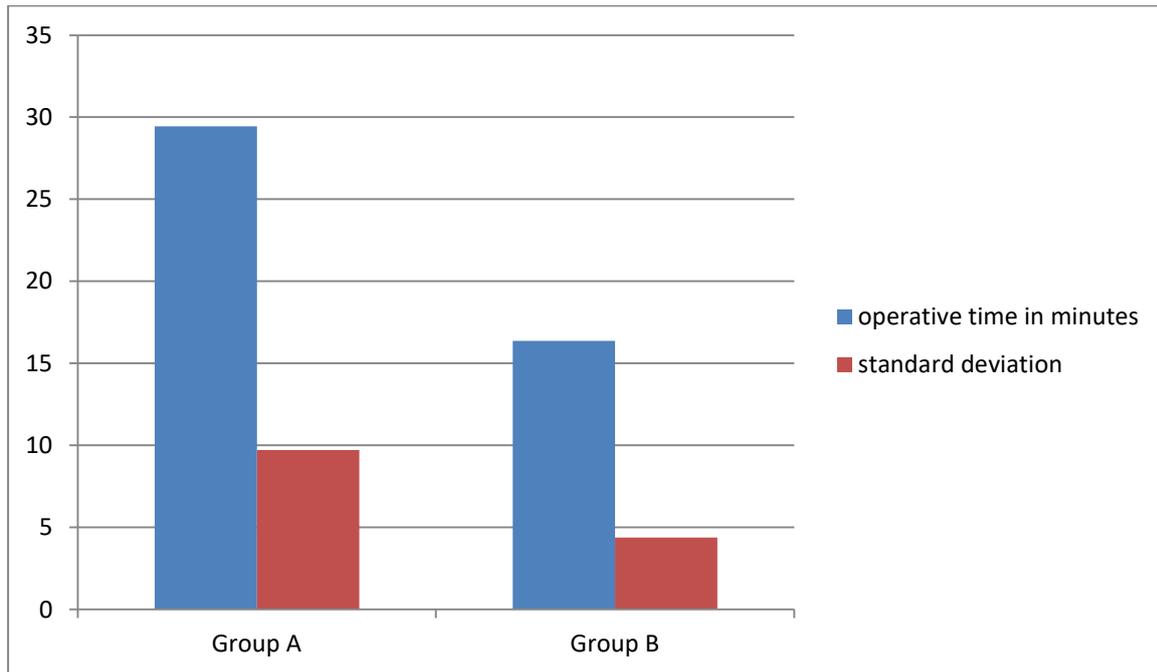
**Figure V: Graph of patients according to Gender (n=234)**



**Figure V: %age of patients according to gender (n=234)**



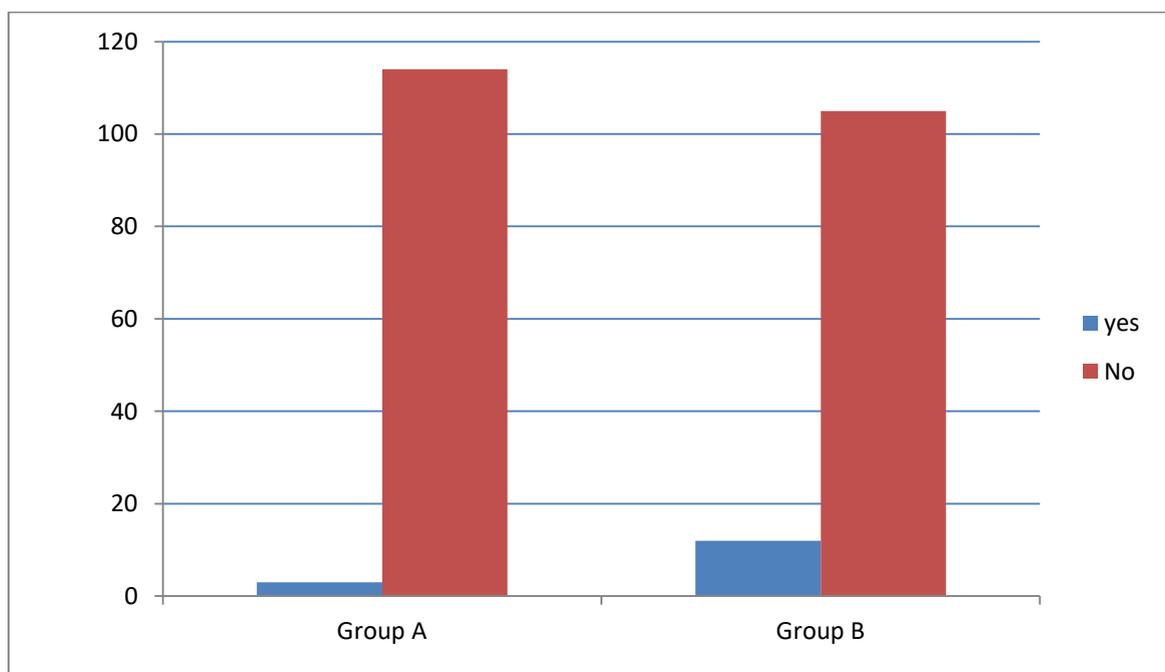
**Figure VI: Mean Operative Time in both groups**



|                           | Group A      | Group B      |
|---------------------------|--------------|--------------|
| <b>Mean</b>               | <b>29.45</b> | <b>16.37</b> |
| <b>Standard deviation</b> | <b>9.71</b>  | <b>4.38</b>  |

➤ p-value <0.0001 which is statistically significant.

**Figure VII: Percentage of secondary hemorrhage in both groups:**



➤ P-value =0.016 which is statistically significant.

**Table II: Stratification of age of patients and operative time in both groups.**

| Age of patients | Operative time (minutes) |       |         |      | P-value |
|-----------------|--------------------------|-------|---------|------|---------|
|                 | Group A                  |       | Group B |      |         |
|                 | Mean                     | SD    | Mean    | SD   |         |
| <b>5-15</b>     | 28.23                    | 7.67  | 15.47   | 4.19 | <0.0001 |
| <b>16-25</b>    | 28.51                    | 10.87 | 16.74   | 5.06 | <0.0001 |
| <b>26-35</b>    | 30.54                    | 9.67  | 16.89   | 4.79 | <0.0001 |

**Table III: Stratification of gender and operative time in both groups:**

| Gender        | Operative Time (in minutes) |      |                 |      | p-value |
|---------------|-----------------------------|------|-----------------|------|---------|
|               | Group A (n=117)             |      | Group B (n=117) |      |         |
|               | Mean                        | SD   | Mean            | SD   |         |
| <b>Male</b>   | 29.39                       | 9.19 | 16.33           | 4.84 | <0.0001 |
| <b>Female</b> | 29.89                       | 9.77 | 16.76           | 4.60 | <0.0001 |

**Discussion:**

To minimize the morbidity and complications associated with tonsillectomy, lot of techniques have been developed each with a unique set of benefits and disadvantages. Despite of these benefits, no single technique has enjoyed the title of being universally acceptable [15]. The variability of operating time, intra as well as post operative hemorrhage, hospital stay, postoperative pain and resumption of routine activities are the set points and basis for the evaluation of different techniques and topic of debate for research purposes.

Our present study was done for the purpose of comparing ligation and bipolar diathermy in contrast of time consumption in operation and risk of secondary hemorrhage. Moreover, it also shed a light on age distribution of tonsillectomy and gender distribution. In our study, mean age was  $13.84 \pm 5.83$  year. Out of 234 patients, majority of patients 55.13% were between 5-15 years of age. As for as gender distribution was concerned, 71.37% were male and 28.63% were females with ratio of 2.49:1. In comparison to our study, sheikh s et al has reported majority of the tonsillectomies in the same age distribution but her findings regarding gender distribution showed higher incidence in females (57.5%) compared to males(2). Similar to our study, khan AR et

al reported high incidence of tonsillectomy in males (72.22%) and he attributed this higher incidence with possibility of male dominating society(15).

In the present study, mean operative time in group A (ligation group) was  $29.45 \pm 9.71$  minutes and in group B (bipolar diathermy group) was  $16.37 \pm 4.38$  minutes with p-value of  $<0.0001$  which is statistically significant. Pang (16), Kirazli et al (17), Silveira et al (18), Raut et al (19) and Blomgren et al (20) reported that electro dissection tonsillectomy was associated with considerable reduction in operative time owing to its potential of simultaneous dissection of tonsils with coagulation of bleeding points. In contrast to our study, studies conducted by Kujawski (21) and Lassaletta et al(22) showed no significant difference between operating time of both groups.

The Secondary hemorrhage was seen in 03 (2.56%) patients in group A (suture ligation group) and 12 (10.56%) patients in group B (Bipolar diathermy group) with p-value of 0.016, in our current study. In contrast to our study, Pang YT(16) and Stephen O'Leary et al (23) concluded that difference between the post operative hemorrhage of both groups had no statistical significance. However, Gendy S(6), Lowe D et al(24), Raut et al(25), Weimert et al (26) and Tay H L(27) reported a considerably increased risk of secondary hemorrhage in electro dissection (diathermy) group of tonsillectomy compared to the cold dissection group. Frequent touch, high power and increase application time leading to excessive thermal damage might give a clarification of association of diathermy with increase secondary hemorrhage(28).

### Conclusion:

In tonsillectomy, electro dissection (bipolar diathermy) use for hemostasis is a fast technique associated with significant decrease in operative time compared to the silk ligation technique. But as far as the chances of secondary hemorrhage are concerned, a significant rise was seen in bipolar diathermy group compared to silk ligation group. So, trainee should also master the technique of silk ligation in tonsillectomy.

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