Conventional Dissection and Bipolar Electrocauterization Methods of Tonsillectomy: A Comparative Study

Sharma A[1], Bhandari S[1], Paudel DR[1]

ABSTRACT

Introduction: Tonsillectomy is frequently performed surgical procedure. There are several different methods with varied advantages and disadvantages. In spite of the different techniques available there is no consensus and definite evidence for best method. The most commonly performed are conventional dissection and bipolar electrocauterization methods. **Aims**: The aim of the study was to compare time required for the completion of surgery, intraoperative and postoperative blood loss along with post operative pain between conventional dissection and bipolar electrocauterization methods. **Methods**: This comparative study was conducted from August 2019 to March 2021 in total of 30 patients planned for tonsillectomy in department of Otorhinolaryngology, Nepalgunj Medical College Teaching Hospital.In every patient right side tonsillectomy was done with conventional dissection method and left side tonsillectomy was done with bipolar electrocauterization method. **Results**: The mean age was 27.2±13.08 years. The mean duration of surgery was 16.53 ± 2.43 min and 11.10 ± 1.93 min in conventional dissection method and bipolar electrocauterization method respectively. The difference was statistically significant. Intraoperative blood loss was significantly lower in bipolar electrocauterization method with mean intraoperative blood loss of 19 ±4.62 ml in bipolar electrocauterization group and 81.83 ±36.54 ml in conventional dissection method. The pain intensity was statistically similar in both methods at all-time intervals post operatively. **Conclusion**: In tonsillectomy, bipolar electrocauterization method has advantage over conventional dissection method in regards to reduced surgical time and intra operative blood loss, without any significant difference in post-operative pain intensity and post-operative hemorrhage.

***Keywords*:** Bipolar electrocauterization, Blood loss, Conventional dissection, Post-operative pain, Tonsillectomy

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INTRODUCTION

Tonsillectomy is one of the oldest and the most common surgical procedure constituting 20% of all otorhinolaryngology surgeries done worldwide.[1,2] Although tonsillectomy is a well-tolerated surgery, it is still not devoid of complications.[3] Post-tonsillectomy hemorrhage is the most frequently encountered complication after tonsillectomy, in addition to pain, dehydration, airway obstruction, vomiting and pulmonary edema.[4] The mortality in tonsillectomy has been reported to be 1 per 1100 to 1 per 1600. Most of these mortalities have been attributed to perioperative bleeding.[5]

Increased post-operative pain intensity indirectly increases chance of secondary hemorrhage as it leads to inadequate oral intake, poor oral hygiene and dehydration which results in infection and early breakage of slough causing disruption of vessels.[6] Thus proper control of postoperative pain is mandatory not only for the comfort of the patient but also to prevent secondary hemorrhage.

Laser and harmonic scalpel have been seen superior to other technique in term of early recovery, less blood loss and less postoperative pain but their availability, affordability, technicality and maintenance costs is a big issue.[7] This reason along with the low cost and ease of the procedure conventional dissection and electrocauterization tonsillectomy are still the two most commonly used techniques.[8,2] Nevertheless there is no consensus in optimal method of tonsillectomy.[9] Hence we chose to conduct a study comparing conventional dissection and bipolar electrocauterization tonsillectomy.

METHODS

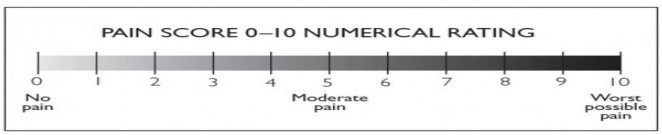
This single blinded, prospective and comparative study was conducted from August 2019 to March 2021 in Nepalgunj

Medical College Teaching Hospital, after taking ethical clearance from Institutional Review Committee (IRC). 30 patients of age 13 years and above, who were undergoing tonsillectomy, were enrolled for the study after taking consent. In every patient right side tonsillectomy was done with conventional dissection method and left side tonsillectomy was done with bipolar electrocauterization method. Both methods were carried out in a single patient, so that the individual patient factors were nullified and each patient becomes their own control.

Patients with congenitally malformed tonsils, acute tonsillitis, quinsy, bleeding disorders and patients on antiplatelets and anticoagulants were excluded from the study. In operation table patient were given general anesthesia according to the standard protocol and operated in Rose's position. For better exposure of the surgical field nasal intubation was done.

The operative time was recorded from time of putting the mucosal incision till the achievement of complete hemostasis. Amount of intraoperative blood loss was measured by adding number of cotton balls used for moping and blood present in the suction jar. Fully soaked cotton balls and partially soaked cotton balls were taken as 1 ml and 0.5 ml blood loss respectively.

Post-operative pain was measured at 2, 6, 12, 18, 24 hours and 2 and 10 days respectively, using Numerical Pain Rating Scale as pain measurement tool.[10]



Both primary and secondary hemorrhage if occurred were noted and if required treated. For pain control all the patient received intravenous (IV) paracetamol as a stat dose just after the surgery in recovery room and thereafter when orally allowed they were given tablet (Tab) paracetamol+ ibuprofen thrice a day (TDS) for 5 days according to their body weight. Diclofenac gargle was started as TDS course 12 hours after the surgery for 7 days in all patients.

Statistical Analysis

Data were analyzed using SPSS 20. Independent t-test was used for analysis. 'p' valve less than 0.05 was considered significant.

RESULTS

The mean age of the study population was 27.2±13.08 years with the maximum age 68 years and minimum age 13 years. With the numbers of male and female, 14 and 16 respectively, there was no statistically significant difference between them. The mean duration of surgery was 16.53 ± 2.43min and 11.10 ±1.93 min in conventional dissection method and bipolar electrocauterization method respectively. The difference was statistically significant. Intraoperative blood loss was significantly lower in cauterization method with mean of 19 ±4.62 ml in cauterization method and 81.83 ±36.54 ml in conventional dissection method.

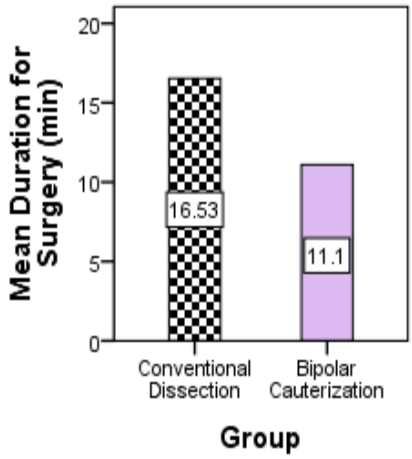


Figure: 1 Comparison of mean duration of surgery

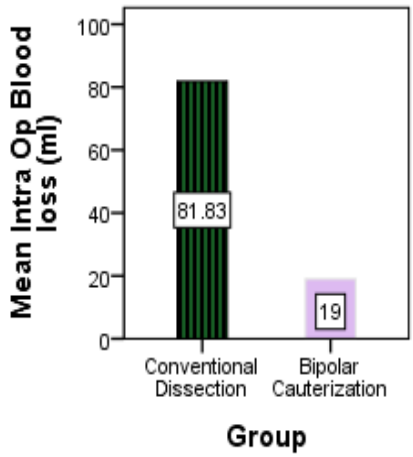
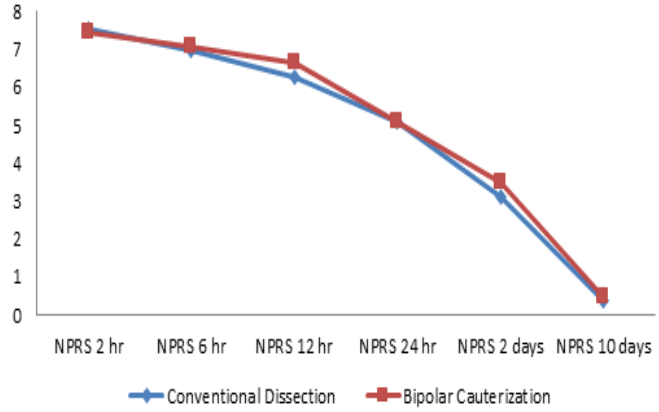


Figure 2: Comparison of mean intra operative blood loss

	Group	N	Mean	Std. Deviation	P Value
Duration for Surgery (min)	Conventional Dissection	30	16.53	2.432	0.00
	Bipolar Cauterization	30	11.10	1.936	
Intra Op Blod loss (ml)	Conventional Dissection	30	81.83	36.542	0.00
	Bipolar Cauterization	30	19.00	4.624	

Table I: Comparison of duration of surgery and intra operative blood loss between the groups



NPRS = Numerical Pain Rating Scale

Figure 3: Comparison of pain intensity in at different time intervals between the groups

Pain rating scale (NPRS)	Group	N	Mean	Std. Deviation	P Value
2hr	Conventional	30	7.53	1.008	
	Bipolar cauterization	30	7.47	1.042	0.802
6 hr	Conventional	30	7.00	1.017	
	Bipolar Cauterization	30	7.07	0.980	0.797
12hr	Conventional	30	6.27	0.980	
	Bipolar Cauterization	30	6.67	1.028	0.128
24 hr	Conventional	30	5.10	0.960	
	Bipolar Cauterization	30	5.07	1.015	0.896
2 days	Conventional	30	3.10	1.447	
	Bipolar Cauterization	30	3.50	1.456	0.290
10 days	Conventional	30	0.37	0.765	
	Bipolar Cauterization	30	0.47	0.860	0.636

Table II: Comparison of pain intensity at different point intervals between the groups

The pain intensity was measured with numerical pain rating scale at 2, 6, 12, 24 hours, 2 and 10 days postoperatively. The pain intensity was statistically similar in both methods at all-time intervals post operatively. In our study only one patient had primary hemorrhage from the conventional dissection method side who resolved with packing with tranexamic acid. Whereas with both methods wound site was healthy, no post-operative hemorrhage and no post-operative infection was seen.

DISCUSSION

The surgical removal of tonsils has been performed as long as three thousand years, as mentioned in Hindu literature. Cornélio Celsus, in the 1st century B.C, was the first to describe tonsillectomy surgery.[11] At the beginning of the twentieth century, Worthington (1907) and Waugh (1909) described the technique of tonsillectomy via a dissection method. Goycolea in 1982 described electrodissection by using monoplar diathermy and Pang YT 10 years later reported the first tonsillectomy by bipolar electrocautery.[1] Although in search for method to decrease the procedure time, blood loss during surgery, postoperative hemorrhage, pain and hasten the wound healing CO2 laser, bipolar radiofrequency and harmonic scalpel are added.[12, 13] They are still not common due to their high cost and technical difficulties. In such situation conventional dissection method and bipolar electrocauterization method tonsillectomy continues to be the most used technique.[8]

Excessive heat of 400°C to 600°C generated from electrocautery can cut tissue and coagulate vessels quickly resulting in reduced operative time, intraoperative bleeding and primary hemorrhage in comparison to conventional dissection. But the main issue is that the heat generated also injures the surrounding tissue including pillar mucosa, which leads to increase post-operative pain, increase risk of necrosis and infected slough formation and thus secondary hemorrhage.[9,14,15,16] It is important to minimize pain following tonsillectomy not just for patient comfort but also because it may impair swallowing, with a risk of dehydration, infection and secondary haemorrhage.[6] Post-tonsillectomy hemorrhage may require further surgical intervention and can be life threatening.[6,17] In our study the duration for the surgery was 16.53±2.43 min and 11.10±1.93 min in conventional dissection and bipolar cauterization methods respectively. The time for completion of surgery was significantly less in electrocauterization method. The study done by Singh OP[18] in 60 patients shows the similar result with mean duration of intraoperative time of 21.75 min and 11.75 min in conventional dissection method and bipolar electrocauterization method respectively. Likewise the study done by Al-Shehri[2] in 2020 in 50 patients shows operation time with bipolar cauterization is significantly reduced when compared to conventional method.

The intraoperative blood loss was statistically significantly lower in bipolar method. The mean blood loss was 81.83±36.54ml and 19±4.62ml in conventional dissection and bipolar electrocauterization method respectively. A study done by Malik S[9] showed 75 ml blood loss in traditional method and 10 ml in bipolar method, which was statistically significant. Similar findings was observed by Mofatteh MR.[1]

Postoperative pain assessment done with numerical pain rating scale in our study showed that there was no statistically significant difference at 2, 6, 12, 24 hours and 2 and 10 days postoperatively. This was similar to the result of Pang YT[19], but different than Mofatteh MR[1] and Al-Shehri[2] studies where the postoperative pain was high and low respectively in traditional dissection method when compared to bipolar method.

There was one case of primary hemorrhage in conventional dissection method which was treated with tranexamic acid. The occurrence was 3.33%. The difference was statistically

insignificant. Similar result was seen in Singh OP[18] study where incidence of post operative hemorrhage was 5% in traditional method which was statistically insignificant when compared to bipolar method.

LIMITATION

The limitation of this study was small sample size.

CONCLUSION

In tonsillectomy, bipolar cauterization method has advantage over conventional dissection method in regards to reduced surgical time and intra operative blood loss, without any significant difference in post-operative pain intensity and post-operative hemorrhage.

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