

Bipolar versus Unipolar Diathermy for Per-operative Haemorrhage Control during Tonsillectomy

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Abstract

Objective: To compare per operative haemorrhage control, and post operative pain during tonsillectomy using bipolar and monopolar diathermy

Patients and Methods: This retrospective study was conducted at Department of ENT CMH Rawalpindi. Data were collected from hospital admission & discharge register from March 2011 to June 2012. One hundred and twelve patients undergoing tonsillectomy were divided into two groups of fifty six each. All patients underwent tonsillectomy with bipolar diathermy being used in Group A and monopolar diathermy in Group B for haemorrhage control.

Results: No statistical difference was found among two groups regarding per operative haemorrhage control. While post operative pain control was significantly better in Group A.

Conclusion: Bipolar as well as unipolar diathermy effectively control haemorrhage in tonsillectomy and bipolar diathermy is more effective controlling post operative pain.

Keywords: Tonsillectomy, unipolar, bipolar, diathermy

Introduction

Although tonsillectomies historically rank amongst the most common surgical procedures performed, their numbers have steadily declined with the advent of antibiotics since the middle of the 20th century. Various surgical techniques are used to perform this operation, including classic blunt dissection, guillotine excision, electrocautery, cryosurgery, coblation, ultrasonic removal, laser removal, monopolar and bipolar dissection, thermal welding tonsillectomy and ligature tonsillectomy.¹ Common targets of these new techniques have been to reduce the incidence of potential complications by shortening the operative time and increasing the safety and comfort of the patient.²

Unipolar and bipolar cautery are both used to ensure post tonsillectomy hemostasis.³ Unipolar diathermy coagulates by simply cauterizing the area, whereas

bipolar selectively cauterizes the area between the prongs thereby reducing the amount of tissue damage and ensuring a more precise hemostasis. Any surgery may result in primary haemorrhage. The surgeon has to control this haemorrhage firstly as excessive haemorrhage can lead to severe consequences in terms of patient health and secondly a clear operating field is must for any surgeon to proceed. Following injury to the vessel in the tonsillar bed two haemostatic processes are started. First there is vasoconstriction of the bleeding vessel followed by a cascade of events to form a platelet plug.^{2,4}

World over many newer dissection and coagulation techniques are been tried to decrease postoperative morbidity and intra operative bleeding. From tonsil scraping with blunt finger dissection without anesthesia to the use of a plasma field for dissection, there have been great strides in the development of modern tonsillectomy techniques. Recently with the introduction of the harmonic scalpel,⁵ microdebrider, coblation, and laser for excision of the tonsils there are claims of decrease in postoperative morbidity.^{6,7} As with the guillotine method becoming obscure these newer techniques seem to push dissection tonsillectomy out of clinical practice but till these new techniques become widely available and cheap dissection method will still be vogue.⁸ These newer techniques apply the principle of dissecting medial to the tonsillar capsule and it is said that this reduces the blood loss and provides a natural cover for the tonsillar bed that would be there in the conventional method.⁹

Material and Methods

This retrospective study was carried out in ENT Department CMH Rawalpindi. One hundred and thirty two patients undergoing tonsillectomy were divided into two groups of sixty six each. All patients

underwent tonsillectomy with bipolar diathermy being used in Group A and monopolar diathermy in Group B for haemorrhage control. Post operatively all patients were given intravenous ceftriaxone 50 mg/kg body weight daily in two divided doses, and intramuscular diclofenac sodium 75 mg twice daily. Intraoperative blood loss was calculated by measuring blood collected in suction reservoir. Blood loss of 25 ml or less was taken as mild haemorrhage, whereas above 25 ml blood loss was scored as severe haemorrhage. Post operative pain was recorded on a graduated scale from 1- 10. Mild pain was scored 1-4, moderate as 5-7, and severe as 8-10.

Results

The study consisted of 112 patients randomly divided into two groups A and B consisting of 56 patients each. There were 87 males and 25 females in the study. Chi square test was applied to test the significance of haemorrhage control and pain scores in both groups. Ages of the patients varied from 18 to 47 years with mean age of 21.6 ± 6.2 SD. Haemorrhage control was compared using chi square test and was not found to be significant in the two groups ($p > 0.05$). Pain score was found to be significantly better in group A as compared to group B.

Groups	Haemorrhage Control		
	Mild	Severe	
A	43	23	66
B	41	25	66

p value > 0.05 (Chi Square test)

Groups	Post Operative Pain Scores			
	Mild	Moderate	Severe	
A	39	20	7	66
B	12	18	36	66

p value < 0.05 (Chi Square test)

Discussion

This study comprised of 112 patients undergoing tonsillectomy. Per operative haemorrhage control was shown to be equally effective with either method. Cautery is recognized worldwide as the most effective method to deal with per operative haemorrhage

control. The advantage with bipolar diathermy over monopolar method is that bipolar diathermy selectively cauterizes the bleeding tissue as the impact size of the burn is 0.5 mm as compared to 5 mm impact area of monopolar diathermy.¹⁰ The advantage of this fact is further demonstrated by decreased pain sensation of the bipolar diathermy group (Group A). Intra operative blood loss dwells on the fact that in the postoperative period mean red blood cell volume is affected immediately rather than the hemoglobin concentration. Haemorrhage after tonsillectomy can be classified according to Windfuhr et al¹¹ as;

1. Grade-1: There is minor capillary oozing which stops spontaneously.
2. Grade-2: bleeding point visible and can be cauterized.
3. Grade-3: Bleeding point not visible and ligation of bleeding point required.
4. Grade-4: Ligation of external carotid artery becomes necessary
5. Grade-5: Lethal outcome.

Amount of blood loss is important as losses of up to 10 % can change the blood pressure significantly and losses of upto 20 % can result in shock. Intraoperative blood loss can be accurately judged in the immediate postoperative period by calculating the haematocrit and not the haemoglobin. The results of our study showed that bipolar diathermy is as good and equal to monopolar diathermy for haemorrhage control. But pain scores were significantly better in Group A. Rungby et al¹² in their study found no difference in haemorrhage control with either use of monopolar diathermy or bipolar diathermy and this was mainly due to the fact that their study was carried out by more than one surgeon with varying surgical expertise and quality of surgery, whereas in our study there only one surgeon had performed all the surgeries over a period of eight months. Ahmed et al¹³ in their study found bipolar diathermy as a better method of haemorrhage control. Haemorrhage control in our study was calculated by using gauze pieces of fixed size. Bipolar diathermy is now also being used as a cutting tool in tonsillectomy and not merely reserved for cauterization¹⁴ as it carries equal precision of a sharp cold steel instrument.¹⁵ Less clearance of surgical fields is required with bipolar tonsillectomy as the blood loss is minimal thereby giving the surgeon an excellent view of the restricted surgical field of the oral cavity.¹⁶ The surgical time is comparable to most of the newer expensive methods¹⁵ with equally good haemorrhage control.¹⁷ The advent of bipolar scissors

has dramatically increased the efficiency of the surgeon and reduced the operating time.¹⁸

Conclusion

During tonsillectomy, haemorrhage control with bipolar and unipolar diathermy was statistically comparable ($p>0.05$); however, post-operative pain was significantly less with the use of bipolar as compared to unipolar diathermy ($p<0.05$).

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