MONOPOLAR CAUTERY VERSUS COLD STEEL DISSECTION FOR TONSILLECTOMY IN CHILDREN. A RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Objective: To compare monopolar cautery with cold steel dissection for tonsillectomy in pediatric age group.
Study Design: A randomized clinical trial.
Place and Duration of Study: Ear, nose and throat (ENT) department Combined Military Hospital Gujranwala, from Jan 2013 to Jan 2015.
Material and Methods: A total of 220 consecutive pediatric patients undergoing tonsillectomy for recurrent or chronic tonsillitis between Jan 2013 to Jan 2015. Both groups were compared with regards to surgery time, intraoperative bleeding, post operative pain and complications.
Results: A total of 20 patients were excluded from the study for various reasons while the data of the rest of the patients has been presented. Mean age of the study group was 8.82 years. A total of 58% of the patients were male. Average time of surgery for monopolar cautery was 29.33 (SD 2.77) min as compared to 18.53 min (SD 2.94) for dissection method which was significant (p<0.005). Average blood loss for monopolar surgery was 11.66 ml and 29.04ml for dissection method (p<0.005). Average pain scores were less for dissection method at 2nd post op day 3.59 vs. 5.51. Rates of primary and secondary hemorrhage were less for monopolar method although they were not statistically significant.
Conclusion: Monopolar cautery though causes decreased intraoperative blood loss however requires longer anesthesia and causes significant post operative pain to the patient.

Keywords: Cold steel dissection, Hemorrhage, Monopolar cautery, Tonsillectomy.

INTRODUCTION

Tonsillectomy is one of the most commonly performed surgeries in any Ear, nose & throat (ENT) department worldwide[1]. First described by Celsius in the 1st century BC many new techniques have evolved since then. These include blunt dissection, guillotine excision, electrocautery, cryosurgery, coblation tonsillectomy, laser tonsillectomy monopolar and bipolar cautery tonsillectomy[1,2]. Due to the presence of an open wound that heals secondarily in case of tonsillectomy the basic aim of all these methods is to reduce the time of surgery, intra operative bleeding, post operative pain and hemorrhage[3,4]. Convincing proof is however still lacking as to the type of surgery that will benefit the patient the most.

In Pakistan cold steel dissection is thre most commonly employed technique for tonsil because of the ease of availability and the fact that most young surgeons are initially trained in performing this surgery switching to other methods as they gain more experience[5]. This entails removal of the tonsil from its bed using sharp and blunt dissectors and controlling the bleeders by applying ligatures[3]. However electrocautery is the most commonly applied technique for tonsillectomy world wide Monopolar diathermy entails using a monopolar cautery probe to thermally coagulate and dissect in the plane of tonsillar fossa and control

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hemorrhage at the same time by ablating the bleeders[5,6].

Although much work has been done world wide comparing different modes of tonsillectomy however such studies are lacking in our set up.

We present a randomized clinical study comparing cold steel dissection with monopolar electrocautery for tonsillectomy with regards to the following out comes.

- Intra operative time
- Intra operative bleeding
- Post operative pain and
- Complication including post operative hemorrhage

SUBJECTS AND METHODS

A total of 220 consecutive patients coming for tonsillectomy in ENT unit of Combined Military Hospital (CMH) Gujranwala from Jan 2014 to Jan 2015 were selected and randomly divided into two groups. Ethical committee's approval was sought before initiating the study. All patients above 4 years regardless of gender presenting with complaints of recurrent tonsillitis, Obstructive sleep apnea, history of peritonsillar abscess and suspected malignancy were included in the study. Patients having bleeding disorders, recent history of respiratory tract infection and any systemic illness or congenital condition were excluded from the study. All surgeries were performed by the researcher or his consultant colleague.

Monopolar tonsillectomy was done using standard monopolar diathermy probe with setting of 20 watts for cutting and coagulation. Cold steel dissection was done using blunt and sharp dissectors and snares for dissection and suture ligation for hemorrhage control.

Surgical time was measured from the time of application of incision on first tonsil to the time of complete hemostasis. Intraoperative blood loss was measured by weighing 1x1cm round cotton swabs before and after tonsillectomy and adding the amount in suction bottle as well. All patients were observed in ward for 48 hours before discharging them with advice to follow up and special emphasis on review in case of bleeding from throat or persistent fever. Pain scores were measured on day 2 using standard Visual Analog Scale. Standardized pain control regime was used in all patients which included syrup paracetamol according to weight every 6 hours. Post tonsillectomy hemorrhage was defined as hemorrhage requiring management in general anesthesia. Patients who were unable to follow up were interviewed telephonically by researcher surgeon personally. SPSS version 16 was used to perform statistical analysis using the one way ANOVA. A p-value <0.05 was taken as significant.

Table-I: Dissection versus cautery in terms of operative time, blood loss & post operative pain.

N=100 in each group		Mean	Std. Deviation	Std. Error	Minimum	Maximum
operative time	Dissection method	18.5300	2.94205	.29420	14.00	25.00
	Cautry method	29.3300	2.77454	.27745	24.00	35.00
	Total	23.9300	6.11901	.43268	14.00	35.00
Intra op blood loss	Dissection method	29.0400	12.99100	1.29910	9.00	87.00
	Cautry method	11.6600	5.29383	.52938	4.00	43.00
	Total	20.3500	13.18319	.93219	4.00	87.00
Post op pain	Dissection method	3.59	1.776	.178	1	9
	Cautry method	5.51	2.227	.223	2	9
	Total	4.55	2.228	.158	1	9

RESULTS

In our study average age of presentation was 8.89 years and included 58% males with almost similar number of males in both groups. The mean time of surgery in dissection group was 18.53 min as compared to monopolar cautery group which was 29.33 min. This was statistically significant (p<0.005). Intra operative blood loss was 29.04 ml in dissection group as compared to 11.66 ml in cautery group. This was also occurred more in cautery group, 14 cases as compared to 5 in dissection group. The results are presented in tabulated form in table-I, II, & III.

DISCUSSION

Tonsillectomy is one of the commonest performed procedures in otolaryngology practice worldwide. Around 60000 surgeries are performed annually in United States alone[1,6]. Common indications for tonsillectomy include recurrent tonsillitis and tonsillar hypertrophy. Other less common indications include unilaterally enlarged tonsil, peritonsillar abscess and halitosis[1,7,8]. In spite of tonsillectomy being a short procedure performed on day care basis mostly; in different setups, it is associated with significant morbidity. Patients usually have post operative pain and odynophagia. Post tonsillectomy hemorrhage is another complication which must be kept in mind while performing the surgery in an outpatient setting[6,8].

Table-II: Comparison of dissection & cautery method in terms of operative time, intra operative blood loss and post operative pain.

		Sum of Squares	Mean Square	Sig.
Operative time	Between Groups	5832.000	5832.000	.000
	Within Groups	1619.020	8.177	
	Total	7451.020		
Intra op blood loss	Between Groups	15103.220	15103.220	.000
	Within Groups	19482.280	98.395	
	Total	34585.500		
Post op pain	Between Groups	184.320	184.320	.000
	Within Groups	803.180	4.056	
	Total	987.500		
	Within Groups	64.780	.327	
	Total	64.780		

Table-III: Frequency of complications in dissection versus cautery method.

Groups A and groups B * post op complication Crosstabulation

		Post Op Complication				Total
		Reactionary haemorrhage	Secondary haemorrhage	Nausea/vomiting	None	
Groups A and groups B	Dissection method	4	1	5	90	100
	Cautry method	1	1	14	84	100
Total		5	2	19	174	200

With such high volume of surgery being performed annually there is a substantial need to look for a viable surgical option which reduces the risk of surgery to the patient while minimizing the duration of stay and associated morbidities.

Our study showed that there was statistically significant time lag in performance of dissection tonsillectomy as compared to monopolar tonsillectomy (18.5 vs 29.33 min) but at the same time this came at a cost of significantly increased (29.04 vs 11.66 ml) intraoperative bleeding. Post operative complications occurred at similar rates in spite of any treatment used. Post operative pain scores were better for dissection group as compared to cautery group (3.59 vs. 5.51). These were also statistically significant. The reason for this may be that monopolar cautery coagulates the tissue by causing thermal damage and the temperature around the probe reaches 200-400^{o}C within an area of 5 mm from the field of probe which therefore causes more tissue trauma and hence post operative pain[5,6]. This also explains the significantly decreased blood loss in cautery method as the bleeders are coagulated at the same time as they arise while dissection method entails removal of the specimen followed by ligation of the bleeding points[9,10]. The surgical time is consequently increased in cautery method as more time is spent in careful dissection while ensuring hemostasis at the same time[10,11].

Our results are similar to review articles done by Pinder et al and Burton and Doree which showed an average surgical time of 18 minutes for dissection method as compared to 21 min for cautery method. Similarly the average intraoperative blood loss was 68.95 ml for dissection and 11.2 ml for monopolar cautery in Burton and Doree and 36 ml in dissection as opposed to 12 ml in diathermy group in the review article by Pinder et al[11,12]. This was significantly less for cautery method as compared to dissection method which reaffirms our finding. Another study done by Tirelli et al found average operative time to be 25 min vs. 35 min for dissection vs. cautery group while Ahmed et al found the average intraoperative blood loss to be 10 ml with cautery as compared to 65 ml with dissection[13,14]. These studies therefore augment our findings. Similarly Burton and Doree also showed that average pain scores were significantly higher for cautery method as compared to dissection surgery[12].

With regards to post tonsillectomy hemorrhage rates the authors found no particular advantage of one technique over the other[11,12,14]. This finding is supported by Pinder et al who concluded that there was no statistically significant advantage of one technique over the other with regards to post tonsillectomy hemorrhage rates[8,11].

The results however fail to overwhelmingly favor one technique over the other as each method is with its pros and cons however ENT unit in our hospital favors monopolar diathermy because of its significantly less intraoperative blood loss at the cost of slightly increased operative time.

A further refinement in our study could have been the use of dissection method on one side and cautery method on the other which could have further reduced the bias.

CONCLUSION

Monopolar cautery though causes decreased intraoperative blood loss however requires longer anesthesia and causes significant post operative pain to the patient.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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