

## COMPARISON OF POSTOPERATIVE PAIN AND HEMORRHAGE IN CHILDREN AFTER TONSILLECTOMY WITH BIPOLAR DIATHERMY TECHNIQUE VERSUS TONSILLECTOMY WITH COLD STEEL DISSECTION AND SILK LIGATURE

Muhammad Ahmed Khan, Zafar Ullah Khan\*, Sumera Akram\*\*, Usman Rafique\*, Hassan Bin Usman\*\*\*

102- Medical Battalion Bahawalpur, \*Combined Military Hospital Kharian, \*\*Bahawal Victoria Hospital Bahawalpur Pakistan,

\*\*\*Institute of Health & Management Sciences Islamabad Pakistan

### ABSTRACT

**Objective:** To compare post operative pain and hemorrhage in children after tonsillectomy with bipolar diathermy versus tonsillectomy with cold steel dissection and silk ligation to secure hemostasis.

**Study Design:** Randomized controlled trial.

**Place and Duration of Study:** Combined Military Hospital (CMH) Kharian from June 2012 to June 2013.

**Materials and Methods:** A total of 126 patients were included in the study through non-probability convenience sampling and randomly divided in two groups of 63 each. In group A patients were treated by tonsillectomy with bipolar diathermy and in group B patients underwent tonsillectomy with cold steel dissection and silk ligation to secure hemostasis. Results in terms of postoperative hemorrhage and pain based on Facial Pain Scale were observed.

**Results:** A total of 126 patients were included in the study and randomly divided in two groups of 63 each. Average age in group A was 6.60 years (SD  $\pm$  2.46) and in group B it was 6.31 years (SD  $\pm$  2.48). There were 33 males (52.38%) in group A while 37 males (58.73%) in group B. Both the groups are comparable with respect to gender ( $p=0.473$ ) and age ( $p=0.522$ ). In group A, there were 5 (7.93%) cases of mild pain as compared to 15 (23.80%) in group B. Similarly there were 32 (50.79%) cases of moderate pain in group A and 39 (61.90%) in group B. In group A 25 (39.68%) had severe pain as compared to 9 (14.28%) in group B. It indicates that patients who underwent tonsillectomy with bipolar diathermy had significantly high frequency of severe pain than group A ( $p=0.03$ ). In both groups there was no incidence of primary hemorrhage. In group A, 3 (4.76%) patients had secondary hemorrhage and in group B, 1 (1.58%) patient had secondary hemorrhage however this was insignificant ( $p = 0.310$ ).

**Conclusion:** Cold steel tonsillectomy technique with silk ligation to secure hemostasis is a safe method. It has significantly less postoperative pain as compared to bipolar diathermy technique. However there is no significant difference in post operative hemorrhage between the two methods.

**Keywords:** Bipolar diathermy, Cold steel Dissection, Tonsillectomy.

### INTRODUCTION

Palatine tonsils are a specialized collection of lymphoid tissue and the largest component of Waldeyer ring which is a ring of lymphoid tissue located in the pharynx<sup>1</sup>. Tonsils are the first lymphoid organs in the body to encounter the ingested pathogens and are involved in immunologic activity<sup>2</sup>. They play an important role in defense of body against various infections and act in the development of immune system. Tonsillectomy is one of the most common otorhinolaryngological

procedures in children and its frequency varies from one region to other<sup>3</sup>.

The common indications of tonsillectomy include recurrent tonsillitis, peritonsillar abscess and obstructive symptoms i.e snoring, obstructive sleep apnea etc. There are different methods of performing tonsillectomy. Most common methods include cold steel dissection method and electrocautery (bipolar and monopolar diathermy). However newer techniques of tonsillectomy have also been invented including tonsillectomy with radiofrequency ablation, harmonic scalpel, microdebrider and CO<sub>2</sub> LASER. Tonsillectomy is an operation which has associated morbidity and complications. A common complication of this surgical procedure is bleeding during or

**Correspondence:** Dr Muhammad Ahmed Kahn, ENT Dept, 102- Medical Bn Bahawalpur, Pakistan  
Email: ahmedkhan2036@hotmail.com

Received: 28 Mar 2014; revised received: 25 Aug 2014;  
accepted: 04 Sep 2014

after surgery. Primary hemorrhage (within 24 hours after surgery) has been reported to be 0.2% to 2.2% and secondary hemorrhage has been reported to be 0.1 to 3 %<sup>4</sup>. Other preoperative complications include trauma to teeth, lips, palate, and larynx. Postop complications are nausea, vomiting, pain, dehydration, referred otalgia, pulmonary edema and velopharyngeal insufficiency<sup>5</sup>. The rationale of the present study was to study the comparison of pain score and complication among the two study groups.

### MATERIAL AND METHODS

These randomized controlled trials were carried out at the department of Ear, Nose and Throat, Combined Military Hospital (CMH) Kharian from June 2012 to June 2013. Patients of either sex in paediatric age group (between the ages of 0 -12 years) were included in the study. All the cases were selected for tonsillectomy under the criteria approved by the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). Inclusion criteria for

control hemostasis. After the operation all the patients were given standard analgesic (Brufen) and antibiotic (Co-amoxiclav) for seven days and were observed for complications including pain and hemorrhage. During postoperative period subjective pain was assessed according to the Facial Pain Scale. The post operative pain was categorized into three categories i.e mild, moderate and severe. Mild pain included pain score of 1-3, moderate pain included score of 4-6 and in severe pain, score ranged from 7 to 10. All the data was recorded on a specially designed performa attached as annexure A. All patients were also observed for postoperative hemorrhage and the parents were advised to report back immediately in case the child develops hemoptysis, hematemesis or bleeding from mouth. The patients who had post tonsillectomy hemorrhage were readmitted and managed according to the protocol under strict observation.

Data had been analyzed using statistical package for social sciences (SPSS) version 19.

**Table-1: Comparison of pain score between the two groups.**

Groups	Mild Pain	Moderate pain	Severe Pain
Group A (n = 63)	5 (7.93%)	32 (50.79%)	25 (39.68%)
Group B (n = 63)	15 (23.80%)	39 (61.90%)	9 (14.28%)

$p=0.03$

**Table-2: Frequency of patients with secondary hemorrhage vs No hemorrhage.**

Frequency	Group A (n = 63)	Group B (n = 63)
Secondary hemorrhage	3 (4.76%)	1 (1.59%)
No hemorrhage	60 (95.24%)	62 (98.41%)
$p$ -value	0.310	

tonsillectomy included recurrent tonsillitis, peri-tonsillar abscess, obstructive sleep apnea and excessive snoring. Patients having congenital bleeding disorders or presence of acute infection were excluded from the study. Total 126 patients fulfilling the inclusion criteria were included in the study through non-probability convenience sampling and randomly divided into two equal groups of 63 each. In group A patients underwent tonsillectomy with bipolar diathermy and in group B the patients underwent tonsillectomy with cold steel dissection and silk ligation to

Frequency and percentage were calculated for qualitative variables while mean and standard deviation (SD) were calculated for quantitative variable. Chi square test was used to develop association between the two groups. A  $p$ -value < 0.05 was considered significant.

### RESULTS

A total of 126 patients were included in the study and randomly divided in two groups of 63 each. Average age in group A was 6.60 years (SD  $\pm$  2.46) and in group B it was 6.31 years (SD  $\pm$  2.48). There were 33 males (52.38%) in group A while 37 males (58.73%) in group B. Both the

groups were comparable with respect to gender ( $p=0.473$ ) and age ( $p=0.522$ ). In group A, there were 5 (7.93%) cases of mild pain as compared to 15 (23.80%) in group B. Similarly there were 32 (50.79%) cases of moderate pain in group A and 39 (61.90%) in group B. In group A 25 (39.68%) had severe pain as compared to 9 (14.28%) in group B. Patients who underwent tonsillectomy with bipolar diathermy had significantly high frequency of severe pain ( $p=0.03$ ) (table-1). In contrast the patients who underwent tonsillectomy with cold steel dissection had higher frequency of mild and moderate pain than severe pain. In both groups there was no incidence of primary hemorrhage. In group A, (4.76%) patients had secondary hemorrhage and in group B, (1.58%) patient had secondary hemorrhage however this was insignificant ( $p = 0.310$ ) as shown in table-2.

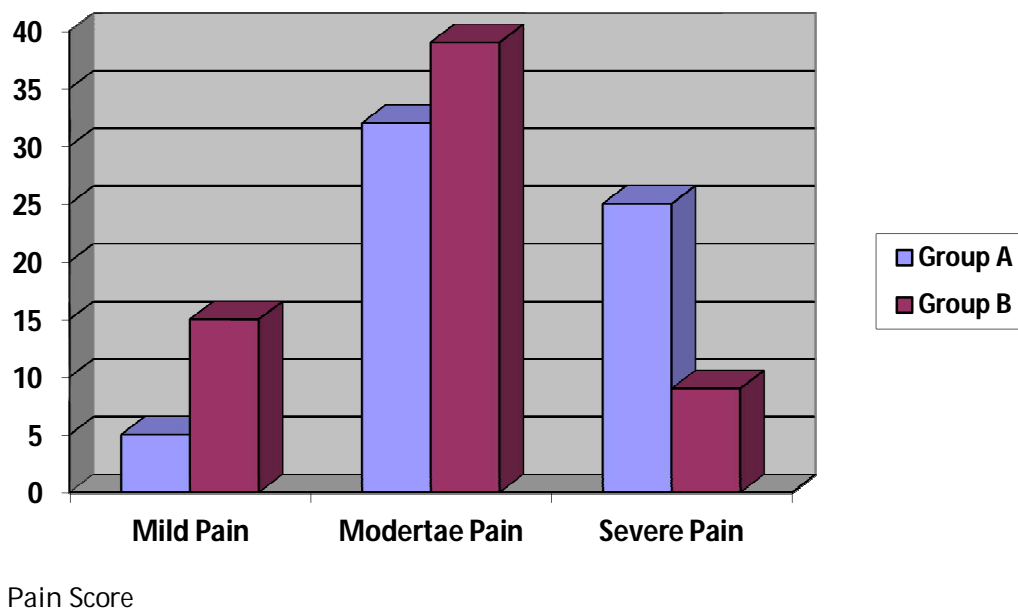
## DISCUSSION

There are various techniques of tonsillectomy which have been devised over the period of years. These techniques are associated with postoperative morbidity and complications. In this study postoperative pain and hemorrhage after the two common techniques of tonsillectomy have been

dissection with silk ligatures to control hemostasis technique.

In the present study, all the children (of both study groups) had postoperative pain but the children in group A (bipolar diathermy technique group) had more pain as compared to children in group B (cold steel dissection with silk ligatures). Average pain of children in group A was 5.84 (SD=2.19) and average pain in group B was 4.85 (SD=2.26) and this was significant ( $p=0.015$ ). This is in accordance with the study of Wexler et al who showed less postoperative pain in children undergoing tonsillectomy with cold steel dissection technique<sup>6</sup>. Similar results in terms of postoperative pain were revealed by Chettri et al<sup>7</sup>. Raut carried out a study which compared bipolar electrocautery and cold dissection method however in this study no significant difference was observed in postoperative pain between the two techniques<sup>8</sup>. The postoperative pain in electrocautery method was found to be less than that of cold steel dissection method in the study of Kousha et al<sup>9</sup>.

In our study there was no case of primary hemorrhage however there were cases of secondary hemorrhage in both groups, typically



**Figure-1: Comparison of pain score between the groups.**

compared i.e bipolar cautery versus cold steel occurring between 5<sup>th</sup> and 8<sup>th</sup> postoperative

days. Secondary hemorrhage was seen in 3 (4.76%) of cases in group A (bipolar diathermy group) and was seen in 1 case (1.48%) of group B (blunt dissection technique group). Pizzuto et al in 2008 compared different techniques of tonsillectomy and found that the bipolar technique was a better choice because of less bleeding, both intra and post-operatively, short recovery period and fewer days off the school<sup>10</sup>. But on the other hand, a systematic review showed the risk of postoperative hemorrhage to be higher following hot techniques (electrosurgical) as compared with cold dissection method<sup>11</sup>. The results in our study were also consistent with those of a randomized controlled trial<sup>12</sup> and large prospective cohort studies showing a higher risk of postoperative hemorrhage after tonsillectomy with electrocautery as compared with cold dissection techniques<sup>13,14</sup>. A retrospective study of 494 patients by Ali et al also showed the postoperative hemorrhage rates to be higher with bipolar cautery technique<sup>15</sup>. In cauterization there is tendency to a deeper and more extensive zone of necrosis and subsequent exposure of larger vessels when sloughing of the eschar occurs and this leads to increased chance of hemorrhage<sup>16</sup>.

## CONCLUSION

Cold steel tonsillectomy with blunt dissection and silk ligatures to secure hemostasis is a safe method. It has significantly less postoperative morbidity i.e post operative pain as compared to bipolar diathermy

technique. However there is no significant difference in post operative hemorrhage between the two methods.

## CONFLICT OF INTEREST

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

## REFERENCES

1. Kenna MA, Amin A. Anatomy and physiology of the oral cavity. In: Snow JB, Wackym PA. Ballenger's Otorhinolaryngology Head and Neck Surgery. 17th ed. Shelton: BC Decker Inc; 2009:769-74.
2. Bernstein JM. Mucosal immunology of the upper respiratory tract. *Respiration*. 1992; 59: 3-13.
3. Van Den Akker EH, Hoes AW, Burton MJ, Schilder AG. Large international differences in (adeno) tonsillectomy rates. *Clin Otolaryngol Allied Sci* 2004; 29:16.
4. Windfuhr JP, Chen YS, Remmert S. Hemorrhage following tonsillectomy and adenoidectomy in 15,218 patients. *Otolaryngol Head Neck Surg*. 2006; 132:281-286.
5. Leong SC, Karkos PD, Papouliakos SM, Apostolidou MT. Unusual complications of tonsillectomy: a systematic review. *Am J Otolaryngol*. 2007; 28(6): 419-22.
6. Wexler DB. Recovery after tonsillectomy: Electrodissection versus sharp dissection techniques. *Otolaryngol Head Neck Surg* 1996; 114: 576-81.
7. Chettri. A single blind controlled study comparing bipolar electrocautery tonsillectomy to cold dissection method in pediatric age groups. *Health Renaissance* 2013; 11(3):270-72.
8. Raut V. Bipolar scissors versus cold dissection tonsillectomy: a prospective, randomized, multi-unit study. *Laryngoscope* 2001; 111(12): 2178-82.
9. Kousha A, Banan R, Fotoohi N, Banan R. Cold dissection versus bipolar electrocautery tonsillectomy. *Journal of Research in Medical Sciences*. 2007; 12:117.
10. Pizzuto MP, Brodsky L, Duffy L, Gendler J, Nauenberg E. A comparison of microbipolar cautery dissection to hot knife and cold knife cautery tonsillectomy. *Int J Pediatr Otorhinolaryngol*. 2000; 52 (3): 239-46
11. Mowatt G, Cook JA, Fraser C. A systemic review of the safety of electrosurgery for tonsillectomy. *Clin Otolaryngol*. 2006; 31:95-102.
12. Haddow K, Montague ML, Husain SS. Post-tonsillectomy hemorrhage: prospective, randomized, controlled clinical trial of cold dissection versus bipolar diathermy dissection. *J Laryngol Otol*. 2006; 120: 450-54.
13. Lee MS, Montague ML, Hussain SS. Post-tonsillectomy hemorrhage: cold versus hot dissection. *Otolaryngol Head Neck Surg*. 2004;131: 833-36.
14. O'Leary S, Vorrath J. Postoperative bleeding after diathermy and dissection tonsillectomy. *Laryngoscope*. 2005; 115:591-594.
15. Ali RB, Smyth D, Kane R, Donnelly M. Post-tonsillectomy bleeding: A regional hospital experience. *Ir J Med Sci*. Dec 2008; 177(4):297-301.
16. Collision PJ, Mettler B. Factors associated with post-tonsillectomy hemorrhage. *Ear Nose Throat J*, 2000; 79(8): 640-2.