

**Original Article**

## COMPARISON OF POSTOPERATIVE PAIN BETWEEN COLD STEEL DISSECTION METHOD WITH BIPOLAR DIATHERMY METHOD OF TONSILLECTOMY

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### ABSTRACT

**Background:** Tonsillectomy is performed to relieve the patients from repeated attacks of recurrent tonsillitis. Post-tonsillectomy pain lasts for 8 to 10 days. Postoperative complications like pain after tonsillectomy can lead to more burden on hospital settings and patient's resources.

**Materials and methods:** A hospital-based comparative study was conducted in the Department of ENT, Hayatabad Medical Complex (HMC) Peshawar between June 1, 2019, and Jan 23, 2022, after obtaining ethical approval from the ethical board of HMC. A total of 236 patients were selected and divided into two equal groups of 118 each, labelled as A and B by consecutive sampling technique. Patients in group A were operated on by the cold steel dissection method while group B by the bipolar diathermy method of tonsillectomy and were assessed for postoperative pain on Visual Analogue Score (VAS). The intensity of pain on VAS was measured after the 6th postoperative hour. Independent t-test for 2 samples was used to compare mean pain scores between the groups and one-way ANOVA test for the differences of pain scores among different age groups.

**Results:** Bipolar diathermy electro dissection has mean post-operative pain of  $7.62 \pm 1.79$  on VAS as compared to cold steel technique with mean pain of  $5.41 \pm 2.42$  which was then analyzed using independent t-test and was found to be statistically significant with  $p\text{-value} \leq 0.001$ . One-way ANOVA was used to see differences in pain scores among different age groups in groups A and B, which showed a significant difference in pain scores with a  $p\text{-value} \leq 0.04$ .

**Conclusion:** The Diathermy method of tonsillectomy caused more pain compared to the cold steel method. Pain scores among the two groups increase with age.

**Keywords:** Cold Steel dissection, Bipolar Diathermy, Tonsillectomy, VAS pain score.

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### INTRODUCTION

Tonsillectomy is a surgical procedure performed

on both children and adults throughout the world. The primary reasons include recurrent tonsillitis and sleep or breathing disorders. Tonsillectomy is commonly indicated in individuals who despite acquiring adequate medical treatment, experience recurrent tonsillitis, recurrent pharyngitis, or those individuals who don't respond to medical therapy<sup>1</sup>.

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In the U.S, approximately 289,000 tonsillectomies are done annually on children under 15 and 5968 on adults performed between 2005 and 2011<sup>2</sup>. National Health Services (NHS) in the UK reports around 35,000 tonsillectomies every year<sup>3</sup>.

Studies suggest that the median hospital revisit rate of tonsillectomies is 9.5%, a mortality rate of 0.03%, a complication rate of 1.2%, and a post-tonsillectomy haemorrhage rate of 2.62%<sup>2,4,5</sup>. In the UK, tonsillectomy is performed with a consistent rate of around 45,000 to 49,000 procedures annually, and it is particularly prevalent in children, who represent nearly two-thirds of the cases<sup>6</sup>. Evidence suggests that in US the rates of childhood tonsillectomy is three times higher than in the UK. According to Herzon et al<sup>7</sup>, in the US, one-third of patients with peritonsillar abscesses comprise children. According to a report, 11.7% of Norwegian children and 12.1% of Turkish children suffer from Recurrent tonsillitis.

Cold steel dissection and bipolar diathermy are two techniques used for tonsillectomy. Although there is much advancement in surgical and anesthetic techniques, still tonsillectomy has significant postoperative morbidities which include pain, poor oral intake, fever, dehydration, vomiting and bleeding. These morbidities are present both in hospital and at home after discharge<sup>8</sup>.

Pain following surgery has an impact on a patient's response to therapy. Postoperative pharyngeal discomfort results from the exposure of sensory nerve endings of the glossopharyngeal and the vagus nerve that supplies this region<sup>8</sup>. When tissues like these are exposed to the environment after surgery, they become irritated, which might cause spasms. Because the constrictor muscles contract with every swallow, inflamed constrictor muscles can be quite painful. Any improvement in surgical technique would seem to have to deal with the problem of these structures being damaged and exposed. Postoperative pain causes difficulty in chewing and swallowing causing dehydration and results in

lassitude and delayed recovery of strength and well-being. studies suggest that postoperative pain after tonsillectomy can lead to pharyngeal pain, otalgia, severe pain intensity, vomiting associated with nausea, difficulty in swallowing, earache, and can be incapacitating, affecting hydration<sup>9</sup>.

These studies suggest that significant post-operative pain after tonsillectomy, especially with larger wounds and recurrent pre-operative tonsillitis, can lead to prolonged hospital stays, although some cases show mild pain with an average discharge time of 2.4 days<sup>10</sup>.

Post-operative pain severely affects the quality of life soon after the procedure. It also results in increased length of stay in the hospital thus affecting hospital workload and output statistics<sup>11</sup>. This study is conducted in the settings of tertiary care hospital of district Peshawar to evaluate and compare the pain score after cold steel and diathermy method of tonsillectomy. This study may be useful to generate updated evidence regarding the best method with less pain for the local population.

## **MATERIALS AND METHODS**

A comparative hospital-based study was conducted in the Department of ENT, Hayatabad Medical Complex, Peshawar from June 1st, 2019 to Jan 23, 2022.

Patients both males and females aged 10-25 years with chronic tonsillitis with duration > 6 months were included in this study. Patients having conditions such as adeno-tonsillitis, unilateral tonsillitis, metastatic malignancy, peritonsillar abscess, congenital anomalies and other comorbid like Down syndrome and asthma were excluded from this study. Ethical approval was sought from the ethical committee of HMC and the CPSP research committee.

All patients attending OPD, and fulfilling the inclusion criteria were included in the study, at Hayatabad Medical Complex, Peshawar. A proforma was designed to note all the information about age and gender was recorded. Confounders were controlled by following exclusion criteria. A written informed

consent was obtained that explained the purpose of the study, the risks that were involved and the benefits offered to the patient. A detailed history was obtained from all the patients, and clinical examination and necessary pre-operative investigations were done.

A total of 236 patients were selected using the WHO sample size formula<sup>10</sup> following assumptions of 95% confidence level and 80% power of the test and keeping a margin of error at 0.05. Patients were selected through consecutive sampling techniques. Patients were divided into two groups with 116 patients in each group. Patients in group A were subjected to the cold steel method of dissection during tonsillectomy while patients in group B were subjected to the bipolar diathermy method during tonsillectomy. All tonsillectomies were done under general anesthesia by experienced ENT surgeons having minimum of five years of experience to avoid bias. All the patients were admitted to the hospital for at least 24 hours. The intensity of pain on VAS was measured after the 6<sup>th</sup> post-operative hour by trained personnel and if any patient complained of pain, then diclofenac sodium (IM) was given based on body weight. VAS is calibrated from 0 to 10 depending upon the severity of pain. The data were analyzed using SPSS version 22. Frequencies and percentages were calculated for categorical variables like gender. Mean and standard deviation were calculated for continuous variables like age, duration of recurrent tonsillitis and pain on VAS. Independent sample t-test was used to compare the mean pain scores in both groups while

keeping the p-value of < 0.05 as significant. Pain score in different age groups was further analyzed using a one-way ANOVA test using a p-value < 0.05 as significant. Mean pain scores in both groups were stratified among the age, gender, and duration of illness to effect modifiers keeping a p-value of < 0.05 as significant.

**RESULTS**

Patients in group A underwent tonsillectomy by cold steel dissection method while for patients in group B, tonsillectomy was done by bipolar diathermy.

There were 73 (61.86%) male and 45 (38.13%) female patients in the cold steel group while 59 (50.0%) were male and 59 (50.0%) were females in the diathermy group. Pain distribution among male and female was statistically insignificant in both the group with p-value 0.06 as shown in Table no 1.

A comparison of mean pain scores showed that cold steel group A had average pain of 5.41±2.42 SD while in diathermy group B it was 7.62±1.79 SD. After applying the independent t-test it was found that mean pain score was significantly higher in the diathermy group with a p-value of 0.001 as shown in Table no 2.

Stratification of mean pain scores for age groups in group A and group B were analyzed using a one-way ANOVA test, it was shown that the distribution of pain among different age groups was statistically significant in groups with a p-value of 0.04. The mean pain score in age groups is shown in Table no 3.

**Table 1: Gender Distribution in Group A and Group B**

Gender Distribution in Both Groups					
		Gender of Patient		Total	p-value
		Male	Female		
Type of Group	Group A (cold steel)	73 (61.86%)	45 (38.13%)	118 (100.0%)	0.06
	Group B (diathermy)	59 (50.0%)	59 (50.0%)	118 (100.0%)	
Total		132	104	236	

**Table 2: Comparison of Mean Pain Scores between Group A and Group B**

Type of group		Pain Score on VAS	p-value
Group A (cold steel)	N	118	0.001
	Mean	5.4153	
	Std. Deviation	2.42257	
Group B (diathermy)	N	118	
	Mean	7.6271	
	Std. Deviation	1.79170	

**Table 3: Stratification of mean pain score for age groups in Group A and Group B**

Age Groups	Comparison Groups	ANOVA	Group A (cold steel)		Group B (diathermy)		p-value
			N	mean±S.D	N	mean±S.D	
10-15	16-20	0.811	81 (68.64%)	4.22±2.01	64 (54.23%)	6.31±2.35	0.04
	21-25	0.045					
16-20	10-15	0.811	19 (16.10%)	5.05±2.01	32 (27.11%)	6.68±1.53	
	21-25	0.219					
21-25	10-15	0.045	18 (15.25%)	5.76±2.51	22 (18.64%)	8.55±1.02	
	16-20	0.211					

**DISCUSSION**

Tonsillectomy is one of the most frequently performed procedures in the department of otolaryngology around the globe in all age groups<sup>10</sup>. Postoperative pain after tonsillectomy can lead to an increased burden on hospital and patient resources. the method of tonsillectomy varies from one setting to another as consensus on the use of the best method for tonsillectomy is not yet developed and more studies are recommended<sup>12</sup>. This study was designed to compare 6th-hour postoperative pain scores in cold steel dissection tonsillectomy and Bipolar diathermy in our study setting.

There were 73 (61.86%) male and 45 (38.13%) female patients in the cold steel group while 59 (50.0%) were male and 59 (50.0%) were females in the diathermy group. Pain distribution among males and females was statistically insignificant in both the group with a p-value of 0.06.

A comparison of mean pain scores showed that cold steel group A had average pain of 5.41±2.42 SD while in diathermy group B it was 7.62±1.79 SD. After applying an

independent t-test it was found statistically significant with a p-value of 0.001. Tay et al showed that diathermy has increased postoperative pharyngeal pain. It was mentioned that diathermy also has an increased otalgia risk. A study done by MN Kumar found that postoperative pain on the first day was less in the cold steel method (4.4889±0.6613) compared to the bipolar diathermy method (4.9556±0.2084)<sup>13,14</sup>. However, Nunez et al and M. Ali in their studies reported that there is no significant difference between pain scores in the two groups in the first 24 hours.<sup>15,16</sup>

Stratification of mean pain scores for age groups in group A and group B were analyzed using a one-way ANOVA test, it was shown that the distribution of pain among different age groups was statistically significant with a p-value of 0.04 with a higher mean pain score of 8.55±1.02 was found in diathermy group aged 21-25. This is in line with research by Wexler et al.<sup>17</sup> that found children following tonsillectomy surgery using the cold steel dissection technique reported less pain. Similar results in terms of postoperative pain were revealed by Chettri et al<sup>18</sup>. Tay’s study<sup>13</sup> also

reported that on the first postoperative day in adult patients, there is significantly more pharyngeal pain on the diathermy. This is in agreement with research by Wexler et al<sup>17</sup> which indicated that children undergoing tonsillectomy with cold steel dissection technique experienced less postoperative pain than those using the diathermy approach.

### CONCLUSION

Cold steel tonsillectomy with blunt dissection is a safe method. The Diathermy method of tonsillectomy caused more pain compared to the cold steel method. Pain scores among the two groups increase with age.

### AUTHOR'S CONTRIBUTION:

MUS: Conceived Idea, Designed Research Methodology, Data Collection, Proofreading & Final Approval

SI: Literature Search, Data Analysis, Manuscript Writing, Proofreading, & Final Approval

JA: Proofreading, Literature Search, Data Analysis

HM: Designed Research Methodology, Data Collection, Literature Search,

K: Designed Research Methodology, Data Collection, Literature Search

MIU: Literature Search, Data Analysis, Manuscript Writing.

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