

# HARMONIC SCALPEL AND TONSILLECTOMY

Arif Raza Khan, Inayat Ullah Khan, Muhammad Hafeez, Asad Ullah Arif

Department of Otorhinolaryngology and Head and Neck surgery Khyber Teaching Hospital, Peshawar - Pakistan.

## ABSTRACT

**Objective:** To know the outcome of tonsillectomy by Harmonic scalpel in terms of bleeding and pain.

**Material and Methods:** This was a case controlled study, conducted in the department of otorhinolaryngology and head and neck surgery, Khyber Teaching Hospital-Peshawar-Pakistan. The study period was from June 2017 to June 2018, A total of 40 patients were enrolled in the study. Patients of both sexes with age range of 5 to 40 years presented with chronic tonsillitis were included while those patients who presented with sinusitis and tonsillitis, pharyngitis with tonsillitis, with deviated nasal septum and tonsillitis were excluded from the study.

**Results:** A total of forty patients were enrolled in the study, the youngest age was 5 years and the oldest was 40 years. Twenty five (62.5%) were male and 15(37,5%) were female patients. In all the patients main indication for the operation was chronic tonsillitis. One patient had huge tonsil of the right side in oldest age group and a suspicion of malignancy arose for which both of the tonsils of this patient was subjected to histopathology to rule out the malignancy, but the biopsy report suggested chronic tonsillitis. The time taken for the operation was from 4 -10 minutes, In the 30 cases the time taken was from 4 -8 minutes and in the rest it was upto 10 minutes.

**Conclusion.** Harmonic Scalpel used in tonsillectomy caused no or minimal bleeding per operatively, so it is a safe procedure although is costly.

**Key words:** Tonsillectomy, Harmonics, Scalpel, Bleeding.

---

**This article may be cited as:** Khan AR, Ullah I, Hafeez M, Ullah AU. Harmonic Scalpel and Tonsillectomy. J Med Sci 2018; 26: (3) 254-256.

---

## INTRODUCTION

Tonsillectomy is a procedure which was first attempted in 3000 BC by Celsius<sup>1</sup>. Initially parts of tonsil were removed, later on in 1827 the first gullitone tonsillectomy was performed by an American surgeon<sup>2</sup>. subsequently tonsillotomy or enucleation of tonsils came into being<sup>3</sup>. In recent past tonsillectomy was performed by dissection method utilizing amputating snare<sup>4</sup>.

Now a days the procedure of tonsillectomy is routinely done worldwide. This operation is associated with postoperative pain and haemorrhage in the initial and postoperative period<sup>5</sup>. Various surgical procedures are adapted to reduce postoperative pain and bleeding like electrocautry, cryosurgery, LASER surgery, cobra-

tion etc<sup>6</sup>. the new advance of harmonic scalpel which is an ultrasonically activated surgical device, which can coagulate after cutting the blood vessel or tissues at low temperature<sup>7</sup>. It does not conduct electric current and has high ability of haemostasis. The harmonic scalpel controls the bleeding by coaptive coagulation at low temperature ranging from 60 to 100 degrees Celsius<sup>8</sup>. The blood vessels are tamponaded and sealed by protein coagulam this process occurs by protein denaturation when the blade vibrating at 55,500 Hz couples with protein<sup>9</sup>. The larger vessels are sealed with prolonged secondary heat, the visual field remains clear because of less thermal damage with minimal smoke. The essential components of harmonic scalpel includes a generator, a hand piece (shear) with a connecting cable, a blade system with foot pedal. the generator is microprocessor with a high frequency controlling switching power supply that drives the acoustic system in the hand piece, it has five power levels<sup>10</sup>. The coagulation and cutting speed are inversely proportional. The study was conducted in a tertiary care hospital for surgery, peri and postoperative bleeding, postoperative complaints and follow up. This procedure (harmonic scalpel) was carried out for the first time in our setup.

---

**Professor Dr. Arif Raza Khan** (Corresponding Author)  
Chairman and HOD  
Department of Otorhinolaryngology Khyber Teaching Hospital Peshawar - Pakistan  
Contact: +92-333-9167305  
Email: arifraza\_k@yahoo.com

**Date Received:** July 05, 2018  
**Date Revised:** Aug 30, 2018  
**Date Accepted:** Sept 20, 2018

## MATERIAL AND METHODS

This was a case controlled study, conducted in the department of otorhinolaryngology and head and neck surgery, Khyber Teaching hospital - Peshawar -Pakistan. The study period was from June 2017 to June 2018, A total of 40 patients were enrolled in the study. Patients of both sexes with age range of 5 to 20 years presented with chronic tonsillitis were included while those patients who presented with sinusitis and tonsillitis, pharyngitis with tonsillitis, with deviated nasal septum and tonsillitis were excluded from the study. After the base line investigations, the fitness for general anaesthesia was sought from the incharge anaesthesia department. The patients were kept nil by oral 6 hours before the operation, then were shifted to operation table, full general anaesthesia was given and a gauze pack was kept in hypopharynx to stop the secretions or the blood to enter the stomach. The medium size of harmonic scalpel was used in all of the cases, the time taken for the procedure ranges from 4 to 10 minutes and in about 30 minutes the patients recovered from the effect of anaesthesia, these patients were kept in day surgical unit (DSU) for 12 hours and when the patients were fully recovered and able to swallow were discharged with oral treatment.

## RESULTS

A total of forty patients were enrolled in the study, the youngest age was 5 years and the oldest was 40 years. Twenty five (62.5%) were male and 15(37.5%) were female patients. In all the patients main indication for the operation was chronic tonsillitis. One patient had huge tonsil of the right side in oldest age group and a suspicion of malignancy aroused for which both of the tonsils of this patient was subjected to histopathology to rule out the malignancy, but the biopsy report suggested chronic tonsillitis. The time taken for the operation was from 4 -10 minutes, In the 30 cases the time taken was from 4 - 8 minutes and in the rest it was upto 10 minutes probably because of the fibrosis of tonsils. Intraoperatively in 38(95%) patients the amount of blood loss was minimal or no blood was lost even no swab was kept in the fossa and no suctioning was done. In 2(5%) cases only one swab was required in each fossa to soak the bleeding which was again very minimal and no suctioning was required. In immediate post operative period the pain was minimal in the throat and a regular dose of oral analgesia (Syp ibuprofen 100 mg TDS in children and 200mg TDS in adults) took care of pain for 5 days, none of the patient required additional analgesia. In almost all the cases pain subsided on 4th day but the analgesia was given one day more to settle the pain completely. There was no oedema of the uvula

was found and the reason was not use of suction tip which normally touches the uvula during the process of suctioning. Three (7.5%) of female patients complained the foreign body sensation in throat and found difficulty in swallowing. All the patients were discharged home after 12 hours stay in DSU and were regularly followed after 10, 20 and 30 days in OPD. All the patients started normal activities and food after 10th day of the operation.

## DISCUSSION

Removal of one or both the tonsils are commonly performed procedure in the world<sup>11</sup>. This procedure was previously performed by the dissection method with a great loss of intraoperative blood<sup>12</sup>. With the advent of newer methods and especially the harmonic scalpel method there is a minimal loss of blood and almost no damage to surrounding structures. In our study the time taken for the procedure was from 4 to 10 minutes, conducted by while a study conducted by Dutta NN et al the time taken was from 5 to 30 minutes probably the reason could be the learning curve and the study was done in 2001<sup>13</sup>. The two most important postoperative complications are pain and haemorrhage<sup>14,16</sup>. The degree of pain is related to the degree of soft tissue damage, if this pain is related to the oral stasis, this predisposes to infection and further pain and risk of secondary haemorrhage<sup>17</sup>. The harmonic scalpel is associated with less pain with subsequent less postoperative pain. In our study in almost all cases there was minimal pain and which got settled in 4 to 5 days these findings are consistent with the other studies<sup>18,19</sup>. The dissection time of the procedure was also very less in most of the literature<sup>20</sup>, which is almost comparable to our study. In a previous study, the amount of bleeding which occurred during the procedure of tonsillectomy was about to soak a gauze piece of 2X4 cm used for the purpose of swab<sup>20</sup>, while in our study the total amount of blood loss varied from 0.5 ml to 0.1 ml this is comparable to the previous studies.

## CONCLUSION

Harmonic scalpel gives excellent results in tonsillectomy in reducing pain and minimal postoperative bleeding.

## REFERENCES

1. Mc aullife CJ. The history of tonsil and adenoid surgery; Otolaryngologic Clinics of North America. 1987;20.415-19.
2. Blue stone Status of tonsillectomy and adenoideotomy. Laryngoscope. 1977;87.1235-43.
3. Husband AD, Davis A. Pain after tonsillectomy. Clinical otolaryngology. 1996.21:99-101.

## Harmonic scalpel and tonsillectomy

4. Choiuy ATK, Su AP. Bipolar diathermy or ligation for haemostasis in tonsillectomy? A prospective study on post operative pain: J laryngol Otol.1992;106.21-22.
5. Lore JM Jr, Medina JE. an atlas of head and neck surgery 4th edition. Philadelphia PA. Elsevier Saunders.2005.1015-19.
6. Mc Carus SD. Physiologic mechanism of ultrasonically activated scalpel. Amerc Assoc Gynaecol.1996.601-08.
7. Gotohda N, Konish M, Takahashi S, Kinoshita T, Kato Y. Surgical outcome of liver transection by the crush clamping technique combined with harmonic FOCUSA, World J Surg.2012.36.2156-60
8. Ortega J, Sala C, Flor B, Liedo S. Efficacy and cost effectiveness of the ultracision harmonic scalpel in thyroid surgery. J Lapro Endoscop.2004;14.9-12.
9. Ferri E, Armato E, Spinato G, Spinato R. Focus harmonic scalpel compared to open conventional haemostasis. Oto laryngol.2011. 3: 179- 81
10. He Q, Zhuang O, Zheng L, Fan Z. Harmonic focus versus electrocautry in axillary lymph node dissection. Clin Breast Cancer. 2012.12.454-58.
11. Aponte ME, Saade RA, Saade Aure. Endoscopic axillary dissection. Breast.2009.18,150-58.
12. Hodgson WJ, Poddar PK, Mencer EJ, William J. Evaluation of Ultrasonically powered instruments in the laboratory and clinical settings.1979.72.133-40.
13. Dutta NN, Bordoloi BM. Tonsillectomy using Harmonic scalpel. Ind I. Oto Laryngol. 2002.54(1).74-76.
14. Zambuda AR, Rodreguiz, Sonia T. Prospective study of postoperative complications after total thyroidectomy for multinodular goiters by surgeons with experience in endocrine surgery. Am J Surg.2004.240.18-25.
15. Ortega J, Sala C, pior BLiendo S. Efficacy and cost effectiveness of the ultracision harmonic scalpel in thyroid surgery. J lapro endoscope.2004.14.9-12.
16. Cordon C, Faarito R, Ramirez J. A randomized prospective parallel study comparing the harmonic scalpel to electrocautry in thyroidectomy. Surgery.2005.137.337-41.
17. Siperestien AE, Berber B, Morkayon E. The use of the harmonic Scalpel vs conventional knot tying for vessel ligation in thyroid surgery. Arch Surgery.2002.137.138-42.
18. Rothenberg SS, Laproscopic splenectomy using the harmonic scalpel. Lapr Surg.1996.61-63.
19. Enam TA, Cuseri A. How safe is high power ultrasonic dissection?. Annals Surg 2003.237.186-91.
20. Dieter K, Fritz T, Wayne M, Shamir P, Chandarana. Harmonic Scalpel impact on blood loss and operating time in major head and neck surgery: a randomized clinical trial. J Otol laryngol.2016.45-48.

**CONFLICT OF INTEREST:** Authors declare no conflict of interest

**GRANT SUPPORT AND FINANCIAL DISCLOSURE NIL**

### **AUTHOR'S CONTRIBUTION**

Following authors have made substantial contributions to the manuscript as under:

Khan AR: Main idea and Operating Surgeon.

Ullah I: Data Collection.

Hafeez M: Interpretation of data.

Ullah AU: Data Collection, Bibliography.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.