

# TONSILLECTOMY USING HARMONIC SCALPEL

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**ABSTRACT :** *Surgery of tonsils are associated with risk of haemorrhage and post operative pain. Harmonic scalpel is a new device which we have been using to perform tonsillectomy for the last one year. This instrument reduces dissection time, intra-operative bleeding and post operative pain.*

**Key Words :** *Harmonic scalpel, Tonsillectomy.*

## INTRODUCTION

Surgery of the tonsil was first attempted by Celsius in 3000 B.C. Thereafter only partial removal of tonsils was practiced for several centuries. The use of first tonsil guillotine was reported in 1827 by an American Surgeon. Subsequently, primary enucleation or tonsillectomy came into practice. In the modern day practice various dissection methods which also utilize an amputating snare are now the more commonly used method.

At the present time tonsillectomy for recurrent infection is one of the most common surgical procedures performed worldwide. But the operation is associated with pain and risk of haemorrhage in the initial and post-operative period. Various techniques have been developed to reduce the risk of bleeding and post-operative pain like electrocautery, cryosurgery, laser surgery etc.

The Harmonic Scalpel is an ultrasonically activated surgical device which can cut and coagulate the vessels or tissues at low temperature. It does not conduct electric current and has high ability of haemostasis. The Harmonic Scalpel technology controls bleeding by coaptive coagulation at low temperature ranging from 50 to 100 degree Celsius. The vessels are coapted (tamponaded) and sealed by protein coagulum. Coagulation occurs by means of protein denaturation when the blade vibrating at 55,500 Hz couples with protein, denaturing it to form a coagulum that seals small coapted vessels. When the effect is prolonged, secondary heat is produced that seals larger vessels. It causes less thermal damage, with minimal smoke resulting in clear visual field.

The components of Harmonic Scalpel system consists of a generator, a hand piece with a connecting cable, a

blade system and a foot pedal. The generator is a microprocessor controlled high frequency switching power supply that drives the acoustic system in the hand piece. The Harmonic Scalpel has five power levels. The cutting speed and coagulation are inversely related.

This study was done using Harmonic Scalpel for tonsillectomy for last one year and reviews the time taken for surgery, primary, reactionary or secondary haemorrhage, post-operative complaints and follow up.

## MATERIALS AND METHODS

Forty (40) patients undergoing elective tonsillectomy between August 2000 to August 2001 were included in the study. Tonsillectomy was performed using harmonic scalpel in all the cases. A standardized general anaesthetic technique was used and tonsillectomy was performed by the same operating surgeon in all the cases. The duration of operation and amount of intra-operative bleeding was



Fig. I : Generator of Harmonic Scalpel

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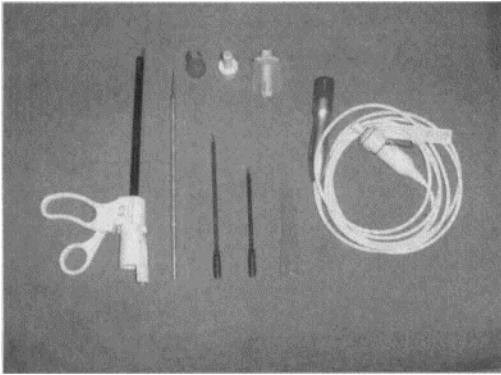


Fig. II : Probes & Connecting cable of Harmonic Scalpel documented. Post-operatively the tonsillar fossa was examined for escher, oedema and clots. Post-operative pain and haemorrhage was also documented.

### RESULTS AND ANALYSIS

Of the 40 patients the youngest was 3 years old and the oldest was 73 years old (mean-24.6 years). 19 patients (47.5%) were male and 21 patients (52.5%) were female.

Recurrent and chronic infections indicated tonsillectomy in 28 patients (70%). 10 patients (25%) had undergone tonsillectomy along with adenoidectomy. In one patient (2.5%) elongated styloid process was also removed on both sides along with tonsillectomy. One patient (2.5%) was operated for suspected malignancy in the right tonsil but the biopsy report suggested chronic infection.

The time taken to remove tonsils ranged from 8 minutes to 45 minutes (average-23.9 minutes). In the earlier 23 cases the time taken was more and ranged from 25 mins. to 45 mins. (average-33.7 mins). But with improvement of skill and change of the blade of Harmonic Scalpel, in the last 17 cases the time taken for removal of tonsils ranged from 8 mins. to 15 mins. (average-10.6 mins.).

Intra-operatively in 25 cases (62.5%) bleeding was nil and no suctioning or swabbing was required. In 15 cases (37.5%) only one swab was required in each fossa to soak the bleeding which was minimal. No suctioning was required.

In 2 cases (5%) post-operative haemorrhage occurred. All the patients had started taking normal diet and resumed

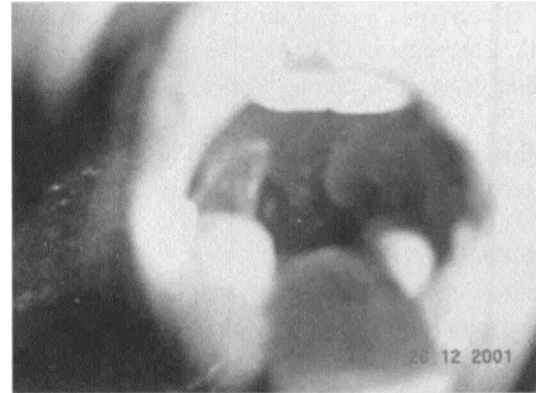


Fig. III : Tonsillar fossa on the second post-operative day. In both the cases bleeding points had to be ligated under GA. None of the patients had reactionary haemorrhage.

In the postoperative period pain was minimal in all the cases and regular dose of analgesics (i.e. Nimesulide-100 mg B.D. in adults and 5 mg/kg/day in divided doses in children, for 5 days), could take care of the pain. None of the patients required additional dose of analgesics. The pain subsided by 4<sup>th</sup> day in 27 cases (67.5%) and lasted for 7-10 days in 13 cases (32.5%).

In the earlier 27 cases (67.5%) there was gross oedema of the uvula and soft palate in the post-operative period which lasted for 4-5 days. The patients complained of foreign body sensation in throat and found difficulty in swallowing. In the last 13 cases (32.5%), with the change of blade of the Harmonic Scalpel to small hook like, the oedema has decreased to only minimal oedema of the uvula.

The eschar formation was more with Harmonic Scalpel and extended beyond the limit of tonsillar fossa to nearby areas, though it had reduced in the last 8 cases with change of blade.

All the patients were discharged on the second post-operative day and followed up after 2 weeks and 4 weeks. 2 patients had to be readmitted due to post-operative haemorrhage in the first 3 months. After switching over to blade with hook no patient reported with post-operative haemorrhage.

normal activities by 10<sup>th</sup> day. On follow up after one month, 2 patients (5%) complained of pain in one of the tonsillar fossa and a fibrous band was seen in the posterior pillar. In one patient laser excision of the fibrous band was done, but the other patient did not come for further treatment.

**DISCUSSIONS**

Tonsillectomies are one of the most commonly performed surgical procedures in Otorhinolaryngology. The purpose of this operation is to remove the palatine tonsil in such a way that blood loss is minimal and unnecessary trauma to the adjacent tissue is avoided. The two most common post-operative complications following tonsillectomy are haemorrhage and pain (Bluestone, 1977; Husband and Davis, 1996 ) The degree of pain is related to the degree of soft tissue damage . If this pain is associated with oral stasis , this predisposes to infection with further pain and risk of secondary haemorrhage (Choy and Su,1992 ) The Harmonic Scalpel is associated with less adjacent tissue damage and so post-operative pain is less.

Our study demonstrates that tonsillectomy using a Harmonic Scalpel is a good method where dissection time is less, and the method is effective in controlling intra-operative bleeding. It also does not increase the risk of reactionary or secondary haemorrhage and there is less post-operative pain. But, this method is associated with extensive Escher formation and oedema of the uvula.

As there is dearth of literature on this subject, no

comparative study could be shown. However, information gathered from the internet showed that the Harmonic Scalpel is now being used by ENT doctors Glyn Marsh , M.D. , Glen Yoshida , M.D.and David Gordon , M.D, at Altru Health System for tonsil surgery. We are doing a study comparing tonsillectomy using Harmonic Scalpel with dissection method and laser surgery and the results will be published later on.

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**CORRIGENDUM**

The Main Article Titled Otitis Media with Effusion; an Audit on the indications and outcome, Published in page-285 of Vol. 53 No. 4 (Dec. 2001) is authored by Dr. V. V. Routh and not Dr. Joyti P. Mukherjee as erroneously printed. The error is regretted.

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