



# Neck dissection with harmonic scalpel and electrocautery? A randomised study



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## ABSTRACT

**Objective:** Is the use of harmonic scalpel for neck dissection useful? Literature search did not show a single, prospective, randomised control trial. We intended to study the role of harmonic scalpel in neck dissection and compare it with conventional electrocautery technique for oral cavity carcinoma.

**Methods:** 40 patients undergoing selective neck dissection for primary oral cavity malignancy were enrolled in this study. The harmonic scalpel (HS) group consisted of 20 patients, and the electrocautery technique (ET) group comprised of 20 patients. The following variables were examined: intraoperative blood loss, operative time, number of ligatures used, postoperative drain, and postoperative hospital stay.

**Results:** Intraoperative blood loss was found to be significantly reduced in harmonic scalpel group as compared to electrocautery group. However, we found no difference in other parameters like operative time, postop drain, postoperative hospital stay and number of ligatures used between both groups.

**Conclusion:** Harmonic scalpel for neck dissection is associated with significantly lesser intraoperative blood loss as compared to electrocautery. There is no effect on operative time and postoperative hospital stay in both groups.

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## 1. Introduction

Advancement in surgical techniques focuses not only on improving the outcomes of surgery but also on the methods and ways to reduce surgical morbidities and mortality. Since the introduction of monopolar electrocautery by Bovie in 1926 [1], several instruments have been developed like bipolar cautery, radiofrequency ablator, hemo clips, etc. with the aim to reduce the blood loss and intraoperative time during head neck surgery [2]. Harmonic scalpel (HS) uses ultrasonic energy and has become popular in head and neck surgeries since its

introduction in 1990 [3,4]. It was found to be especially useful in thyroid surgery, parotid surgery and tonsillectomies after several authors have proved its safety and efficacy in these procedures [5,6]. It has been found to reduce blood loss and intraoperative time.

Use of harmonic scalpel for neck dissection is slowly becoming popular after few authors have shown it to be useful. Kos et al. [7] studied the use of HS in neck dissection and compared it with the electrocautery technique and reported a shorter operating time and reduced blood loss with HS. Walen et al. [8] also showed reduced blood loss, but there was no difference in operating time. Ferri et al. [9] showed that the harmonic scalpel usage has a reduced blood loss, operating time, postoperative pain and drain volume. Shin et al. [10] also

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showed similar reports except for the drain volume that did not show any difference. However, there are anomalies among these studies with regard to calculation of blood loss, time of calculating surgery, no uniform technique of neck dissection (modified, radical and selective neck dissection) in same study, neck dissection for surgeries such as oral, thyroid and laryngectomy being clubbed together, and different surgeons performing neck dissection in same study. Moreover, there is dearth of prospective, randomised, controlled trials on use of harmonic scalpel as regard to its efficacy and safety in neck dissection.

In this prospective, randomised study, we compared the efficacy of HS and electrosurgical technique, with regard to intraoperative blood loss, operating time, drain duration and postoperative hospital stay after neck dissection for oral cancer.

## 2. Material and methods

This was a randomised, prospective clinical case–control study done in 40 consecutive patients of oral cancer requiring selective neck dissection. Patients of oral carcinoma older than 18 years and who required selective neck dissection as part of treatment plan were included in the study. Patients who had received prior radiotherapy or had undergone prior surgery, who did not give informed consent and who had restriction of shoulder movements were excluded from the study. Patients who required distant and free flaps for reconstructing oral defects were also excluded from study.

40 consecutive patients of oral carcinoma who required neck dissection between July 2014 and December 2015 were eligible for the study. The study was reviewed and approved by the institute's ethics board. The patients were randomly divided into control and experimental groups based on computerisation table. The experimental group consisted of 20 neck dissections performed on patients of oral carcinoma by using harmonic scalpel to achieve haemostasis. Control group consisted of 20 neck dissections for oral carcinoma in which standard neck dissection technique (sharp dissection and using monopolar and bipolar cautery to achieve haemostasis) was done.

All the patients selected for the study underwent detailed clinical examination of the primary and the metastatic neck nodes. All patients were subjected to biopsy of the primary lesion, fine-needle aspiration cytology of the clinically palpable lymph nodes and CT scan for the details of the disease extension. All patients were operated by a head–neck oncologic surgeon. In all the neck dissections, a transverse cervical incision was given, and the skin flaps in both the groups were raised using monopolar electrocautery. Based on the randomisation table, cases were assigned to either of the control and experimental groups. 16FR suction drains were placed after neck dissection, and wound was closed in layers. Parameters analysed were the following.

### 2.1. Immediate preop

The patient's haemoglobin, hematocrit and body weight were noted and used in statistical analysis.

## 2.2. Intraoperative

### 2.2.1. Operating time

Time was noted from the time of incision to the delivery of the neck dissection specimen.

### 2.2.2. Blood loss

The intraoperative blood loss was calculated by the following two methods:

#### *Weighing method:*

The dry gauze was weighed on an electric weighing machine preoperatively under aseptic precaution. Only these were taken to the surgical field for mopping. Once the neck dissection specimen was delivered, all the gauzes used were counted and weighed again; the difference in the weight was the blood loss during the neck dissection [11,12].

#### *Calculation:*

Initial weight =  $i$  g, number of gauze used =  $n$ , final weight =  $f$  g.

$BL = f - (n \times i) +$  volume of blood in suction canister.

#### *Hematocrit method:*

Blood loss was also calculated by using the hematocrit values pre and post surgery by using modified gross formula [13,14].

Initial hematocrit =  $hct\ i$ , final hematocrit =  $hct\ f$ , mean hematocrit =  $hct\ m$

$$BL = \frac{BV(hct\ i - hct\ f)}{hct\ m}$$

where  $BV =$  body weight  $\times$  70 ml/kg.

The final blood loss during neck dissection was taken as the average of both the methods.

### 2.2.3. Ligature usage

The number of ligatures used for tying the larger vessels in both group HS and Group EC was counted and noted.

### 2.2.4. Intraoperative complication

Injury to the internal jugular vein, spinal accessory nerve, hypoglossal nerve, lingual nerve, greater auricular nerve, phrenic nerve, thoracic duct and apical pleura intraoperatively was noted in both the groups.

### 2.2.5. Surgical field grading

The surgical field was graded by the surgeon and anaesthetist separately. The surgical grading was done using a grade devised by our institution.

### 2.2.6. Surgical field grading

Grade	Surgical field
I	Minimal bleeding
II	Bleeding that does not require frequent mopping
III	Bleeding That requires frequent mopping
IV	Bleeding that is not controlled by frequent mopping and interfering with dissection

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