



# PROSPECTIVE RANDOMIZED CONTROL TRIAL COMPARING THE EFFICACY OF DIATHERMY INCISION VERSUS SCALPEL INCISION OVER SKIN IN PATIENTS UNDERGOING INGUINAL HERNIA REPAIR

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## Abstract

### Background:

Electrocautery in surgery is widely used except for the skin incisions, this is because of fear of scarring of tissues, post operative pain, and wound infection in view of devitalisation of tissues. This study compares the scalpel incisions with electrocautery incision over skin in patients undergoing hernia repair.

### Materials and Methods:

In this study prospective randomized study 60 patients undergoing mesh repair for inguinal hernia are divided into two groups. In Group A skin incision is taken with electrocautery, and in Group B incision is taken with scalpel. Postoperative pain, wound complication and requirement of analgesic are compared between the two groups.

### Results:

The two groups did not differ in relation to post operative pain. Post operative analgesic requirement are similar in two groups and post operative complications seroma, hematoma, purulent collection are comparable in two groups.

### Conclusion:

Although results are comparable in two groups, electrocautery can be safely used in making skin incisions as results are comparable in two groups. We recommend further broad study of electrocautery usage in other surgical procedure and its further evaluation.

**Keywords:** Electrocautery, Scalpel, Skin incision

## Introduction

Traditionally skin incision are made with stainless steel scalpel, these incision are more bloody and painful. To overcome such problems laser and cavitron electronic surgical aspirator have been introduced, these instrument are costly. Electrocautery which is available in all operation theatres has been used less frequently because of the fear of tissue damage leading more postoperative pain, impaired wound healing, hypertrophic scarring. The use of electrode delivering pure sinusoidal current however allows tissue cleavage without damaging to surrounding areas. Electrocautery incision of this type is not true cutting incision<sup>1</sup>. This method heats cell within tissues so rapidly that they vaporize, leaving cavity within cell matrix, heat created disappears as steam, rather than being transferred to adjacent tissues. As electrode is moved forward new cells are contacted and vaporized with creation of incision. This explains absence of scarring and subsequent healing with less scarring<sup>1</sup>. Many studies are conducted to compare electrocautery incision with scalpel incision over skin and many of them showed electrocautery incision is

better than scalpel incision in terms of time taken for incision, lesser pain, better wound healing and little blood loss<sup>2-6</sup>. This study is undertaken in larger group of patients undergoing hernial repair to compare the efficacy electrocautery incision over scalpel incision and to substantiate the results of studies conducted earlier.

## Materials and Methods

### Source of Data

60 cases undergoing hernia repair for inguinal hernia in KLES Dr. Prabhakar Kore Hospital, Belgaum over 1 year.

### Method of Collection of Data: Study Design

Randomized control trial. Randomization done according to computerized randomization table with block length of 10x6.

The observer is blinded to the type of incision used and gave his observation based on the predefined criteria

Sample size: 60 Cases

1) In 30 cases incision is taken with electrocautery over skin.

2) In 30 cases incision is taken with conventional scalpel.

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Sample size has been arrived based on pain score reduction in previous study<sup>2</sup>, for pain score reduction of 30%, with p value of 0.05 and power of 80% at 24hrs, sample size will be 30 in each group to get significant results.

Duration: One year

Exclusion criteria:-

1. Complicated inguinal hernia like irreducible hernia, obstructed hernia, strangulated hernia.

2. Preoperative use of analgesics for > 3 days per week for >3 months.

3. Paediatric [ <12 yrs] and geriatric [>50yrs] patients.

4. Patients with chronic pain >3 months.

5. h/o drug or alcohol abuse

6. Severe hepatic, renal, cvs dysfunction.

7. Diabetes mellitus.

8. Immunocompromised Status.

Outcome - 1. Postoperative pain is measured using pictorial visual analogue scale at 6, 12 and 24 hours. If pain score is >4 inj diclofenac 50 mg im will be given. 2. During post operative period (up to 7 days) complications noted in hospital stay are measured by means of

Seroma-collection of serous discharge in suture site.

Hematoma-collection of blood clots

Purulent – collection of purulent discharge

The results are finally analyzed and compared for the two groups using Mann-Whitney U Test, and percentage of type of complication at incision site is measured. After taking the informed consent, patients are randomized and divided in two groups A and B.

In Group A-Incision is taken with electro cautery needle using pulse sine wave current and power setting of 70 watts. Hemostasis is achieved with force coagulation.

In Group B-Skin incision is taken with scalpel, bleeding controlled by force coagulation using pulse sine wave on power supply 30 watts. All standardized incision will be medial 3/5 and 2.5 cms above and parallel to inguinal ligament. All the procedures are

carried under standardized spinal anesthesia. Premedication is given ciprofloxacin 100 ml and metronidazole 100 ml, two hour before procedure. Closure of the abdominal layer are done with continuous proline for external aponeurosis, intermitant plane catgut for subcutaneous tissue and mattress suture with 2-0 silk for skin closure.

## Results

### Patient demographics

60 patients with inguinal hernia are randomised prospectively to either electrocautery group or scalpel group for skin incision. There were no significant demographic difference between two groups [Table -1]. Mean age of patient in group A i.e electrocautery group is  $47.8 \pm 16.21$  and in group B i.e scalpel group is  $47.7 \pm 13.95$

### Post operative pain

Post operative pain is assessed by visual analogue scale at 6, 12, 24 hrs after the surgery. In our study results are analyzed with Mann Whitney U Test. results are shown in Table 2. There is no significant difference between two groups.

### Analgesic requirements post operatively

Dose of analgesic i.e diclofenac 50 mg im are recorded in both groups post operatively, results are shown in table 3. Results analysed using Mann Whitney U test. Dose requirements are similar in two groups.

### Local wound complications

Overall wound complications are assessed for 7 days post operatively. In our study we assessed complications like seroma, haematoma, and purulent collection (table 4). Seroma in both groups are comparable. Although scalpel group shows more hematoma [20%], difference is not statistically significant. Other complication i.e purulent collection in post operative wound is similar in two groups.

Table 1. AGE (mean $\pm$ SD)

	EC	SC
Age in years	$47.8 \pm 16.21$	$47.7 \pm 13.95$
t = 0.034    DF = 58    P = 0.973		

Table 2. Pain score (mean $\pm$ SD)

Time	EC	SC	Mann-Whitney U test (Adjusted for ties)
6 hrs	$6.6 \pm 0.81$	$6.7 \pm 0.53$	P = 0.475
12 hrs	$3.8 \pm 0.83$	$3.7 \pm 0.64$	P = 0.556
24 hrs	$2.5 \pm 0.86$	$2.4 \pm 0.51$	P = 0.762

Table 3. Dosage of analgesic

Doses of analgesic (Mean±SD)	
EC	1.8 ± 0.66
SC	1.6 ± 0.48
P = 0.499      Mann-Whitney U test (Adjusted for ties)	

Table 4. A) Hematoma

Group	Yes	No	Total
EC	1 (3.3%)	29	30
SC	6 (20%)	24	30

X<sub>2</sub> with Yate's correction = 2.588    DF = 1    P = 0.108

B) Seroma

Group	Yes	No	Total
EC	9(30%)	21	30
SC	10(33.3%)	20	30

X<sub>2</sub> with Yate's correction = 0.077    DF = 1    P = 0.108

C) Purulent collection

Group	Yes	No	Total
EC	4 (13.3%)	26	30
SC	5 (16.6%)	25	30

X<sub>2</sub> with Yate's correction = 0    DF = 1    P = 1

## Discussion

Surgeons have been always in search of an ideal method of making skin incision which would provide quick and adequate exposure with minimum loss of blood. Electrocautery mainly used for hemostasis and less often for skin incision.

Earlier days when explosive anesthetics agents were in use, electrosurgical instruments had limited use because of explosive risks associated with anesthetic agents. After the invention of nonexplosive anesthetic agents like halothane, electrosurgical instruments like diathermy are increasingly used for tissue dissections except for skin incision. This reluctance for use of electrocautery is attributed to the belief that electrosurgical instruments cause devitalisation of tissue within the wound which consequently lead to wound infection, delayed wound healing and wound scar formation.

The fear of injury tissues was first unfolded when this technique was used by Peterson in reconstructive and cosmetic faciomaxillary surgery<sup>7</sup>, Mann and Klippel in paediatric surgery<sup>8</sup>, Kamer in rhinoplasty<sup>9</sup>, Tabin in blepharoplasty<sup>10</sup>, with minimum scarring and excellent results. skin incisions in general surgery was reported by Dixon and Watkin<sup>1</sup> in patients undergoing inguinal herniorrhaphy and cholecystectomy. Various studies<sup>2-6</sup> were undertaken to evaluate the efficacy of electrocautery over scalpel in making skin incision and results are varying some showing better results with electrocautery some showing similar results.

In our study 60 patients are randomized in to two groups, incision is taken with either scalpel or electrocautery depending on the group allotted, and evaluated post operatively for pain, requirement of analgesic doses and post operative wound complications. This study showed no difference between the two groups in post operative pain, analgesic requirement and wound complication.

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