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Original Research Article

A Clinical Study of Efficacy of Diathermy Incision Vs Scalpel Incision in Patients Undergoing Open Hernia Surgery

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Abstract:

Introduction: An incision is a slit or cut used to get entree to deeper structures. Electro cautery is a medical term that refers to the process of burning a part of the body to get rid of or shut it.

Although fears of severe scarring and poorer wound healing have restricted its usage for skin incision, electro-cautery is becoming more often employed for tissue dissection

Material and Methods: A total of 60 patients receiving mesh plasty for inguinal hernia are distributed into two groups in this prospective randomized research. A skin incision is made using electro-cautery in Group A, while a scalpel incision is made in Group B. The two groups are compared in terms of postoperative pain, wound complications, and the need for analgesics. Finally, using the Mann-Whitney U Test, the findings are examined and equated for the two groups.

Results: Postoperatively pain will be calculated by using pictorial visual analogue scale at 6hours, 12hours and 24 hours. In case of pain score is >4 INJ.DICLOFENAC 50 mg IM would be given. In the post-operative period complication noted in hospital stay are calculated by means of Seroma- discharge of serous collection in suture site, Hematoma- blood collection

Conclusion: The results of both groups, namely the diathermy and Scalpel groups, have been confirmed to be **comparable** based on the findings of this study of the following; 1. Postoperative pain, 2. The need for analgesics, 3. Wound problems after surgery.

Keywords: Inguinal hernia, Prolene Mesh, Diathermy, scalpel, Pain, Seroma, Hematoma.

Introduction

An incision is a slit or cut used to get entree to deeper structures. Electro cautery is a medical term that refers to the process of burning a part of the body to get rid of or shut it. Although fears of severe scarring and poorer wound healing have restricted its usage for skin incision, electro-cautery is becoming more often employed for tissue dissection.

Incisions are conventionally made with a stainless steel Scalpel. These incisions are said to be bloodier and more painful. Many modern procedures, such as cavitron electron and laser surgical aspirator, have been developed to address this issue, but cost of these technologies is high, and they are generally unavailable in the in our hospital.

Electro-cautery, which is obtainable in all operating rooms, is used less commonly for skin incisions, the worry of tissue damage, the fear of post-operative complications like pain and scarring.

Electro-cautery may be used for skin incisions without any postoperative consequences such as wound infection or scarring, and with reduced postoperative pain, according to recent breakthroughs and studies. The goal of this study is to dispel the surgical community's concern of employing electro-cautery for skin incisions.

Aim:

In patients that undergoing Open Hernia surgeries, to assess and compare post-operative pain and complications in electro-cautery and Scalpel incisions over skin.

Objectives:

1. Postoperative pain
2. Analgesics requirement
3. Wound complications like

a) Seroma
b) B. Hematoma
c) C. Purulent Collection

Material and Methods:

The present Comparative study was conducted in Government General Hospital, Department of General Surgery, Government Medical College, Srikakulam,

A total of 60 patients receiving mesh plasty for inguinal hernia are distributed into two groups in this prospective randomized research. A skin incision is made using electro-cautery in Group A, while a scalpel incision is made in Group B.

The two groups are compared in terms of postoperative pain, wound complications, and the need for analgesics. Finally, using the Mann-Whitney U Test, the findings are examined and equated for the two groups.

Ceftriaxone 1 gram is administered 30 minutes prior to the procedure as a premedication. All surgeries are performed under uniform spinal anesthesia and all incisions are medial and 2.5cm above and corresponding to the inguinal ligament.

Continuous vicryl for external oblique aponeurosis, intermittent vicryl for subcutaneous tissue, and vertical mattress suture with 2-0 ethylon for skin closure are used to close the abdomen layer.

Inclusion Criteria:

- Patients of age >12yrs & <70yrs
- Uncomplicated INGUINAL hernias (reducible hernias only)

Exclusion Criteria:

- <12yrs & >70 yrs.
- Emergency surgery, peritonitis, bowel obstruction, strangulation, perforation
- Patient unfit for surgery (both laparoscopic and open repair)
- Irreducible ventral hernias
- Recurrent hernia
- Multiple scars on the abdominal wall, which make intra peritoneal access difficult
- NOT willing to give consent
- Immunocompromised patients (AIDS)
- Severe systemic failure like hepatic, renal, cvs dysfunction.
- Diabetes mellitus.

Statistical Analysis and Results:

1. Patient Demographs:

Patients of 60 in number having inguinal hernia are divided into electrocautery group or scalpel group for skin incision. There were no convincing demographic difference between two groups is noted in table -1. Mean age of patient in group A i.e electrocautery group is 46.46 15.45 and in group B i.e scalpel group is 46.63 13.82.

Table 1: Age: (Mean±SD)

	Electrocautery	Scalpel
Age	46.46 ±15.45	46.63 ±13.82

Table -1 t = 0.045 DF = 58 P = 0.96

2. Post-operative pain: Post-operative pain is evaluated by VAS (visual analogue scale) at 6 hours, 12 hours and 24 hours respectively in the postoperative periods. The Mann Whitney U Test was used to analyze the data in our study, and the results are shown in table 2. Between the two groups, there is no discernible difference.

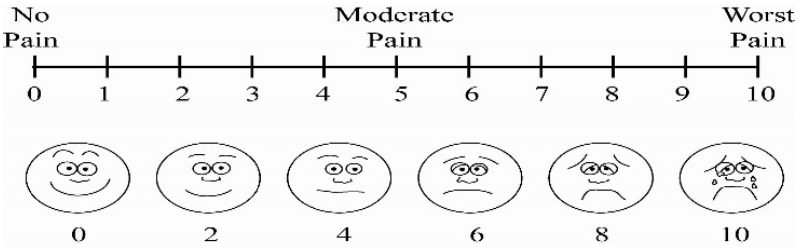
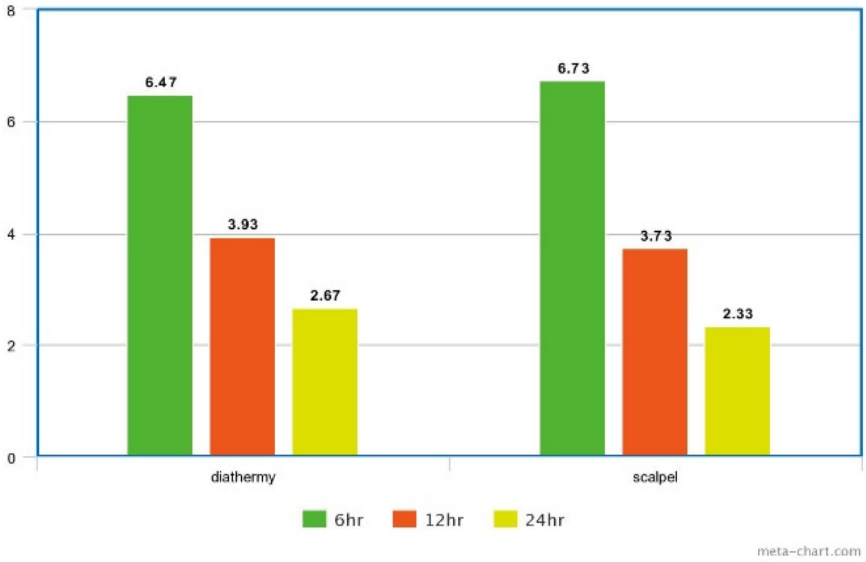


Figure 2: VAS (Visual Analogue Score)

Pain Score: (Mean±SD)

Table 2:

Time	Electrocautery	Scalpel	Mann-Whitney U test
6 hours	6.47 ±0.921	6.73 ±0.727	P = 0.229
12 hours	3.93 ±0.891	3.73 ±0.679	P = 0.332
24 hours	2.67 ±0.760	2.33 ±0.596	P = 0.058



Graph 2: Pain Score comparison

3. Requirement of analgesics in post-operative period:

The dose of painkiller, INJ DICLOFENAC 50 mg IM, was recorded in both groups after surgery, and the findings are presented in table 3. The Mann Whitney U test was used to examine the results. In both groups, the dosage requirements are similar.

Analgesic Doses: (Mean±SD)

- P = 0.682
- X2 with Yate's correction = 0.1307 DF = 1 P = 0.717688
- DF = Degrees of freedom
- X2 = Chi-square

Seroma in two groups are comparable.

Even though scalpel group appears more hematoma, difference is not statistically important.

Other complication i.e purulent collection in post-operative wound is similar in two group

4. Wound complications:

Overall wound problems are monitored for seven days after surgery.

We looked at problems including seroma, hematoma, and purulent collection in our study.

A. Hematoma

Table 4a:

Groups	Yes	No	Total
Electrocautery	2(6.6%)	28	30
Scalpel	6 (20%)	24	30

X_2 with Yate's correction = 2.3077 DF = 1 P = 0.128

B. Seroma

Table 4b:

Group	Yes	No	Total
Electrocautery	8(26.6%)	22	30
Scalpel	9(30%)	21	30

X_2 with Yate's correction = 0.0821 DF = 1 P = 0.7744

C. Purulent Collection

Table 4c:

Group	Yes	No	Total
Electrocautery	4 (13.3%)	26	30
Scalpel	5 (16.6%)	25	30

Discussion

Electrosurgical unit (ESU) is the most common electrical equipment in the modern operating rooms. Many studies have shown that diathermy is ever more being used for making skin incisions, securing hemostasis, dissecting tissue planes and cutting. It facilitates hemostasis, lowers overall intraoperative time, and, finally, creates a wound that heals similarly to a Scalpel wound.

Despite these benefits, surgeons' use of it for skin incisions in developing countries, such as ours, is still suboptimal. We can point to a lack of studies

including this group of patients in this location as a contributing factor, as well as an outdated belief that diathermy causes when electric burns are used to generate skin incisions, the amount of devitalized tissue in the wound increases. Surgeons, generally avoid diathermy for making skin incisions due to suspected delayed wound healing, infections and excessive scarring. The present hospital based randomized control trial was thus conducted to compare diathermy and steel Scalpel skin incisions in inguinal hernia repair with regards to: Incision time, incisional blood loss, post-operative pain and post-operative wound complications

Mean age of the study subjects undergoing hernia repair was 48.0 years with mean age of 50.1 and 45.9 years in Scalpel and cautery group respectively. Mean BMI was 25.8 and 25.3 Kg/m2 in Scalpel and cautery group respectively. Both groups were comparable on baseline demographic variables

The mean incisional time was significantly shorter with cautery (7.04 ± 0.88 sec/cm2) as compared to Scalpel (8.41 ± 1.39 sec/cm2; $p<0.01$). The mean blood loss was also less with the diathermy as related to the Scalpel (1.17 ± 0.67ml/cm2 vs. 1.84 ± 0.89 ml/cm2; $p<0.01$

Mean VAS (visual analogue score) was seen to be significantly less in cautery group as related to Scalpel group at 6, 12 and 24 hour follow up ($p<0.01$). According to this study, the diathermy group had much less postoperative pain than the control group.

This is due to diathermy's heat influence on sensory nerve fibers, which causes nerve impulse transmission to be disrupted. The administration of a pure sinusoidal current causes cell vaporization, which causes rapid tissue and nerve necrosis without damaging adjacent structures. As a result, there is total or partial injury to the cutaneous nerves in the area of the surgical wound in patients who had diathermy skin incisions, with a reduced postoperative pain profile.

Seroma and Hematoma formation was seen in 45 (18.2%) and 23 (9.1%) subjects of Scalpel group as related to 53 (21.2%) and 15(6.1%) subjects in cautery group ($p>0.05$). Surgical site infection as observed by purulent collection was seen in 23 (9.1%) subjects of Scalpel group as related to 38 (15.2%) subjects in cautery group (p- 0.078).

Surgeons have long sought the optimal method of making a skin incision that would allow for quick and appropriate exposure with minimal blood loss. Diathermy is used most commonly for hemostasis and skin incision. In our prospective study, 60 patients were randomly assigned to one of two groups, incisions are created with a Scalpel or diathermy depending on the group, and patients are assessed post-operatively for pain, analgesic requirements, and post-operative wound complications.

In this investigation, there was no difference in postoperative pain, analgesic demand, or wound complications between these two groups

Conclusion

The results of both groups, namely the diathermy and Scalpel groups, have been confirmed to be comparable based on the findings of this study of the following;

1. Postoperative pain
2. The need for analgesics
3. Wound problems after surgery.

The diathermy group (46.46□15.45) and scalpel group is (46.63□13.82) are of similar age ($P = 0.96$). Post-operative pain levels are similar in both groups. Although the hematoma in the Scalpel group is greater, the variance is not statistically important. Postoperative seroma and purulent collection are similar in both groups

Based on the outcomes of this study, we recommend that diathermy be utilized more generally in all surgical operations to generate skin incisions because it is a relatively safe approach

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