

OUTCOME OF SCALPEL VERSUS DIATHERMY SKIN INCISION IN INGUINAL HERNIA SURGERY: A COMPARATIVE CROSS SECTIONAL STUDY

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ARTICLE INFO

Received : 23 January, 2021

Accepted : 02 February, 2021

Published : 15 June, 2021

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ORA 234

DOI: <https://doi.org/10.3126/bjhs.v6i1.37637>

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Citation

Sanjaya Kumar Yadav, Sabin Shrestha, Nisesh Sitoula, Ram Kumar Singh. Outcome of Scalpel Versus Diathermy Skin Incision in Inguinal Hernia Surgery: A Comparative Cross Sectional Study. BJHS 2021;6(1)14. 1358-1362.

ABSTRACT

Introduction

In inguinal hernia surgery, the scalpel skin incision is most commonly used whereas diathermy skin incision is also emerging. Surgeons are still not comfortable giving diathermy skin incision because they believe that it devitalizes the tissue leading to poor wound healing. Several studies have demonstrated that there is less early postoperative pain and local wound complications encountered with the diathermy skin incision. In our teaching hospital, we encountered several cases of inguinal hernia and following both incisions but its comparison in terms of post-operative pain and local wound complications is lacking.

Objective

The objective of this study was to find the outcome of scalpel and diathermy skin incision in inguinal hernia surgery in terms of early postoperative pain and local wound complications at Birat Medical College Teaching Hospital.

Methodology

A hospital based comparative cross sectional study was conducted from 1st Oct 2020 to 30th Dec 2020 among 60 elective inguinal hernia repair patients at the surgery department of Birat Medical College Teaching Hospital. Ethical clearance was taken from the institutional review committee (Ref: IRC-PA-079/2077-78) of Birat Medical College Teaching Hospital.

and informed written consent was taken from each study participant. Collected data were entered in Microsoft Excel and analyzed by SPSS 23. Frequency, mean and standard deviation were used for univariate analysis. Independent sample t-test and chi-square test were used for bivariate analysis and statistical significance was set at 95% confidence interval and p-value less than 0.05.

Results

The mean age of the diathermy group was 50.4±15.6 and the scalpel group was 46.7±16.2. The majority were male 53 (88.3%). There was no statistically significant association between the outcome of diathermy and scalpel skin incision in terms of postoperative pain assessed at 6 hours, 12 hours, and 24 hours. In terms of the local wound complications at day 7, the scalpel group has 5.1 times more complications than the diathermy group and was statistically significant (p=0.04).

Conclusion

In our center, the diathermy skin incision for inguinal hernia surgery has less local wound complications in comparison to scalpel skin incision.

KEYWORDS

diathermy, inguinal hernia, scalpel, skin incisions, teaching hospital



INTRODUCTION

In surgical practices, incision is given to gain access to the underlying structures.¹ They are usually made with a scalpel. It may result in skin bleeding which obscures the operating field and thus wastage of operating time. The other alternative incision method is diathermy skin incision. It is mainly used for tissue dissection and hemostasis.² In inguinal hernia surgery, the scalpel skin incision is most commonly used whereas diathermy skin incision is also emerging despite its added advantage of maintaining hemostasis. But surgeons are still not comfortable giving diathermy skin incision because they believe that it devitalizes the tissue leading to poor wound healing.³ Postoperative pain is another important issue that can delay ambulation and recovery, resulting in delayed hospital discharge, consequently increasing the economic burden to patients. Hernia repair can be done under general, spinal or regional anaesthesia but any method of skin incision is not devoid of postoperative pain and wound complications. Further, despite several analgesic options, management of postoperative pain is often unsatisfactory. Studies have demonstrated that there is less early postoperative pain and local wound infection encountered with the diathermy skin incision.^{4,5} In our teaching hospital, we encountered several cases of inguinal hernia and following both type of incisions but its comparison in terms of postoperative pain and local wound infection is still lacking. Therefore, the objective of the study was to find the outcome of scalpel versus diathermy skin incision for reducible inguinal hernia surgery in terms of early postoperative pain and local wound complications at Birat Medical College Teaching Hospital.

METHODOLOGY

A hospital based comparative cross sectional study was conducted from 1 October 2020 to 30 December 2020 among elective reducible inguinal hernia repair patients under spinal anesthesia at the surgery department of Birat Medical College Teaching Hospital. For sterile preparation, prophylactic antibiotic at the time of induction was given

and strictly followed the standard procedure of operation theatre. Nylon suture was used for closure of skin. Ethical clearance was taken from the institutional review committee [Ref: IRC-PA-079/2077-78] of Birat Medical College Teaching Hospital. A previous study conducted by Gupta M reported standard deviation ($s_1=0.60$) and ($s_2=0.63$) in diathermy and scalpel skin incision groups respectively.⁶ Sample size was calculated by using formula for two independent samples for continuous outcome. By considering effect size (0.4), sample size was; $n=2 (Z * S_{Dtotal}/Effect\ Size)^2$ where $SD\ total = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{(n_1+n_2-2)}}$ and effect size = $(Mean1-Mean2)/SDtotal$. So, the total number of patients in each group was 18. Adjusting 10% non response rate, the minimum sample size was $18/0.9=20$ but we enrolled 30 patients in each group. First patient was enrolled by coin toss method and then each alternative patient was enrolled in each group after taking informed consent. Postoperative pain was assessed according to a visual analogue scale (VAS) from 0 (no pain) to 10 (worst pain imaginable). We assessed postoperative pain at 6 hour, 12 hour and 24hour. The local wound complications (seroma, hematoma and purulent discharge) were assessed on the 7th postoperative day. Collected data were entered in Microsoft Excel and analyzed by SPSS 23. Anonymity and confidentiality data was maintained. Frequency, mean and standard deviation were used for univariate analysis. Independent sample t-test and chi-square test were used for bivariate analysis and statistical significance was set at 95% confidence interval and p-value less than 0.05.

RESULTS

We enrolled 30 patients in the diathermy skin incision group and 30 patients in the scalpel skin incision group. The mean age of the diathermy skin incision group was 50.4 ± 15.6 years and the scalpel skin incision group was 46.7 ± 16.2 years. The majority were male 53 (88.3%). Majority (61.7%) had right sided hernioplasty followed by left sided hernioplasty 20 (33.3%) and 16.7% had some forms of local wound complications at day 7 as in table 1.

Table 1: Baseline characteristic of participants (n=60)

Age (Mean \pm SD) years		Sex		Type of Surgery (Hernioplasty)			Local wound complications at Day 7			
Diathermy	Scalpel	Male	Female	Right Sided	Left-sided	Bilateral	Seroma	Hematoma	Purulent Discharge	No
50.4 \pm 15.6	46.7 \pm 16.2	53 (88.3%)	7 (11.7%)	37 (61.7%)	20 (33.3%)	3(5%)	4 (6.7%)	4(6.7%)	2 (3.3%)	50 (83.3%)

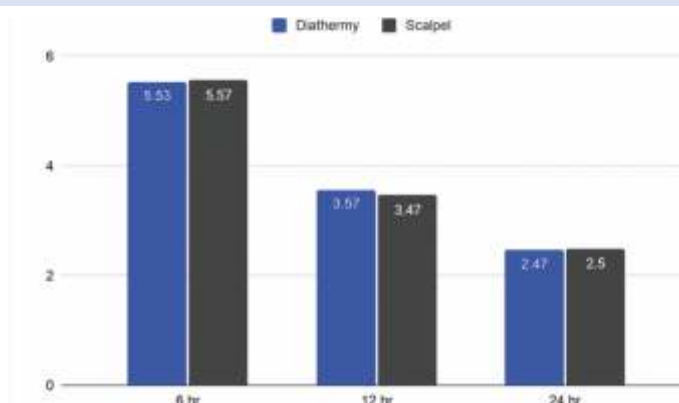


Figure 1: Post Operative Pain Score in both groups (n=60)

In both incision groups the pain score was decreasing as the time passed. At 6 hours, it was 5.53 and 5.57 for diathermy skin incision and scalpel skin incision. The details given in figure 1.

Table 2. Comparison of postoperative pain score at different time (n=60)

Post Operative Pain Score	Diathermy Skin Incision (n=30)	Scalpel Skin Incision (n=30)	t-test	p-value
6 hours	5.53±0.5	5.57±0.5	-0.26	0.8
12 hours	3.57±0.5	3.47±0.5	0.77	0.5
24 hours	2.47±0.5	2.5±0.5	0.51	0.6

There was no statistically significant association between the outcome of diathermy and scalpel skin incision in terms of postoperative pain assessed at 6 hours, 12 hours, and 24 hours as in table 2.

In terms of the local wound complications at day 7, the scalpel skin incision group has 5.1 times more complications than the diathermy skin incision group and was statistically significant ($p=0.04$) (table 3).

DISCUSSION

Surgical procedures are common at tertiary hospitals. Many cases presented with inguinal hernia each day at the surgery department. Surgeons are familiar with either scalpel skin incision or diathermy skin incision for hernioplasty. Diathermy skin incision is preferred for better hemostasis and quick incision whereas scalpel skin incision lacks these features.^{7,8} The outcome of incisions in terms of postoperative pain, local wound infection are different in different hospitals. These outcomes affect the day of discharge, dose of analgesia, complications, patient satisfactions, scar formation, keloid formation etc. These factors ultimately lead to high economic burden and work day loss for the patients. It will also impact the utilisation of such services in hospital. Surgeons are always aware of this fact and patients are always curious about their outcomes. The outcome of incision varies as per type and site of surgeries. In this study, we compared the outcomes of incisions in terms of postoperative pain and local wound infections specific to inguinal hernioplasty. Various studies carried out showed varying results in Nepal and elsewhere. Some studies reported that the diathermy skin incision group had better results and some showed similar results. We had enrolled 30 patients in each group and found no statistical significant difference between both groups in terms of postoperative pain assessed at 6 hour, 12 hour and 24 hours. Similar findings were reported from a study at the department of general surgery at Nepalgunj medical college teaching hospital, Kohalpur of Nepal.^{7,9} In our study, we found statistically significant differences in terms of local wound infection, which was more in scalpel than diathermy skin incision group. Similar findings reported from a study at the department of general surgery at Nepalgunj medical college teaching hospital, Kohalpur of Nepal where scalpel skin incision group shows more hematoma.⁹ In contrast to our finding there was no statistical significant difference in a study conducted at KLES Dr. Prabhakar Kore Hospital, Belgaum of India.⁷ A recent meta analysis concluded that there was no statistical significant difference between

diathermy skin incision group and scalpel skin incision group in open inguinal hernia surgery in terms of local wound complications and postoperative pain score.¹⁰ The direction of inguinal skin incisions should be considered while comparing their outcomes. It may be related to adversities.¹¹ We are limited to consider this in our research work. Diathermy skin incision or scalpel skin incision more concern only the skin, which is related to superficial inflammation only.¹² The local wound complications occur due to other factors such as time of operation, quality of aseptic procedure, hygiene condition of patients, unknown systemic complications. Both incision types have been in use since the 19th century with similar results. But the reduction in shorter incision time in diathermy is a notable benefit.¹⁰ Research suggested that patients having platelet disorders, coagulopathy, on anticoagulant medications have diathermy skin incision is the best selection.¹³ Study done at Rawalpindi of Pakistan reported that there was no difference between two types of incision in terms of postoperative local wound complication.¹⁴ It seems that the diathermy skin incision is as safe as traditional scalpel skin incision. Different meta analysis also supported this findings.¹⁵⁻¹⁶ Research done at Kolkata of India also reported no difference between two types of incision in terms of postoperative local wound complication.¹⁷ In a study from Nepal, on the use of Scalpel skin incision group versus diathermy skin incision group in Ear, Nose, Throat and Head and Neck Surgeries, postoperative pain was significantly more in scalpel skin incision group than diathermy skin incision group. It suggests that diathermy skin incision is beneficial in these surgeries.¹⁸ This is also supported by another research done at Maharashtra of India where the diathermy skin incision group had less local wound complications.¹⁹ In other surgeries such as; appendectomy, caesarean section there was also no difference reported in different studies done in different places.²⁰⁻²² A study from Nigeria does not show any significant difference in terms of post operative pain and wound infection.²⁰ Another study from Greece, concluded both diathermy skin incision and scalpel skin incision were same in terms of post operative pain and local wound complications.²³ For cosmetic acceptance, diathermy skin incision is advisable.²⁴ We lack this cosmetic evaluation in our research work. A cochrane review suggested low-certainty evidence shows no clear difference in postoperative local wound infections.²⁵ Another systematic review and meta analysis also reported no difference between diathermy skin incision and scalpel skin incision in terms of postoperative pain and local wound complications.²⁶ Further, a systematic review and meta analysis also did not find any significant difference in diathermy skin incision and scalpel skin incision.²⁷ In orthopedic surgeries using internal implants, no significant difference in healing reported in both type of incision.²⁸ In terms of blood loss, the diathermy skin incision was better than scalpel skin incision.²⁷ In our study we failed to compare in terms of incisional blood loss, scar marks, days of follow up, skills and experiences of surgeons, mode of patient handling either emergency and scheduled. This



type of research work will help the surgeons for rationale thinking while operating any case especially regarding type of skin incision. Evidence based practice with rationale thinking would help patients for better compliance hence better service utilisation.

CONCLUSION

In our center, the diathermy skin incision for inguinal hernia surgery has less local wound complication in comparison to scalpel skin incision but in terms of postoperative pain it was similar.

RECOMMENDATIONS

We would like to recommend a diathermy skin incision for inguinal hernia surgery in our center. It would be better to have a meta-analysis of such comparison form studies conducted in Nepal. We will further recommend conducting this study with a large number of samples from different centers with consideration of all factors that might affect the outcome of any method of skin incision for inguinal hernia surgery.

LIMITATION OF THE STUDY

We were limited to not following the study participants after 7 days. Assessment of pain score among patients may not be acquired because of different thresholds of pain. This cannot be omitted. It would be better to follow up to assess patient satisfaction of incision, any incision related complications (scar, keloid etc).

ACKNOWLEDGMENTS

We would like to acknowledge our study participants, nursing professionals, and institutional review committee (IRC) of Birat Medical College Teaching Hospital.

CONFLICT OF INTEREST

We have no conflict of interest to declare for this research work.

FINANCIAL DISCLOSURE

We disclose no financial support for this research work.

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