Mean Postoperative Pain in patients with Elective Midline Laparotomies Using Either Scalpel or Diathermy for Incision

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ABSTRACT

Background: During a laparotomy, the midline incision is frequently made with an electrosurgery or scalpel. According to studies, there is no difference between the achieved hemostasis’ rates of complications.

Aim: To assess the average postoperative pain in patients who underwent elective midline laparotomies at the Hayatabad Medical Complex Peshawar using either a scalpel or diathermy for incision.

Methodology: This was a randomized controlled trial, which included 60 laparotomies patients who were divided into two groups at random. One group of patients had diathermy, whilst the other group underwent scalpel incisions. On the second postoperative day, a follow-up was conducted.

Results: In diathermy group we had 63.3% males and 36.7% females while in the scalpel group we had 17 males and 13 females. Patients in diathermy group were hypertensive, this ratio was 36.7% in the scalpel group, diabetic patients were 26.7% in diathermy group and 16.7% in scalpel group.

Practical implication: Cutting by diathermy is simpler, quicker, and results in less blood loss. Furthermore using diathermy to make an incision is no more likely to result in complications than using a scalpel.

Conclusion: For an elective laparotomy, skin incision with diathermy provides superior postoperative pain management than a scalpel.

Keywords: Diathermy, incision, Laparotomy, woundpain, scalpel

INTRODUCTION

Laparotomies are frequently performed for a variety of medical conditions. An incision is made in the anterior abdominal wall to get access to the abdominal cavity and obtain information that cannot be obtained with the aid of regular diagnostic procedures. Although a laparotomy is often an exploratory treatment, it can be transformed into a therapeutic procedure during surgery when the surgeon determines an easily treatable cause for the patient's morbidity.

Similar to this, laparotomies are occasionally performed in order to take a biopsy from an intraabdominal tumor. Laparotomies are still one of the most often performed procedures in any surgical department, despite the fact that their usefulness has decreased with the development of improved diagnostic techniques. This is because they are still frequently cost-effective in many circumstances. In cases of abdominal TB, tubo-ovarian disease, and in patients with suspected intraabdominal adherions, an elective laparotomy is performed.

In settings with limited resources, laparotomy followed by on-table endoscopy is used to treat gastrointestinal bleeding with an unidentified origin. A midline incision is frequently used by surgeons because it provides simple access to the peritoneum. Additionally, it leads to minimal blood loss. Bowel damage risk is also decreased by midline incision. Other techniques that surgeons can use, when needed, include transverse and para-median incisions. Due to a number of post-operative complications, laparotomy causes a great deal of pain for the patient. Incisional herniae and wound infection are the outcomes. Although these side effects are well known, the post-operative pain is sometimes overlooked and underestimated as a result of laparotomy.

The operating surgeons used to have serious concerns about using cautery to make incisions because they feared burns and slower wound healing. But with the development of current diathermy units, cautery has revolutionized incision making because it reduces operating time and causes less blood loss due to excellent haemostasis. Not only are laparotomy incisions large, but they also require a lot of surgical time to allow for full exposure.

Patients have significantly more post-operative pain with midline laparotomies than with other incisions, in particular. Therefore, it’s crucial to select the proper incision procedures in order to lessen the postoperative pain for these patients. Either a scalpel or electrosurgery can be used to cut the skin in the midline incision. Cutting by diathermy is simpler, quicker, and results in less blood loss. According to studies, using diathermy to make an incision is no more likely to result in complications than using a scalpel.

As of now, the primary result of the current investigation has been postoperative pain. Furthermore, in light of the conflicting results of various studies, our study was carried out in the general population with a focus on post-operative pain in midline skin incisions during emergency laparotomies with a crucial concern to evaluate the superior method over the alternatives that would reduce the patient's post-operative pain, an important contributor to post-operative morbidity and subsequently helpful to the patient's recovery.

METHODOLOGY

This randomized controlled trial was conducted in the Department of General Surgery Hayatabad Medical Complex Peshawar from February 2022 to November 2022. Sample size was 60 and Sampling technique used was non-probability consecutive sampling.

Data collection: The sample size was estimated using the anticipated pain scores of 12.65±8.06 for the diathermy group and 17.12±9.49 for the scalpel group, with a 5% level of significance and an 80% power of the test. Procedure was used to enroll 60 patients (thirty in each group), who were eligible for the study.

Inclusion criteria: In the study, both male and female patients with elective laparotomy indications between the ages of 18 and 60 were included.

Exclusion criteria: The study excluded all patients who used Warfarin, had a history of abdominal surgery, or underwent a midline laparotomy.
Data analysis: SPSS 23.0 was used to record and analyze the data. For quantitative factors such as age, surgery time, hospital stay, intraoperative blood loss, and postoperative pain scores, mean ± SD were determined. For categorical factors including gender, history of DM, and HTN, frequencies and percentages were determined. An independent sample T-test was used to compare the average pain scores between the two groups, and a p-value of ≤0.05 was considered significant. To evaluate if there was any effect modification, pain scores were stratified according to age, operation length, history of DM and HTN, using a t-test and a p-value of 0.05 as significant.

RESULTS

Total 60 patients were included. Patients were randomly allocated into two groups by lottery methods (30 in each group). Mean age of patients in the diathermy group was 36±8.6 years while in the scalpel group 32.5±8.9 years (p = 0.125). Details of the age groups for both treatment arms are elaborated in Table 1.

In diathermy group we had 63.3% males and 36.7% females while in the scalpel group we had 56.7% males and 43.3% females (p = 0.598). The mean duration of surgery in both groups are shown in (Table 2). 40% of patients in the diathermy group were hypertensive compared to 36.7% in the scalpel group (p = 0.791), 26.7% in the diathermy group were diabetic compared to 16.7% in the scalpel group (p = 0.347).

The mean duration of hospital stay in the diathermy group was 3.5±1.6 days compared to 3.2±1.7 days in the scalpel group (p = 0.426). The mean postoperative pain of patients in the diathermy group was 2.9±1.2 while that of the scalpel group was 3.7±1.6. The difference was statistically significant after applying the independent sample T-test with a p-value of 0.040 (Table 3).

However, ongoing study and inventive technology allowed for the development of alternative skin incision techniques, and contemporary electrosurgical devices have generated considerable interest in this area. Since its development by Shetty et al., hemostasis and underlying dissections have been the primary uses of electrosurgery. During diathermy, the electrical current is changed into a high-frequency alternating current that travels through the body, excites the molecules of the tissue, and produces energy. This heat impact of diathermy damages sensory nerve fibers partially or completely, which compromises the transmission of nerve signals. When used for skin incisions, diathermy has been linked to safety and may have other benefits in addition to reducing early postoperative wound pain. Historically stainless steel scalpel is frequently used for making skin incisions.

Numerous writers evaluated this approach in reconstructive and aesthetic faciomaxillary surgery, pediatric surgery, rhinoplasty, and blepharoplasty, and found that it produced great cosmetic outcomes with less scarring than scalpel use. The idea that electrosurgery might devitalize tissues with adequate hydration was refuted. The current study showed that electrocautery-created incisions had low early postoperative pain and a reduced need for analgesics, which are similar and congruent findings to earlier research investigations.

The findings of our study agreed with those of the study conducted by Zarei F et al which revealed statistically significant mean pain scores on postoperative days 1, 2, and 3 for the scalpel group of 3.92±1.24, 3.10±1.04 and 2.40±0.20 respectively, and scores of 2.42±0.40, 1.22±0.18 and 1.01±0.11 for the diathermy group. On postoperative days 1, 2, and 3 correspondingly a different study conducted by Yadav SK et al reports mean scores of 3.13, 2.69, and 2.34 for the scalpel group and 1.68, 1.89, and 2.48 for the diathermy group.

But according to another study by Farooque U et al, there was no difference in pain score between diathermy and scalpel incisions on the first postoperative day (mean difference 0.89). Campwala I et al validated a finding from our study that patients who had a midline laparotomy with a skin incision made using diathermy experienced considerably less pain than those whose skin incisions were made with a scalpel. The present investigation has been strengthened by the careful selection of inclusion and exclusion criteria, consecutive sampling, the strongest study design (RCT), and scientifically sound computation of sample size. Additionally, we stratified the analysis to account for confounders and effect multipliers. Additionally, the use of objective criteria for outcome and predictor variables minimized the source of bias in our study.

LIMITATION: One of our limitation is that we had included a small sample size of cases. Therefore, we urge more randomized controlled trials, particularly with bigger sample sizes and consideration of other factors that may affect postoperative pain following laparotomy

CONCLUSION

For an elective laparotomy, skin incision with diathermy provides superior postoperative pain management than a scalpel. Therefore we advise its routine usage in patients undergoing laparotomy.

Conflict of interest: Nil

REFERENCES