

Abdominal Wound Problem after Hysterectomy using Scalpel Versus Electrocautery for Skin and Subcutaneous Dissection

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ABSTRACT

Objective: To evaluate the postoperative abdominal wound problem after hysterectomy with scalpel versus electrocautery for skin and subcutaneous dissection.

Material and Methods: A total of 516 post-menopausal women having age 40 to 65 years who were planned for elective hysterectomy were included in this study. Patients having only benign disorders were included. In group E (N=258); Skin incision and tissue dissection was done using electrocautery by setting the electrocautery machine at cutting mode at 30 to 50 watts' power. In group S (N=258); conventional scalpel was used for skin incision. Scalpel number 23 was used for skin and subcutaneous tissue dissection. Post-operative wound complications such as seroma, hematoma, wound dehiscence and wound infections were primary study endpoints.

Results: Mean age was 48.6±6.9 years in electrocautery and 49.2±6.3 years in scalpel group (p-value 0.30). Seroma formation was diagnosed in 98 (37.98%) patients in electrocautery group and in 52 (20.1%) patients in scalpel group (p-value <0.0001). Wound infections were diagnosed in 50 (19.3%) patients in electrocautery group versus in 87 (33.7%) patients in scalpel group (p-value 0.0002). Hematoma was diagnosed in 10 (3.87%) patients in electrocautery group and in 19 (7.4%) in scalpel group (p-value 0.08).

Conclusion: The use of electrocautery is associated with lower rate of post-operative wound infections and hematoma formation. The present study advocates the use of electrocautery for skin and subcutaneous tissue dissection in patients undergoing abdominal hysterectomy.

Keywords: Abdominal hysterectomy, electrocautery, scalpel, wound complications.

INTRODUCTION

Conventionally scalpel have been the gold standard to give surgical cuts.¹ Since its first use in early-part of 20th century, electrocautery has been extensively used as an alternate tool for making incision. There has been a wide spread use of electrocautery for hemostasis, electrodes used in making electrocautery incision generate a pure sinusoidal current which produce cleavage in tissue planes without producing damage to adjacent tissue, this is one of causes of fewer damage imposed to tissues leading to minimal scar formation. The practice of cutting electrocautery in place of scalpel for skin incision is increasingly attaining recognition due to the facts that it does not increase the wound complications.²

There always been a fear of thermal injuries while using electrocautery for making skin incision.³ The potential benefits of electro-surgery includes reduce blood loss, rapid incision and possible reduction in risk of accidental damage caused by scalpel to operative personnel.⁴ There are concerns about use of electrosurgical knife as its reported to be one of several variable contributing to postoperative abdominal wall incision infection, poor wound healing, adhesion formation.⁵

The NICE guidelines have prohibited the use of electrocautery for skin incisions and have reported that electrocautery increases the risk of post-surgery wound infections.⁶ While some other larger scale studies have contradicted these recommendations.^{7, 8}

The presented study is to evaluate the postoperative abdominal wound problem after hysterectomy with scalpel

versus electrocautery for skin and subcutaneous dissection.

METHODS

A total of 516 women having age 40 to 65 years who were planned for elective hysterectomy in the department of gynecology of Liaquat National Hospital & Medical College, Karachi were included in this study. The study duration was from 1/12/2017 to 31/05/2019. Patients having only benign disorders were included. While Pregnant females, those having any pelvic malignancy, chronic medical illness (diabetes mellitus, anemia) and obese patients having BMI ≥30 Kg/m² were excluded. Approval of IRB board was taken. Consent for study participation from patients was also taken.

Data regarding demographics and underlying etiology was noted for each patient. Patients were randomly divided into two groups;

In group E; Skin incision and tissue dissection was done using electrocautery by setting the electrocautery machine at cutting mode at 30 to 50 watts' power.

In group S; conventional scalpel was used for skin incision. Scalpel number 23 was used for skin and subcutaneous tissue dissection.

Post-operative wound complications such as seroma, hematoma, wound dehiscence and wound infections were primary study endpoints. Abdominal ultrasonography was done at follow-up determine the presence of localized collection of serous fluid at the site of surgery. Wound dehiscence was defined as parting of subcutaneous tissues

without erythema, hematoma, seroma, induration unexpected tenderness, purulent secretion or surgical complication, wound rupture along a surgical incision. Wound Infections were diagnosed by the clinical judgment of the surgeon, diagnosis was confirmed according to the CDC criteria; (i) patient has purulent drainage, pustules, vesicles or boils (excluding acne), (ii) patient has atleast two of the following localized signs or symptoms with no other recognized cause; pain or tenderness, swelling, erythema, or heat.⁹ Patients were discharged on third post-operative day. Follow-up was done after 1st week and then at 6th weeks.

Data Analysis was performed using SPSS v25. Comparison of quantitative variables was made using independent sample t-test. While qualitative variables were compared using chi-square test. P-value ≤0.05 was taken as significant.

RESULTS

A total of 516 patients of abdominal hysterectomy were included, with mean age of 48.6±6.9 years in electrocautery

and 49.2±6.3 years in scalpel group (p-value 0.30). Majority of patients were having age range 40-55 years. There were 460 (237 (91.8%) in electrocautery versus 229 (88.7%) in scalpel group) patients having normal weight. Common indications of hysterectomy were uterine fibroids (119 (46.12%) in electrocautery group v/s 131 (50.7%) in scalpel group) and heavy menstrual bleeding (78 (30.2%) in electrocautery v/s 74 (28.7%) in scalpel group) with p-value 0.72. detailed baseline data is presented in table 1.

On comparison of wound complications, seroma formation was diagnosed in 98 (37.98%) patients in electrocautery group and in 52 (20.1%) patients in scalpel group (p-value <0.0001). Wound infections were diagnosed in 50 (19.3%) patients in electrocautery group versus in 87 (33.7%) patients in scalpel group (p-value 0.0002). Hematoma was diagnosed in 10 (3.87%) patients in electrocautery group and in 19 (7.4%) in scalpel group. There was no significant difference in wound dehiscence rate between the groups (Table 2).

Table 1. Baseline Characteristics.

	Group E (N=258)	Group S (N=258)	p-Value
Mean Age	48.6±6.9	49.2±6.3	0.30
40-55 Years	154 (59.7%)	143 (55.4%)	0.32
56-65 Years	104 (40.3%)	115 (44.6%)	
Mean BMI (460)	24.2±3.7	23.9±3.9	0.37
Normal Weight (56)	237 (91.8%)	229 (88.7%)	0.23
Overweight	21 (8.1%)	29 (11.2%)	
Indications for Hysterectomy			
Uterine Fibroids	119 (46.12%)	131 (50.7%)	0.72
HMB	78 (30.2%)	74 (28.7%)	
Adenomyosis	52 (20.1%)	46 (17.8%)	
PMB	9 (3.5%)	7 (2.7%)	

HMB; Heavy menstrual bleeding, PMB; post-menopausal bleeding.

Table 2. Wound Complications.

	Group E (N=258)	Group S (N=258)	p-Value
Seroma	98 (37.98%)	52 (20.1%)	<0.0001
Hematoma	10 (3.87%)	19 (7.4%)	0.08
Wound Infection	50 (19.3%)	87 (33.7%)	0.0002
Wound Dehiscence	02 (0.7%)	01 (0.38%)	0.56

DISCUSSION

Hysterectomy is one of the commonly performed gynecological surgeries. It can be performed either using abdominal or vaginal route.¹⁰ About 60-80% of hysterectomies are performed using abdominal route.¹¹ The choice of instruments used for skin incision are the first point of concern while performing any surgical procedure. In Present study, we compared the wound complications in patients undergoing hysterectomy by giving skin incision using scalpel with electrocautery.

The present study was conducted only in post-menopausal women, the major indications of hysterectomy were uterine fibroids, heavy menstrual bleeding, adenomyosis and post-menopausal bleeding. Acharya et al. also reported fibroids (40.3%) as the commonest indication of abdominal hysterectomy, other causes were uterine bleeding in 17.3% patients, adenomyosis in 5.8% and benign ovarian tumors in 18.7% patients.¹² A study by Malik et al. reported uterine bleeding (44.6%) as the

commonest benign indication for hysterectomy in their series of 100 patients, other indications were uterine fibroids in 16.2% cases, pelvic pain in 14.5%, endometriosis in 9.4% cases.¹³

We found higher rate of post-operative wound infections in scalpel group; 33.7% versus 19.3% in electrocautery group. While the seroma formation rate higher in electrocautery group; 37.98% versus 20.1% in scalpel group.

Hemsell et al. in a similar study did not found any significant difference in wound related complications using scalpel versus electrocautery in patients undergoing abdominal hysterectomy and reported that choice of instrument used for skin and subcutaneous tissue incision did not influence the wound related complications.¹⁴

A study by Elbohuty et al. on comparison of scalpel versus electrocautery for skin incision during cesarean section, reported wound infections in 1.5% patients in scalpel group versus in no patient in electrocautery group,

seroma formation in 0.0% patients in scalpel and 1.5% patients in electrocautery group. Moreover, they reported significantly shorter wound healing time in electrocautery group patients.¹⁵

Another study reported less post-operative pain using electrocautery for skin incisions in mid-line laparotomies in comparison to scalpel usage.¹⁶

Another study on one year follow-up of cosmetic outcomes of electrocautery versus scalpel for skin incisions in patients undergoing elective surgeries, did not reported any significant difference in early wound complications and early and at 1 year cosmetic outcomes between the two techniques.¹⁷

A recent meta-analysis also reported that giving skin incision with electrocautery is quicker and is associated with lower post-operative pain. The authors did not found any differences in the incidence of wound related complications, hospital stay and cosmetic outcomes in scalpel and electrocautery skin incision groups.¹⁸

The strength of present study is sufficiently large sample size, moreover, we included patients who underwent only abdominal hysterectomy. While many other studies included heterozygous populations who underwent different operations. Underlying surgical area can also influence the choice of the instrument used for skin incisions, like a meta-analysis reported that the use of scalpel is more safe as compared to electrocautery in patients undergoing parotidectomy.¹⁹

CONCLUSION

The use of electrocautery is associated with lower rate of post-operative wound infections and hematoma formation. The present study advocates the use of electrocautery for skin and subcutaneous tissue dissection in patients undergoing abdominal hysterectomy.

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