

A comparative study of scalpel skin incision versus thermo-coagulative skin incisions in general surgery

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Abstract

Introduction: Although electrosurgical instruments are used increasingly for making incisions and tissue dissection, concerns about excessive scarring, higher wound infection rate and poor wound healing have curtailed the widespread use of surgical diathermy for skin incisions. **Aims and Objectives:** To Study of Scalpel Skin Incision versus Thermo-coagulative Skin Incisions In General Surgery. **Methodology:** This study was carried out at tertiary health care center during one year period i.e. 2013 to 2014 in the 60 patients undergoing various General Surgeries Were included into the study. These patients were divided into two treatment groups i.e. Scalpel Skin Incision (n=30) and Thermo-coagulative Skin Incisions (n=30) groups randomly by computer generated random numbers respectively. Un-paired t-test was used for statistical analysis. **Result:** The mean Incision time (sec/cm²) was significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions (P<0.001); The mean Incision Blood lost (ml/cm²) significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.01); The Post- operative pain were significantly higher at Day 1, Day 5 in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.05, P<0.01). The mean Hospital Stay significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.001) **Conclusion:** The Thermo-coagulative Skin Incisions is superior to Scalpel Skin Incision in terms of less The mean Incision Blood lost(ml/cm²), The Post- operative pain ,The mean Hospital Stay .

Key Words: Scalpel Skin Incision, Thermo-coagulative Skin Incisions, Diathermy.

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Received Date: 12/12/2015 Revised Date: 03/01/2016 Accepted Date: 04/02/2016

Access this article online

Quick Response Code:



Website:

www.statperson.com

DOI: 06 March 2016

INTRODUCTION

Although electrosurgical instruments are used increasingly for making incisions and tissue dissection, concerns about excessive scarring, higher wound infection rate and poor wound healing have curtailed the widespread use of surgical diathermy for skin incisions.¹⁻³

³Studies conducted in humans provided conflicting results. Soballe *et al*⁴ reported that electric coagulation increases the incidence of indurated margins, infections,

and weakness of the wound cut in comparison with the knife. Conversely, Groot *et al*,⁵ reported that use of surgical diathermy to create surgical wounds in patients undergoing abdominal or thoracic operations carries a wound infection rate similar to that of scalpel. Traditionally scalpels are used for making skin incisions that produce little damage to surrounding tissues.⁶ However, there has been a continuous surge in identifying other methods of skin incision and in the recent years electro surgical instruments have achieved great attention in this regard. There has been a widespread use of diathermy for homeostasis but fear of production of large scars and improper tissue healing has restricted their usage in making skin incisions.^{7,8} Electrodes used in making diathermy incision generate a pure sinusoidal current, which produces cleavage in tissue planes without creating damage to the surrounding areas. This is one of the reasons of less damage inflicted to the tissues leading to minimal scar formation.^{7,9} At the same time, use of diathermy in skin incisions reduces bleeding and makes the incision quicker¹⁰ but there are no differences in

wound burst strength. Previously, it has been reported that there is a greater rate of infection with diathermy incisions than with scalpel incisions [11]. Many studies in the past have evaluated perioperative blood loss, postoperative wound pain and wound healing in a selected group of patients, mainly with midline laparotomy incisions [9, 12]. There have been limited studies comparing diathermy incisions with conventional scalpel incisions amongst all types of elective surgical procedures.

METHODOLOGY

This study was carried out at tertiary health care center during one year period i.e. 2013 to 2014 in the 60 patients undergoing various General Surgeries. They were included into

the study, all of them explained about the both the operative procedure and their potential advantages and Disadvantages and after written consent of the patients; they were included into the study while those patients who did not give consent and with malignancy and other co morbid condition like diabetes, hypertension or immune compromised state were excluded from the study. Wound pain was calculated by the verbal rating score (VRS). These patients were divided into two treatment groups i.e. Scalpel Skin Incision (n=30) and Thermo-coagulative Skin Incisions (n=30) groups randomly by computer generated random numbers respectively. Un-paired t-test was used for statistical analysis.

RESULT

Table 1: Various post-operative parameters in Scalpel skin incision and Thermo-coagulative skin incisions

Parameter	Scalpel skin incision (Mean±SD)	Thermo-coagulative skin incisions (Mean±SD)	P-value (Un-paired t-test)
Incision time (sec/cm ²)	8.74±2.2	6.74±1.1	P<0.001
Incision Blood lost (ml/cm ²)	1.9± 1.21	1.21± 1.5	P<0.01
Post- Operative Pain			
Day 1	5.32± 1.32	3.2± 1.14	P<0.05
Day 5	2.2± 0.12	0.8± 0.5	P<0.01
Mean Hospital Stay	5 ± 1.2 day	3.1± 1.3 day	P<0.001

The mean Incision time (sec/cm²) was significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions (P<0.001); The mean Incision Blood lost (ml/cm²) significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.01); The Post-operative pain were significantly higher at Day 1, Day 5 in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.05, P<0.01). The mean Hospital Stay significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.001)

DISCUSSION

In an era of explosive anesthetic agents, electro surgical instruments were used only selectively in human surgery. After the introduction of halothane as an anesthetic agent, diathermy became increasingly used to control bleeding and for dissection of tissue planes. However, it is still infrequently used for making skin incisions. The reluctance in the use of skin incision is due to the fear that electro surgical instruments create increased amounts of necrotic tissue within the wound which may increase the chances of wound infection leading to delayed wound healing and excessive scarring [7, 13-14]. After the introduction of oscillator units, which produce pure sinusoidal current, there has been an increasing trend in the use of diathermy for making skin incisions. In the

recent years, many studies have been conducted on both methods of skin incision, which showed less operating time, diminished loss of blood, and reduced early pain and fewer requirements of analgesic drugs after surgery using the diathermy method of skin incision when compared to scalpel incision [7]. In our study we found that The mean Incision time (sec/cm²) was significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions (P<0.001); The mean Incision Blood lost (ml/cm²) significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.01); The Post-operative pain were significantly higher at Day 1, Day 5 in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.05, P<0.01). The mean Hospital Stay significantly higher in Scalpel skin incision group than Thermo-coagulative skin incisions group (P<0.001) These findings are comparative to Altaf Ahmed Talpur [15].

REFERENCES

1. Kim H, Brunner E, Ritter E. Relevance of methods of skin incision technique on development of wound infection. *Am Surg* 1990;56:129-30
2. Rappaport WD, Hunter GC, Allen R, Lick S, Halldorsson A Chvapil. Effect of electrocautery on wound healing in midline laparotomy incisions. *Am J Surg* 1990; 160:618-20.

3. Gallup DG. Opening and closing of the abdomen and wound healing. In: Gershenson DM, DeCherney AH, Curry SL, editors. Operative gynecology. 1st ed. Philadelphia: Saunders; 1993. p. 127-46.
4. Soballe PW, Nimbkar NV, Hayward I. Electric cautery lowers the contamination threshold for infection of laparotomies. *Am J Surg* 1998; 175: 263-6.
5. Groot G, Chappell EW. Electrocautery used to create incisions does not increase wound infection rates. *Am J Surg* 1994; 167: 601-3.
6. Johnson CD, Serpell JW. Wound infection after abdominal incision with scalpel or diathermy. *Br J Surg* 1990; 77(6):626-7.
7. Kearns SR, Connolly EM, McNally S, McNamara DA, Deasy J. Randomized clinical trial of diathermy versus scalpel incision in elective midline laparotomy. *Br J Surg* 2001; 88(1):41-4.
8. Shamim M. Diathermy vs. scalpel skin incisions in general surgery: double-blind, randomized, clinical trial. *World J Surg* 2009; 33(8):1594-9.
9. Dixon AR, Watkin DF. Electrosurgical skin incision versus conventional scalpel: a prospective trial. *J R Coll Surg Edinb*. 1990; 35(5):299-301.
10. Sebben JE. Electrosurgery principles: cutting current and cutaneous surgery--Part I. *J Dermatol Surg Oncol*. 1988; 14(1):29-31.
11. Madden JE, Edlich RF, Custer JR, Panek PH, Thul J, Wangenstein OH. Studies in the management of the contaminated wound. IV. Resistance to infection of surgical wounds made by knife, electro surgery, and laser. *Am J Surg*. 1970; 119(3):222-4.
12. Hussain SA, Hussain S. Incisions with knife or diathermy and postoperative pain. *Br J Surg*. 1988; 75(12):1179-80.
13. Ozgun H, Tuncyurek P, Boylu S, Erpek H, Yenisey C, Kose H, *et al*. The right method for midline laparotomy: what is the best choice for wound healing? *Acta Chir Belg*. 2007; 107(6):682-6.
14. Siraj A, Gilani AAS, Dar MF, Raziq S. Elective midline laparotomy: Comparison of Diathermy and scalpel incisions. *Professional Med J*. 2011; 18(1):106-11
15. Altaf Ahmed Talpur, AbdulBasirKhaskheli, NandlalKella, Akmal Jamal.
16. Randomized, Clinical Trial on Diathermy and Scalpel Incisions in Elective General Surgery. *Iran Red Crescent Med J*. 2015 February; 17(2): e14078.

Source of Support: None Declared
Conflict of Interest: None Declared