

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20172295>

Original Research Article

A comparative study between electrocautery and steel scalpel in making abdominal wall incision in caesarean section

Sonika Gupta^{1*}, Anil Mehta¹, Vikrant Gupta²

¹Department of Gynecology, Government Hospital, Gandhi Nagar, Jammu, India

²Department of Radio diagnosis, Government Medical College and Hospital, Jammu, India

Received: 11 May 2017

Accepted: 16 May 2017

***Correspondence:**

Dr. Sonika Gupta,

E-mail: sonikapaba@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Electrocautery is commonly used in surgical practice. However, its use has been limited in skin due to the fear of tissue scarring, impaired wound healing and wound infection due to damaged tissue. To evaluate and compare the use of electrocautery and steel scalpel in making abdominal skin and deeper tissue incisions in caesarean section pfannenstiell incision with regard to operating time and postoperative wound complication rate.

Methods: The study was a prospective randomized type conducted in the Department of Gynaecology, Government Hospital, Gandhi Nagar, Jammu. 120 patients undergoing caesarean section were divided into two groups, scalpel group in which skin and deeper tissue of abdominal wall were cut by scalpel and cautery group with electrocautery. Comparison was made between the two groups based on the above objectives.

Results: In this study, we find that the operating time was less in electrocautery group and postoperative wound complications were comparable between two groups.

Conclusions: The study demonstrates that electrocautery can be used as an alternative to steel scalpel for making abdominal skin incisions.

Keywords: Caesarean section, Electrocautery, Postoperative wound complication rate, Scalpel

INTRODUCTION

The high-frequency electric surgical knife is one of the common instruments in surgical operations since its inception in 1929.¹

While electrosurgical instruments are used increasingly for tissue dissection, cutting, and haemostasis, concerns about excessive scarring and poor wound healing have curtailed the widespread use of diathermy for skin incision.² Fear of deep burns with diathermy and resultant scarring continues compared with the scalpel, which produces a clean, incised wound with minimal tissue destruction.³ Electrosurgical incision of diathermy type is

not a true cutting incision. This method heats cells within the tissue so rapidly that they vaporize, leaving a cavity within the cell matrix. The heat created dissipates as steam rather than being transmitted into adjacent tissues. As the electrode is moved forward, new cells are contacted and vaporized with the creation of the incision. This may explain the absence of tissue charring and the subsequent healing of tissues with minimal scarring.⁴

This study was taken up to compare the use of electrocautery and steel scalpel in making abdominal skin and deep tissue incision with regard to operating time and post-operative wound complication rate.

METHODS

This was a prospective, comparative study done in the Department of Gynaecology in the Government Hospital, Gandhi Nagar, Jammu over a period of 6 months (September 2016 to February 2017). 120 patients were included in the study.

Inclusion criteria

Pregnant women more than 20 years of age coming to hospital for Elective caesarean section irrespective of sex, race, religion, place of origin or socio-economic status.

Exclusion criteria

- Immunocompromised patient
- Emergency surgery
- Uncontrolled diabetes and hypertension
- Severe organ dysfunctions
- Patients not willing to participate in the study

120 patients undergoing elective caesarean section by Pfannenstiel incision were randomized to either scalpel or electrocautery group. In 50% cases, skin and deep tissue were cut by using cutting-mode high frequency electrocautery and in the remaining 50% by scalpel. Both groups were compared with respect to operating time, postoperative wound complication rate. Stitch line was evaluated by ultrasound using high frequency linear probe in all patients on 8th postoperative day.

Data analysis

Chi-square test was used to find the significance of study parameters. P value of <0.05 was considered significant.

RESULTS

Table 1: Comparison of postoperative complication.

Post-operative complications	Electrocautery No. (%)	Scalpel No. (%)	Total No. (%)
No complication	54(90)	52(86.66)	106(88.33)
Seroma	2(3.33)	3(5)	5(8.33)
Purulent	3(5)	4(6.66)	7(11.66)
Hematoma	1(1.66)	1(1.66)	2(3.33)
Total	60(100)	60(100)	120(100)

Chi-square test value=0.3806, P value=0.94, It is not statistically significant.

The maximum number of patients in the study were in the age group of 20-25 years. The mean haemoglobin level was 10gm%.

The maximum indication for caesarean section in the present study was cephalopelvic disproportion. The incidence of postoperative complications was less in electrocautery group. 6 patients developed complications

in the electrocautery group whereas 8 patients developed complications in the scalpel group. However, the difference was statistically insignificant. Table 1 compares the postoperative complication and Table 2 Compare the ultrasound finding of Parietal wall in both the groups.

Table 2: Comparison of ultrasound finding of parietal wall using linear high probe.

USG Finding	Electrocautery No. (%)	Scalpel No. (%)	Total No. (%)
Normal finding	56 (93.33)	55 (91.66)	111(92.5)
Collection in parietal wall	3 (5)	4(6.66)	7(5.83)
Haemorrhage in wall	1 (1.66)	1(1.66)	2(1.66)
Total	60 (100)	60(100)	120(100)

Chi-square test value= 0.1515, P value =0.926, It is not statistically significant.

The mean operating time was found to be less in the electrocautery group as compared to scalpel group, the difference is statistically insignificant with a P value of <0.0001 as given in Table 3.

Table 3: Comparison of operating time.

Duration of operation (in minutes)	Electrocautery No. (%)	Scalpel No. (%)	Total No. (%)
< 20	51(85)	20(33.33)	71(59.16)
20-30	5(8.33)	34(56.66)	39(32.5)
> 30	4(6.66)	6(10)	10(8.33)
Total	60(100)	60(100)	120(100)

Chi-square test value= 35.4995, P value=0.0001, It is statistically significant.

DISCUSSION

Electrosurgery has been used extensively since its introduction in 1929, and has now become an indispensable tool in every operating room.¹ Despite this, few surgeons use diathermy to incise skin. Early studies with primitive diathermy machines suggested that electrosurgical incisions were associated with just such charring and poor wound healing.⁵ Subsequent animal studies suggested increased wound infection rates with the use of electrocautery.⁶

Other studies have demonstrated similar or decreased infection rates with the use of electrocautery.^{2,7} However, with the use of newer electrosurgical instruments, majority of the studies showed electrocautery skin incision to be equal to or better than scalpel in terms of time taken for incision, less blood loss, less painful and similar wound healing rates.^{2,8}

Dorendro T et al showed that electrocautery is a safe alternative to steel scalpel for making abdominal skin incisions.⁹ It is comparable to steel scalpel with regard to

operating time, postoperative complications and duration of hospital stay when used for making skin incision.

In the in the present study there was no significant difference between electrocautery and steel scalpel in postoperative complication rate as also reported by Kearns SR et al.²

In the present study found that time taken for incision was less in electrocautery group and the difference was statistically significant as also observed by Kearns SR et al.²

CONCLUSION

Electrocautery is a safe alternative to steel scalpel for making abdominal wall incisions during caesarean sections. It is comparable to steel scalpel with regard to postoperative complications and it is better than steel scalpel with regard to operating time.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Lawrenson KB, Stephens FO. The use of electrocuting and electrocoagulation in surgery. Aust NZ J Surg. 1970;39:417-21.
2. 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;88:41-4.
3. Johnson CD, Serpell JW. Wound infection after abdominal incision with scalpel or diathermy. Br J Surg. 1990;77:626-7.
4. AR Dixon DF. Watkin Electrosurgical skin incision versus conventional scalpel: A prospective trial. J R Coll Surg Edinb. 1990;35:299-301.
5. Glover JL, Bendick PJ, Link WJ. The use of thermal knives in surgery: Electrosurgery, lasers, plasma scalpel. Curr Probl Surg. 1978;15:1-78.
6. Arnaud JP, Adloff M. Electrosurgery and wound healing: An experimental study in rats. Eur Surg Res. 1980;12:439-43.
7. Groot G, and Chappel EW. Electrocautery used to create incisions does not increase wound infection rates. Am J Surg. 1994;167(6):601-3.
8. Duxbury MS, Blake SM, Dashfield A, and Lambert AW. A randomized trial of knife versus diathermy in pilonidal disease. Ann R Coll Surg Eng. 2003;85(6):405-7.
9. Dorendro T, Singh RK, Das P. A comparative study between electrocautery and steel scalpel in making abdominal skin incision. IOSR J Dent Med Sci. 2016;15(9):59-63.

Cite this article as: Gupta S, Mehta A, Gupta V. A comparative study between electrocautery and steel scalpel in making abdominal wall incision in caesarean section. Int J Reprod Contracept Obstet Gynecol 2017;6:2328-30.