



## A COMPARATIVE STUDY ON DIATHERMY VS SCALPEL SKIN INCISIONS IN ABDOMINAL SURGERIES

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### ABSTRACT

**OBJECTIVE:** To compare the outcome of diathermy incision Vs. scalpel incision in abdominal surgeries with regards to

- Incision time

- Incisional blood loss
- Post-operative wound infection
- Scar characteristics

Also to study tissue changes and lateral extent in diathermy skin incision.

**MATERIAL AND METHODS:** This is a PROSPECTIVE COMPARATIVE STUDY ON DIATHERMY Vs. SCALPEL INCISION IN ABDOMINAL SURGERIES in a total of 90 patients with 45 in each group in MGMGH, Trichy for a period of 1 year.

- Incision time will be recorded using seconds stop watch.
- Incision blood loss will be assessed by weighing the soakage pads.
- Wound infection will be assessed by ASEPSIS Score.
- Scar assessment will be done using Manchester Score.

**CONCLUSION:** Diathermy incisions are equally prone to get wound infection, as do the incisions made with scalpel. Furthermore, lower incidence of less incision time and minimal blood loss are the encouraging facts supporting routine use of diathermy for abdominal skin incisions after taking adequate precautions. Wound infection rate and scar character were insignificant among both incision techniques. This study also proves that lateral extent of diathermy injury does not extend beyond one cm.

### KEYWORDS : Diathermy, scalpel, blood loss, incision time

Surgical diathermy is usually known by the term as “electrosurgery” or electrocautery. They involve the usage of high frequency Alternating electric current in surgery. Diathermy is used mainly for three purposes coagulation, Fulguration, cutting. Two types of diathermy include MONOPOLAR and BIPOLAR. Monopolar – where electrical current passes from one electrode near the tissue to be treated to other fixed electrode placed elsewhere in the body.

Usually this type of electrode is placed in contact with buttocks or near the leg. Bipolar- where both electrodes are mounted on same pen like device and electrical current passes only through the tissue which being treated. Advantage of bipolar electrosurgeries is that it prevents the flow of current through other tissues of the body and focuses only on the tissue which is in contact. Diathermy incision has certain significant advantages compared with scalpel because of reduced incision time, less blood loss, reduced postoperative time.

Diathermy incision is not a true cutting incision. Diathermy heat cell within tissues rapidly that they vaporise leaving the cavity within cell matrix, heat created disappears as steam instead of being spread to adjacent tissue. The moving electrode contracts and vaporises the new cells and an incision is created.

No single study till date has focused on diathermy skin incisions in midline laparotomies exclusively so as to make out the complications. This study compares diathermy and scalpel skin incisions in terms of incision time, blood loss, wound character and scar assessment in midline laparotomy surgeries in MGMGH, Trichy.

#### Materials And Methods

A total of 90 patients will be included in the study.

Group 1 patients n=45 will be operated via scalpel incisions. Group 2 patients n=45 will be operated via diathermy incisions.

Equal number of cases from both the groups will be operated under the same surgical unit.

Patients will be counselled about the merits and demerits of both incisions and informed consent will be obtained for the study.

All the patients will be operated under spinal or general anaesthesia. All patients will receive preoperatively 1gram ceftriaxone 30 minutes before surgery and repeated 12hourly for 3 days.

Injection tramadol 100mg will be given eighth hourly for two days. Subcutaneous layer will be closed with vicryl and skin with 2-0 ethilon.

Skin sutures will be removed at postoperative day 10 after checking tensile strength.

Incision time will be recorded using seconds stopwatch that is time taken from initial skin incision to complete opening of peritoneum. Incisional blood loss will be assessed by weighing the soakage pads. Wound infection will be assessed by ASEPSIS score.

#### Demographic Data Of Study Group

PARAMETERS	DIATHERMY GROUP (%)	SCALPEL GROUP (%)
MALE	84.4	84.4
FEMALE	15.6	15.6
HEMOGLOBIN ( G % )		
MORE THAN 9	2.2	2.2
MORE THAN 10	35.6	26.7
MORE THAN 11	35.6	42.2
MORE THAN 12	22.2	28.9
MORE THAN 13	4.4	0
BLOOD LOSS		
5 TO 10 ML	55.6	13.3
11 TO 15ML	42.2	66.7
MORE THAN 15 ML	1	9
WOUND ASSESSMENT		
SATISFACTORY HEALING	64.4	66.7
DISTURBANCES OF HEALING	31.1	33.3
MINOR WOUND INFECTION	2	0

#### Comparing scar assessment scores among case and control groups

	Case	Control	P-value
	Median (IQR)		
Scar assessment	14 (4)	14 (4)	0.595

#### Comparing the mean scores of incision time, post-operative wound infection and scar assessment among case and control groups

	Case	Control	P-value
	Mean±SD		
Length Of Incision(Cm)	11.98+1.097	12.40+1.01	0.061
Incision Time(Min)	3.68+0.66	4.38+0.53	0.001**
Pod Suture Removal	11.38+1.34	11.42+1.25	0.871

## DISCUSSION

Electro surgery has been widely used since it was started in 1929. It has now become an essential tool in all the operating theatres. Before the discovery of non-explosive anesthetic drugs, electrosurgical techniques had restricted uses apart from underwater transurethral work, minor skin procedures and neurosurgery where regional anaesthesia or nitrous anaesthesia was in use.[2]

After the introduction of halothane electro surgery was used to for maintain hemostasis and to control bleeding. Apart from this, skin incisions were made with Diathermy by few surgeons. This hesitation to make skin incisions with diathermy was due to the belief that diathermy increases devitalized tissue within the wound, which may cause delay in wound healing, wound infection and result in scar formation. However, pure sinusoidal current delivered by oscillator units, has increased the interest in electro surgery. [2]

Preliminary studies on electrosurgical procedures with diathermy demonstrated that it was associated with only charring of skin.[7] Further animal studies suggested that diathermy was associated with delayed wound healing but there were no difference in wound bursting strength. [8,9] the reason for increased wound infection was suggested to be raise in oxygen tension caused by tissue heating.

The ASEPSIS score saw used to diagnose the infection at the surgical site. The percentage of surgical site infection was lesser in the steel scalpel group (13.1%) than with the incisions made with diathermy (15.7%) with overall wound infection 14.4%

Groot et al. Researched on wound infection rate in abdominal and thoracic surgeries and compared the electrocautery and steel scalpel. They concluded that electrocautery do not increase the wound infection rate.

Ahmad et al. also established a similar finding and said that post-operative infections are comparable in diathermy and scalpel groups.

Ali et al., in the year 2009, proposed that diathermy can used safely to make all types skin incision and stated that SSI is 12.5% cases in the diathermy group and in the scalpel group it was 17.5%. This difference was not found to be statistically significant (P = 0.378). PatilShivagouda in his study in 2005 pointed that electrocautery is safe in skin incisions as his study showed a comparable result.

Manchester Scar Score was used is assessing the wound at the time of discharge. Color, nature and texture were the criteria assessed. Distortion and contour were also noted. Manchester Scar Score can be applied to a wide range of scars. It is also suitable for scar assessment in post-operative cases. The score ranges from 5 to 18. A higher value implies that the scar is poor. In the present study, it was found that the mean Manchester scar score was higher in the control compared to the cases, and the difference was not statistically significant (P>0.01)

Skin biopsies taken from incision site and 1cm lateral from the incision have revealed that the lateral thermal injury to tissues in diathermy incisions does not extend beyond 1cm

## CONCLUSION

Diathermy incisions are equally prone to get wound infection, as do the incisions made with scalpel. Furthermore, lower incidence of less incision time and minimal blood loss are the encouraging facts supporting routine use of diathermy for abdominal skin incisions after taking adequate precautions. Wound infection rate and scar character were insignificant among both incision techniques. This study also proves that lateral extent of diathermal injury does not extend beyond one cm.

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