Research Paper

Volume : 4 | Issue : 12 | December 2015 • ISSN No 2277 - 8179

A Comparative Study of Diathermy and Scalpel Incisions in Abdominal Surgeries

Medical Science

KEYWORDS :

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ABSTRACT

Background: Diathermy is widely used in surgical practice for tissue dissection, cutting, and coagulation – hemostasis. The fear of excessive scarring and poor wound healing had stopped its widespread use for skin incision. Availability of very good diathermy tools in recent times , some surgeons have started using even for skin incisions.

Aims and Objectives: This study was done to compare the outcome of diathermy incisions versus scalpel incisions in general surgery with regard to postoperative pain, postoperative wound infection rate.

Materials and Methods: This study was conducted in the surgical unit of SIMS. A total of 100 patients were taken in the study. Two groups were made as group A and group B, group A consisted of patients who underwent scalpel incision (50 patients) and group B who underwent diathermy incision (50). Variables analyzed were postoperative pain and post operative wound infection rate. All patients aged from 20 years to 60 years who underwent elective surgery (appendectomy,cholecystectomy,and inguinal hernia) were included in the study. The cases not included in the study were, those who were taken as emergency, previous scarred abdomen. The Standard antiseptic protocol for skin preparation was followed to both the groups.

*Results: The results showed significantly less pain postoperatively with diathermy incisions over scalpel incisions. Early postoperative pain using visual analouge scale***VAS) was used to assess and found that the pain was markedly reduced during first 24-48 hours in group A . Postoperative wound infection rate was statistically insignificant and almost same in both the groups.*

Conclusion: Diathermy skin incision in elective surgery is found to be better over scalpel use as it results in less early postoperative pain, insignificant wound infection and early healing.

Introduction

Since ages, the skin was cut opened by the use of a scalpel knife which gave a clean, incised wound [1]. Use of electro surgical instruments for tissue disscetion, cutting, coagulation of vessels was a routine since its inception [2]. The fear of excessive scarring and poor wound healing had stopped its widespread use for skin incision. With invent of good diathermy tools, some surgeons have started using even for skin incisions.

Aims and Objectives This study was to compare the outcome of diathermy incisions versus scalpel incisions in general surgery with regard to

1. **Early post operative pain,**
2. **Post operative wound infection rate**

Material and MethodsThis study was carried out in surgical unit at SIMS. First patients were divided into two groups, group A and group B.

A total of 100 patients were included in the study. Group A patients, n = 50, for scalpel incision. Group B patients, n = 50, for diathermy incision.

The inclusion criteria were both sexes, aged between 20 and 60 years who were admitted for elective surgery in the surgical unit for appendectomy, cholecystectomy, and inguinal hernia. The exclusion criteria were:

1. Emergency surgeries
2. Ventral hernias
3. Pregnant patients,

Patients were counselled in detail regarding the merits and demerits of both the incisions, and informed consent was taken from all patients for the procedure to be undertaken. All the patients were operated either under general or spinal anesthesia. All patients were given intravenous antibiotic prophylactically in the form of Ceftriaxone 1 gram intravenous at the time of induction of anesthesia. Injection Paracetemol 1000mg intavenous injection was given 12-hourly for 24 hours as an analgesic, followed by Paracetemol 1gm oral 12-hourly for next 24 hours. skin closure was done using ethilon 2/0 in bothe the groups . Skin sutures were removed between the seventh and tenth postoperative days.

If any wound discharge is found, it was sent for culture . Wound infection was graded according to Southampton wound scoring system [4]: Grade 0 : normal healing, Grade I, normal healing with mild bruising or erythema; Grade II, erythema plus other signs of inflammation; Grade III, clear or serosanguinous discharge; and Grade IV, purulent discharge and Grade V, deep or serious wound infection with or without tissue breakdown.

Pain was assessed using visual analog scale [5]. Visual analog scale is represented by a straight line measuring 0-10, Total scores range from 0 to 10 with a lower score no pain or less pain and higher score indicating more severe pain. (0=”no pain” to 10=”severe pain”)..

The Allan electrosurgical unit was used providing a maximum power of 120 watts. Current intensity in pure cutting mode for skin incision was set at reading 40. For coagulation the current intensity was set at 40. Hemostasis was performed with coagulation diathermy, and large blood vessels were suture ligated in both groups.

Results In our study the mean age of patients was 40 years. This study does not consider healing time with respect to age. In both groups, female predominance was seen. The risk factors like anaemia and other Co-mormid conditions like diabetes, hypertesion and smoking which may attribute for delayed wound healing were not considered as a criteria in this study. The mean incision length was 10 cm & 10.2 cms for cholecystectomy cases whereas it was 5.3 cm and 3.5 cms for appendectomy cases, 3.8 cms for inguinal hernia.

The early postoperative pain **(considered from immediate post surgery time to day 3)** assessment was done by Visual analouge sacle (VAS). It was found that the mean postoperative pain score was lower in the diathermy cases.

Visual Analog Scale (VAS)

Table I

	1-4 hrs	5-8 hrs	9-12 hrs
Diathermy incision	2-4/50	3-6/50	2-5/50
Scalpel incison	4-6/50	6-9/50	7-8/50

Table 2. Early post operative pain in Appendectomy cases

VAS score	Diathermy	Scalpel	p value
Day 1	3.1 ± 2.2	6.4 ± 4.5	0.003
Day 2	1.9 ± 1.3	4.3 ± 2.6	0.004
Day 3	1.1 ± 0.4	3.7 ± 1.9	<0.001

Table 3. Early post operative pain in cholecystectomy cases

VAS score	Diathermy	Scalpel	p value
Day 1	3.4 ± 1.2	5.9 ± 2.4	0.04
Day 2	2.7 ± 0.86	4.8 ± 1.7	0.01
Day 3	1.6 ± 0.43	2.9 ± 0.9	<0.001

Table 4. Early post operative pain in Inguinal hernia cases

VAS score	Diathermy	Scalpel	p value
Day 1	3.73 ± 1.16	6.13 ± 2.4	0.02
Day 2	2.32 ± 0.4	5.21 ± 2.3	0.04
Day 3	1.14 ± 0.67	4.1 ± 1.9	0.004

Wound assessment

No validated universal system is designed specifically to aid the assessment and management of surgical wounds. The most commonly used, the CDC definition, employs stringent criteria to classify infection. Several other wound scoring systems exist and two of the best are ASEPSIS and the Southampton Wound Assessment Scale. These enable surgical wound healing to be graded according to specific criteria, usually giving a numerical value, and therefore provide a more objective assessment of the wound [10,11].

In this study we have adopted the Southampton Wound Assessment scoring system[4] and the results show that the wound infection rate was almost same in both the groups and was statistically insignificant.

Southampton Wound Assessment scale

Grade	Appendectomy	Cholecystectomy	Inguinal hernia
Normal healing	0	0	0
normal healing with mild bruising or erythema	0	1	0
erythema plus other signs of inflammation	1	2	0
clear or serosanguinous discharge	0	0	0
purulent discharge	0	0	0
deep or serious wound infection with or without tissue breakdown	0	0	0
total	1	3	0

Discussion

Electrosurgery has been used extensively since its inception, and has now become an indisp**ensable tool for all surgeries and in every** operating theater.[1]

Early studies with primitive diathermy machines suggested that electrosurgical incisions were associated with just charring and poor wound healing[8]. Subsequent animal studies suggested increased wound infection rates but no difference in wound bursting strengths [9,12]. It has been suggested that local tissue heating increases subcutaneous oxygen tension, thus enhancing the resistance of the surgical wounds to infection. The lower visual analogue pain scores during the first 48 hours can be explained by the fact that cell vaporization caused by the application of pure sinusoidal current leads to immediate tissue and nerve necrosis without significantly affecting nearby structures.

Other studies have demonstrated significant advantages to the use of electrosurgical incision, including shorter incision time, reduced post-operative pain and sealing of lymphatics during excision of malignant tumors [8].

Dixon et al., has shown that diathermy incision is more rapid than scalpel incision [3]. In another study by Hussain and Hussain, it was concluded that postoperative pain is significantly less following the diathermy group [13]. Kearns also found that postoperative pain was significantly lower in the diathermy group for first 48 hours after operation which is consistent with our study.

In this study, a total of **100** patients were enrolled who were allotted to either group in a randomized manner. The incisions were evaluated in terms of postoperative pain and postoperative wound infection**.** This study shows that diathermy incisions were faster and were associated with significantly lower postoperative pain and results are consistent with the study conducted by bhupender[22].

Kearns et al concluded that the use of diathermy for skin incision is associated with lesser early postoperative pain and less analgesia requirement [2]. Ahmad et al. also noted similar findings that postoperative pain was significantly less with diathermy incisions in first 24 hours [21]. Similar findings were noted by Siraj et al., in 2011, and reported that incision time in the diathermy group is significantly less than in the steel scalpel group [23].

The assessment of the wound in the immediate postoperative period was assessed by the Southampton Wound Assessment scale[4]**.**

The number of surgical site infection in all the surgeries were same in both the groups. Groot et al. studied wound infection rate in cases of abdominal or thoracic wounds and compared the electrocautery and steel scalpel. They found that electrocautery does not increase the wound infection rate [25]. Ahmad et al. also revealed the similar findings and stated that post operative infections are comparable in diathermy and scalpel groups [21].

This study does not consider healing time with respect to age. In both groups, female predominance was seen. The risk factors like anaemia and other Co-mormid conditions like diabetes, hypertesion and smoking which may attribute for delayed wound healing were not considered as a criteria in this study**.**

conclusion Both Diathermy incisions and scalpel incisons are equally prone to get wound infection. Further, lower incidence of early postoperative pain may be one of the encouraging factor which supports use of diathermy for abdominal skin incisions.

Volume : 4 | Issue : 12 | December 2015 • ISSN No 2277 - 8179

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