ORIGINAL ARTICLE

Comparison of Electrosurgical versus Scalpel Skin Incision in Inguinal Hernioplasty in Terms of Early Postoperative Pain

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ABSTRACT

Objective — *To compare early mean postoperative pain following use of diathermy and scalpel for making skin incision in inguinal hernioplasty.*

Study design — *Double blind, randomized controlled trial.*

Place & Duration of study — *Department of General surgery, Combined Military Hospital Rawalpindi, from September 2011 to February 2012.*

Methodology — *A total of 60 patients who underwent either diathermy skin incision (group A n=30) or scalpel skin incision (group B n=30) were analyzed. Early postoperative pain was compared in both the groups by using visual analogue scale. The inclusion criteria were all adult male and female patients who underwent elective or emergency inguinal hernioplasty under spinal anesthesia. The exclusion criteria were patients with recurrent inguinal hernias and patients operated under general or local anesthesia.*

Results — Mean VAS was 2.15 + 1.200 in the diathermy group and p value was 0.00, which was significant.In the scalpel group mean VAS was 4.95 + 1.373. Mean percentage of pain score in scalpel was 49.5%, whereas in diathermy group its was 21.5%, which is significantly lower than the scalpel group.

Conclusion — *Diathermy incision has significant advantage compared with scalpel in terms of reduced early postoperative pain.*

Key words — *Skin incision, Pain scores, Inguinal hernia.*

INTRODUCTION:

Inguinal hernioplasty is a common surgical procedure. Scalpel is used traditionally for making skin incision, alternative is to use electrocautery for making this incision. The use of electrosurgical devices also added advantage of maintaining hemostasis, however most of the surgeons are still reluctant to use diathermy for making skin incision due the fear of postoperative pain and delayed wound healing. This reluctance, has been seriously challenged by newer research work.[1] Electrosurgery is used clinically for coagulation, cutting desiccation and fulgurationof tissues. Commonly used devices are nonpolar and bipolar circuits. Cutting diathermy causes rapid cell vaporization.[2] Most studies have compared electrocautery incision with variable results, in terms of incision time, blood loss, postoperative wound infection and pain. However study by Shamim M showed significantly reduced early postoperative pain in the diathermy group as compared to scalpel.[3] Scalpel skin incision is generally preferred in our set up. Use of cutting diathermy also decreases chances of transmission of blood related diseases, such a hepatitis B and C, and HIV infection, which makes electrocautery superior to scalpel in terms of safety.[4]

This study was planned to alleviate fears of surgeons with regards to use of diathermy for skin incision.

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METHODOLOGY:

This study was carried out at Combined Military Hospital Rawalpindi, from September 2011 to February 2012. All adult male and female patients who underwent elective or emergency inguinal hernioplasty under spinal anesthesia were included. Patients with recurrent inguinal hernias, those operated under general or local anesthesia, were excluded . All patients were included after obtaining informed written consent. Pros and cons of both scalpel and diathermy were explained to the patients.

Randomization was done by senior registrar of the ward and patients were allocated into groups A and B. Patients receiving diathermy incision were placed in group A and patient receiving scalpel incision were placed in group B. Patient was kept blind regarding the type of incision, however informed written consent was taken for both types of incisions. The patients were divided in blocks of two and within each block, the first patient was allocated to group A and second to group B. Pain was assessed by a house officer of surgical ward. The house officers were also kept blind of the incision type.

A total of sixty patients were included in the study. In group A, thirty patients underwent operation via diathermy incision while in group B, thirty patients underwent operation via traditional scalpel incision. Antibiotic prophylaxis was using injection cefuroxime. The skin and subcutaneous tissues were incised with scalpel or a diathermy cutting mode. Hemostasis was secured with coagulation diathermy. Herniotomy was done after dissection of the sac. Polypropylene mesh of 6cm x 11cm was used to strengthen the posterior wall of the inguinal canal. Drain was placed according to the need. External oblique aponeurosis and subcutaneous tissue were sutured with polyglycolic suture 2/0. Skin was closed with polypropylene 2/0. Postoperatively all patients were nursed in the ward. Postoperative pain perception was measured by using visual analogue scale (VAS), graded from 1-10 according to severity, six hours after operation (when patient has recovered from effects of spinal anesthesia) and then after 24 hours (table I). Patients were discharge, on the second postoperative day.

Following operation, both groups of patients were given similar analgesics as per patient requirement. Data was analyzed using SPSS version 16.0 **.** Both groups were compared for early postoperative pain by applying independent samples t-test. P value< 0.05 was considered statistically significant.

RESULTS:

A total of 60 patients were included, 30 in each group. There were no significant demographic differences between the two groups. Group A (diathermy) consisted of 30 patients (29 males and 1 female). Mean age was 52.8 + 16.14 year and range was 18-80 year. Group B (scalpel) consisted of 30 patients (all were males). Mean age was 52.0 + 18.15 year and range 22-80 year. Out of the total of 60 patients 28 had right inguinal hernia, 26 had left inguinal hernia and 6 were bilateral. In the diathermy group 20 patients underwent elective surgery and 10 emergency surgery, while in the scalpel group 22 underwent elective and 8 emergency surgery.

Early postoperative pain was measured in both groups in 24 hours using the visual analogue scale, and it was found to be markedly reduced in the diathermy group (fig. II). Mean VAS was 2.15 + 1.200 and standard error of mean was 0.220 in the diathermy group value was 0.00, which was significant in this study. In the scalpel group mean VAS was 4.95 + 1.373 and standard error of mean was 0.251. Mean percentage of pain score in scalpel was 49.5%, whereas in diathermy group its was 21.5%, which is significantly lower than the scalpel group (table I).

DISCUSSION:

Traditionally scalpel with disposable knives is used for making skin and tissue incisions.[5] The electrosurgical instruments were introduced in 1920s and since then their extensive use has made life easier. It is considered to be an efficient mode of dissection, as it is hemostatic also.[6] Despite of the above mentioned advantages, making skin incision with cutting diathermy is still criticized by many surgeons.[7] Although there is sufficient data to indicate a safety profile of diathermy. There are

Table I: Comparison of Early Postoperative Pain

Type of incision	n	Mean (pain score)	Mean %	Standard Deviation	Standard error of mean	Difference (95% CI)		p value
						Lower	Upper	
Scalpel	30	4.95	49.5	1.373	0.251	2.132	3.468	0.00
Diathermy	30	2.15	21.5	1.200	0.220			0.00

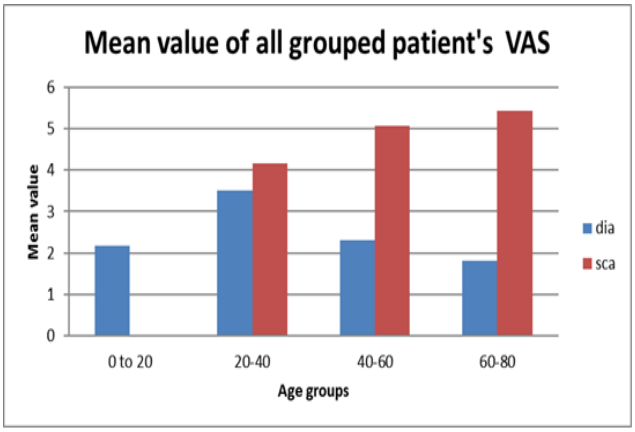

Fig I: Comparison of early postoperative pain in various age groups- Diathermy vs Scalpel

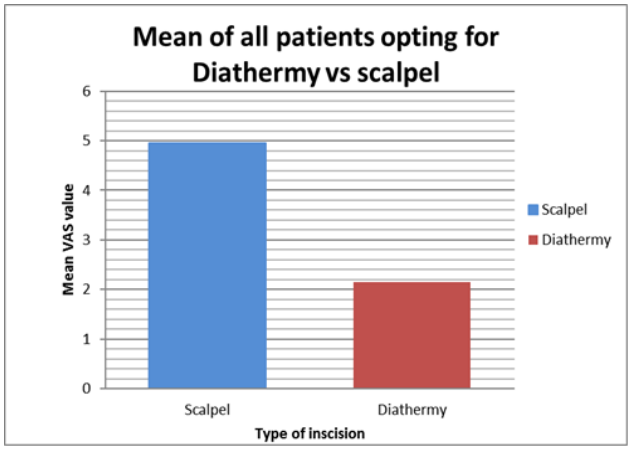

Fig II. Comparison of early postoperative pain- Diathermy vs Scalpel

studies showing delayed healing and scarring with the use of diathermy.[8] A prospective randomized control trials of 214 patients by Chalaya et al showed advantages of diathermy in terms of reduced postoperative pain , less operative time and decreased blood loss.[9] Scalpel related injuries account for 18%, therefore there is high risk of transmission of blood borne infections as Hepatitis B and C, HIV.[10,11] Therefore diathermy appears an attractive option to replace scalpel in the operative field.

In our study the mean early postoperative pain percentage in diathermy group was 21.5%, which is markedly lower than the scalpel group (49.5%). The findings of our study are supported by Kearns et al who compared electrosurgical and scalpel methods in hundred patients undergoing elective midline incision and found that postoperative pain scores were significantly lower in the diathermy group for the first 48 hours after operation.[4] Shamim M compared diathermy and scalpel skin incision in general surgery in 369 patients. He found that diathermy incision has significant advantages compared with the scalpel in in terms of reduced early postoperative pain, in addition to reduced incision time and less blood loss.[3] However, there was insignificant difference in postoperative pain in a study conducted by Telfar et al.[13] They compared 101 patients undergoing midline laparotomy, by either diathermy or scalpel, for intestinal resection. Pearlman et al comparing the two methods of incision for cholecystectomy incision, also concluded that diathermy incision showed no difference with regards to postoperative pain and operating time.[14]

Duxbury et al compared diathermy and scalpel in 32 patients of pilonidal sinus and found diathermy superior to scalpel.[15] The findings of a large (n=964) multicenter, collaborative study by Franchi et al also supports safety of diathermy use for incisions. They studied laparotomy by the two modalities under discussion and concluded that there was no difference between the two with respect to early and late wound complications including wound infection.[16] Dixon et al compared conventional scalpel and diathermy incision using modified (needle) electrode. They also concluded that the later was consistently quicker and no difference between the two groups was found with regard to wound healing.[17] Sheikh B also favors the use of diathermy skin incision in neurosurgery as it reduced blood loss.[18] Therefore we suggest the use of cutting diathermy electrode in making skin incisions since it is quicker, hemostatic and causes less postoperative pain.

CONCLUSION:

Electrosurgical incision had significant advantages in inguinal hernioplasty over scalpel in terms of reduced early postoperative pain in patients undergoing both emergency and elective procedures.

REFERENCES:

1. Siraj A, Dar MF, Gilani AAS, Raziq S. Elective midiline laparotomy: Comparison of diathermy and scalpel incisions. Professional Med J. 2011;18:106-11.

2. Gallagher K, Dhinsa B, Miles J. Electrosurgery. Surgery International. 2011;29:70-2.

3. Shamim M. Diathermy vs scalpel skin incision in general surgery: Double blind, randomized, clinical trial, World J Surg. 2009;33:1594-9.

4. Kearns SR, Connolly EM, McNally S, McNamara DA, Deasy J. Randomized clinical trial of diathermy vs scalpel incision In elective

midline laparotomy. Br J Surg. 2001;88:41-4.

5. Leaper DJ. Basic surgical skills and anastomoses. In: Russell RC, Williams NS, Bulstrode CJ. Editors. Bailey and Love's Short Practice of Surgery. 24th ed. London. Arnold; 2004:95-106.

6. Johnson MA, Gadacz TR, Pfeifer EA, Given KS, Gao X. Comparison of CO2 laser, electrocautery and scalpel incisions on acute phase reactants in rat skin. Am Surg. 1997;63:13-6.

7. Franchi M, Ghezzi F, Benedetti-Panici PL, Melpignano M, FalloL, Tateo S, et al. A multicentre collaborative study on the use of cold scalpel and electrocautery for midline abdominal incision. Am J Surg. 2001;181:12.

8. Sinha UK, Gallagher LA. Effects of steel scalpel, ultrasonic scalpel, CO2 laser, and monopolar electrosurgery on wound healing in guinea pig oral mucosa. Laryngoscope. 2003;113:228-36.

9. Chalya PL, Mchembe MD, Mabula JB, Gilyoma JM. Diathermy versus scalpel incision in elective midline laparotomy: A prospective randomized controlled clinical study. East Central African J Surg. 2013;18:71-7.

10. Perry J, Parker G, Jagger J . Scalpel blades: reducing injury risk . Adv Exposure Prevent. 2003;6: 37-40.

11. Ippolito G, Italiano-Rischio O. Scalpel injury and HIV infection in a surgeon. Lancet. 1996; 347(9007):1042.

12. Shrestha SK , Bhattarai MD. Study of Hepatitis B among different categories of health care workers. J Coll Physicians Surg Pakistan. 2006;16:108-1.

13. Telfer JR, Canning G, Galloway DJ. Comparative study of abdominal incision techniques. Br J Surg. 1993;80:233-5.

14. Pearlman NW, Stiegmann GV, Vance V, Norton LW, Bell RC, Staerkel R, et al. A prospective study of incisional time, blood loss, pain, and healing with carbon dioxide laser, scalpel, and electrosurgery. Arch Surg. 1991;126:1018-20.

15. Duxbury MS, Blake SM, Dashfield A, Lambert AW. A randomised trial of knife versus diathermy in pilonidal disease. Ann R Coll Surg Engl. 2003;85:405-7.

16. Franchi M, Ghezzi F, Benedetti-Panici PL, Melpignano M, FalloL, Tateo S, Maggi R, et al. A multicentre collaborative study on the use of cold scalpel and electrocautery for midline abdominal incision. Am J Surg.,2001;181:12.

17. Dixon AR, Watkin DF. Electrosurgical skin incision versus conventional scalpel: a prospective trial. J R Coll Surg Edinb. 1990;35:299-301 .

18. Sheikh B .Safety and efficacy of electrocautery scalpel utilization for skin opening in neurosurgery. Br J Neurosurg. 2002;18:268-72.