COMPARATIVE EVALUATION OF ELECTROSURGICAL CELIOTOMY IN DOGS

Surendra Singh[1], Somil Rai[2], V.P. Chandrapuria[3]
[1]M.V.Sc. Student, [2]Ph.D. Student, [3]Professor & Head, Department of Veterinary Surgery and Radiology and Director Clinics; College of Veterinary Science & A.H., Nanaji Deshmukh Veterinary Science University, Jabalpur (M.P.), India.
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Present work was conducted on twelve adult dogs for different indications for celiotomy. These dogs were divided into two equal groups. Group I included scalpel celiotomy while group II electrosurgical celiotomy. In scalpel celiotomy, a sharp incision has been made over the skin of ventral midline from umbilicus to few centimeters with scalpel and deepened further through muscle up to the peritoneum to complete the celiotomy, while in electrosurgical celiotomy, electrosurge 250 B solid state electrosurgical unit set on required intensity and pencil knob used with cut mode to incise the skin up to level of peritoneal cavity. Following completion of specific surgery in the abdomen, the celiotomy incision was closed in the routine manner. Sharp and bold incision without charring effect was observed in group I while, unsharp and bold incision with mild charring effect was noticed in group II. The Skin apposition in group I was satisfactory from day 7 to 10 while, in group II 3rd to 7th day. Visual assessment of healing on incisional site showed no marked difference between both the groups on 3rd, 7th and 14th postoperative day, respectively.

Introduction

Electrosurgery is considered to be an efficient mode of rapid haemostasis, faster dissection and minimum post-operative pain (Chalya *et al.*, 2013). Celiotomy provides quick, easy and wide access to nearly all the structures of abdomen and retroperitoneum and also with advantages over other abdominal incisions on the basis of almost bloodless, no muscle fibre divided and no nerve supply injured (Patnaik *et al.*, 2001). Hence a study was undertaken to compare electrosurgery with conventional scalpel incision for celiotomy.

Material and Methods

The present work was conducted on twelve clinical cases of dogs, randomly divided into two equal groups. Group I subjected to scalpel incision while in group II electrosurgical celiotomy incision was made. The cutting and charring effect at the incisional tissue was noticed for grading of incisional quality. The sharp, clean and bold cutting was observed without any charring effect in conventional scalpel celiotomy. However, in electrosurgical celiotomy, unsharp and bold incision was recorded along with the presence of mild charring effect. The grading of **excellent** grade included sharp, clean and bold cutting with absence of charring, **good** included unsharp and bold cutting with mild charring while, irregular cutting with excessive charring was graded as **poor**.

For calculation of amount of blood loss during the incision on skin up to the depth of peritoneum was recorded and calculated by weighing the swabs used during celiotomy and each gram of wet swab was taken as equal to one milliliter of blood. Visual assessment of healing on incisional site was recorded as southampton wound grading and healing score system on 3rd, 7th, and 14th day post-operatively.

Characteristics	Grade	Score
No inflammation No signs of infection No wound gapping	Good	3
Mild to moderate inflammation No signs of infection No wound gapping	Satisfactory	2
Severe inflammation Signs of infection Wound gapping present	Bad	1

The data was analyzed at different time interval by unpaired student t- test. The significance was accepted at $p<0.05$. The standard procedure as outlined by Snedecor and Cochran (1994) was used for the analysis.

Result and Discussion

On the basis of findings group I was graded as excellent while, group II as good for incisional quality. Similar finding was reported by Sheikh (2004) who also noticed the macroscopic differences between the skin edges incised by the scalpel and electrocautery in human. It may be due to the cutting and charring effect of the heat over the incised tissue.

The loss of blood was recorded significantly less in electrosurgery as compared to the scalpel celiotomy because the electrosurgery involves the passes of high frequency electrical current through the tissues producing cutting as well as the coagulation effect at the surgical site which coagulates the fine capillaries and prevents haemorrhage in the celiotomy incision. Ozdogan *et al*. (2008) used electrocautery for skin separation and found that electrocautery had significantly reduced blood loss and total drain volume but increase seroma formation. Siraj *et al*. (2011) also studies on diathermy and scalpel incision for midline laparotomy and reported that diathermy as quicker and haemostatic method for midline laparotomy. Chalya *et al*. (2013) compared the diathermy and scalpel incision for elective midline laparotomy in human and concluded that diathermy offers potential advantage with respect to decreased blood loss, incision time and post-operative pain. Non significant difference was observed in the duration of incision in all animals of both the groups it is in accordance to the reporting of Jhonson and Serpell (1990). The duration of celiotomy in group I and group II was observed almost same because of the smaller length of incision at the linea alba therefore in group II the time was less non significantly.

Post-operative observations showed no difference among animals of both the groups when recorded for response to food, touch, activity, attention to site and vocalization as parameters for pain which may be due to small celiotomy incision. The present findings are in correlation with Shivagoda *et al*. (2010) and Heballi and Bagdi (2013) who also observed non significant difference in post-operative pain in scalpel versus electrosurgery patients.

The skin apposition following celiotomy incision was recorded in both the groups and no difference was observed during the present study. It was good to excellent on the

14th post-operative day in all animals of both the groups. The findings of study were in support that there is no correlation among the knot failure, excessive tension, inversion and eversion and the edge to edge approximation of incisional edges. All these characteristics most often caused by the poor surgical techniq ue in terms of the aseptic preparations and variations in the intra-abdominal surgical procedures (Fahie, 2011).

Table: Mean values (±SE) of visual assessment of healing pattern between the groups at various interval

Intervals (Day)	Group I	Group II
3	2.83 ± 0.17	2.83 ± 0.17
7	2.33 ± 0.11	2.67 ± 0.21
14	2.67 ± 0.21	2.83 ± 0.16

In the present study, the healing pattern of celiotomy revealed non significant difference in animals of both the groups as inflammation, infection and wound gapping were absent, similar findings have been reported by Bateman *et al.* (1996) as he compared the sharp scalpel dissection with electrosurgery and concluded that the use of electrosurgery had no detrimental effect to wound healing or tissue survival, and it provides benefits such as decreased blood loss, need for sharp instruments in the surgical field and faster operative times. Similarly, Rappaport *et al*. (1990) conducted experiments on the effect of electrocautery on midline facial wound healing and found that electrocautery is associated with increased tissue damage and a significant reduction in the tensile strength of healing wounds as compared to scalpel. The healing pattern was satisfactory to good in all animals of both the groups may be because of aseptic pre-operative preparations, surgical dressing, optimum dose of antibiotic administration and the use of non-steroidal anti-inflammatory drug post-operatively were given in all animals of both the groups.

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