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Comparative study of absorbable sutures for laparotomy wound closure in canines

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Abstract

The present study was conducted in 24 clinical cases of dogs which were presented to the Department of Surgery and Radiology, Veterinary College Bidar and Agriculture Product Marketing centre (APMC) Hospital Bidar for ovariohysterectomy. The animals were randomly divided into four groups with six animals each. Chromic catgut, PGA, PG 910 and PDS sutures were implanted to close the laparotomy wound in group I, II, III and IV respectively and tissue reaction were compared with these suture materials on 14th day using TEM. Animals were premedicated with atropine sulphate @ 0.045 mg/kg body weight i/m. Xylazine hydrochloride @ 1 mg/kg and ketamine @ 10 mg/kg mixture in a single syringe administered as single induction bolus and anesthesia maintained with incremental doses of xylazine - ketamine anesthesia by i/v route. The animals were placed in left lateral recumbency. In the present study, tissue reaction was observed to all four suture materials. PDS and PG 910 suture material showed less pronounced reaction when compared to the reaction shown towards PGA and chromic catgut.

Keywords: Canine, laparotomy, sutures, catgut, PGA

Introduction

Closure of skin incisions is a routine procedure in veterinary surgery and should be performed quickly and with minimal tissue damage. Sutures serve to maintain the tissue approximation until a wound attains sufficient tensile strength to prevent dehiscence during normal physiological activity (Wallace *et al.*, 1970)^[7]. Absorbable sutures are those that undergo degradation and rapid loss of tensile strength within 60 days (Bennett, 1988)^[1]. Catgut has been the most commonly used suture material for visceral organs however, synthetic absorbable sutures are now being widely accepted (Kobayashi *et al.*, 1981)^[4]. References to available literature revealed that no systematic work has been carried out to study the comparative evaluation of different suture material for laparotomy wound closure in canine. Therefore the present study was undertaken to compare chromic catgut, polyglycolic acid (PGA), polyglactin 910 (PG 910) and polydioxanone (PDS) sutures for laparotomy wound closure in canines.

Materials and Methods

The present study was conducted in 24 clinical cases of canine which were presented to the Department of Surgery and Radiology, Veterinary College Bidar and Agriculture Product Marketing centre (APMC) Hospital Bidar for ovariohysterectomy. The animals were randomly divided into four groups of six animals each (group I, II, III and IV). Animals were premedicated with atropine sulphate @ 0.045 mg/kg body weight i/m. Xylazine hydrochloride @ 1 mg/kg and ketamine @ 10 mg/kg mixture in a single syringe administered as single induction bolus and anesthesia maintained with incremental doses of xylazine - ketamine anesthesia by i/v route given 'to effect'. The animals were placed in left lateral recumbency.

The surgical site was prepared as per standard procedure. The site of incision was draped. Oblique incision was made at surgical site (three finger width caudal to the last rib and ventral to lumbar transverse process) the right flank laparotomy was done. The right uterine horn was located by means of the index finger, through this right ovary, uterine bifurcation and the left ovary were subsequently approached, ligated and removed from the stump using three artery forceps technique as described by Kumar (1996)^[5]. Abdominal wall closed with routine procedure viz., peritoneum and transverse abdominus muscle closed by simple continuous suture pattern, obliques abdominus internus and obliques abdominus externus muscle together by interrupted suture pattern, using chromic catgut no 1, PGA no1, PG 910 no 1 and PDS no 1

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in group I, II, III and IV respectively. Skin wound was approximated by simple interrupted suture using nylon suture material. Post-operatively ceftriaxone sodium was administered @ 25 mg/kg body weight i/v b.i.d, anti-inflammatory meloxicam @ 0.2 mg/kg i/m to all dogs for three days. Surgical wound was dressed on alternative days using povidone iodine ointment till satisfactory wound healing was observed. Obliques abdominus externus muscle biopsy was collected before suturing (zero day) and on 14th day after suturing by making stab incision at the site of suture under xylazine – ketamine anesthesia. The biopsy fixed in 2.5% glutaraldehyde were sent to RUSKA lab, Hyderabad for transmission electron microscopy (TEM) examination.

Results and discussion

TEM examination conducted on zero day biopsy revealed normal muscle fibers without any inflammatory reaction. TEM of obliques abdominus externus muscle biopsy with suture on 14th day in group I animal showed more number of polymorpho and mononuclear cells around the suture material (Fig 1) whereas, only polymorphonuclear cells were present around suture (Fig 2) in group II animals. Group III and IV showed few number of mononuclear (Fig 3) and polymorphonuclear cells (Fig 4) around the suture material on 14th day respectively. Hoer *et al.* (2000) [2] reported severe persisting inflammatory reactions after the use of absorbable suture material. Lynetta *et al.* (1987) [6] observed the least inflammation when the linea Alba of cat was sutured with polyglactin 910. Kirpensteijn *et al.* (1997) [3] reported polyglecaprone 25 to be favourable with polyglactin 910 suture material for closure of incisions in canine skin. Polyglactin 910 These synthetic braided multifilament materials are very soft, pliable and easy to handle (the soft knotted ends can easily be buried). They have good knot security and cause mild tissue reaction and are absorbed by hydrolysis.

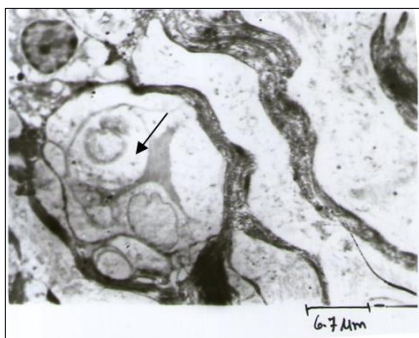


Fig 1: TEM of polymorpho and mononuclear cells around sutre material in group I animals, X2895

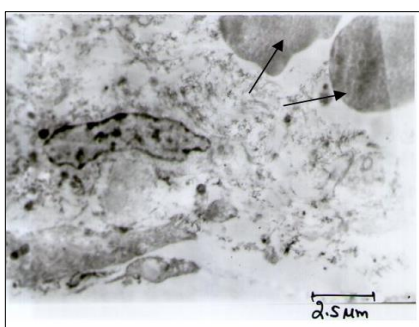


Fig 2: TEM of polymorpho nuclear cells around suture material in group II animals, X7720

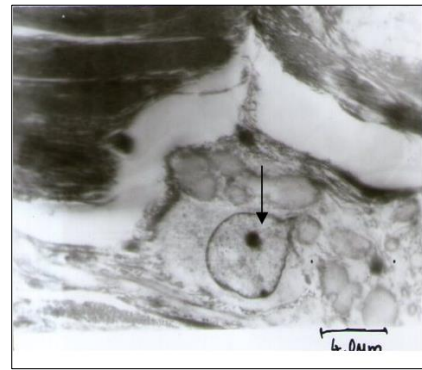


Fig 3: Few mononuclear cells around suture material in group III animals, X4825



Fig 4: Few polymorphonuclear cells around suture material in group IV animals, X7720

Conclusion

From the present study, it can be concluded that tissue reaction was observed to all four suture materials. PDS and PG 910 suture material showed less pronounced reaction when compared to PGA and chromic catgut.

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