

Short Communication

**POSTOPERATIVE STUDIES FOLLOWING VENTRAL
AND DORSAL CYSTOTOMY IN MONGREL DOGS**

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SUMMARY

There was omental adhesion in both the dorsal and ventral approaches to the urinary bladder. Adhesion involving the small intestine and colon were also observed. There was however no urine leakage into the peritoneal cavity following either of the approaches. The incision wounds were also seen to have healed by the fourteen postoperative day when the postmortem studies were carried out.

KEYWORDS: Cystotomy, incisions, postoperative, adhesions, dogs

INTRODUCTION

Cystotomy has been performed most commonly on either the dorsal or ventral aspects of the urinary bladder of dogs but has classically been made on the dorsum because of concern that sediments might form calculi on exposed sutures if it were made on the ventral aspects (Hobson and Bushby, 1985). The dorsal approach was also the attendant preferred because of a less likelihood of urine leakage with an attendant peritonitis and avoidance of post operative adhesion of the bladder wall to the ventral abdominal wall (Gahring, 1983; Wing Field and Rawlings, 1979).

An experimental surgery was therefore conducted to ascertain which of the incision sites would have less likelihood of urine leakage and which would mostly avoid the incidence of postoperative adhesion of the urinary bladder to ventral abdominal wall in

dogs. The findings of this experimental surgery will aid Veterinary Surgeons make a choice of the site for cystotomy whenever it is indicated.

MATERIALS AND METHODS

Experimental animals

Twenty-two clinically healthy mongrel dogs were used. Ten dogs were used for ventral cystotomy, another ten for dorsal, while in the two dogs only laparotomy was performed to serve as control.

Pre-operative procedures

The experimental animals were evaluated based on the pattern described by Sawyer (1985). Only dogs considered to be 'excellent' and 'good' risk patients for anesthesia were used. Such animals had no identifiable organic disease, no systemic disturbances or had only slight dehydration. Prior to the commencement of the

experimental surgery, the dogs were conditioned by treating them to eliminate worms and ectoparasites. This was achieved by administering mebendazole at a dose rate of 5 mg/kg body weight orally and each of the dogs bathed with Asunto[®] Diethyl (-O-(3-chloro 4-menthyl-7-coumarinyl) – phosphorothiate, Bayer Leverkusen, Germany. The patients were each starved for 12 hours before the experimental surgery. The dogs were prepared for aseptic surgery as described by Archibald and Blakely (1974) and Powers (1985), by shaving the entire mid-ventral aspects of the abdominal region from the xiphoid cartilage to the pubis. The area was then washed with soap and water and disinfected with Savlon[®].

Anaesthesia

Pre-anaesthetic medication involved administering atropine sulfate at a dose rate of 0.02mg/kg body weight, intramuscularly. It was given 15 minutes before anesthetic induction. Sedation was achieved by using xylazine (Rompum[®]) at a dose rate of 1 mg/kg body weight intravenously and maintained with halothane in oxygen. The ventral abdominal region was draped as described by Powers (1985).

Surgical procedure

The dogs were positioned in dorsal recumbency. The forelimbs were extended cranially and the hind limbs extended caudally and secured to the surgical table. Sandbags were placed on each side of the chest wall to prevent patient rotation during surgery. A caudal ventral midline incision was made into the abdominal cavity according to the method of Knetcht *et al.* (1987). Skin incision was made parallel and adjacent to the penis. On occasion the incision was carried further curved toward

the midline and continued interiorly on the ventral midline as far as desired. The preprucial branches of the caudal superficial epigastric vessels in the subcutis were identified and clamped with artery forceps while the incision continued through abdominal muscles and peritoneum. The bladder was located, exteriorized from the abdominal cavity by the use of fingers and thumb and isolated from the abdominal viscera and “packed off” with moistened gauze to minimize contamination. Stay sutures were placed at either ends of the anticipated incision using 2-0 chromic catgut to help stabilize the bladder for surgical incisions. When the bladder was full pressure was applied to express the urine. A stab incision was made in the least vascular area on the body of the bladder. The incision was extended with a scissors. In ten of the dogs, a 3 cm incision was made on the ventral aspect of the bladder using the approach described by Knetcht *et al.* (1987). In another group of ten dogs the same length of incision was made on the dorsal aspect. To make the incision, the bladder was reflected posteriorly and care was taken to avoid the ureters. Following each urinary bladder incision, the lumen was carefully examined for the presence of calculi, tumours, polyps or parasites.

The bladder incision was closed by placing Cushing suture with 2-0 chromic catgut through the serosa and muscularis. A second inverting suture of Lambert was also placed. The stay suture was removed and the urinary bladder returned into the abdominal cavity. The ventral abdominal incision was closed by placing sutures appose the linea alba with 3-0 chromic catgut, simple continuous sutures. Extra care was taken to suture the penile sheath to the subcutaneous muscle fascia in the

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males. The skin was closed with silk and horizontal mattress sutures. In the two control dogs, no incisions were made into the bladder. Only laparotomy incisions were made and then closed.

Post-operative procedure

Following recover from anesthesia, the dogs were hospitalized at the kennel of the University of Nigeria Nsukka, Veterinary Teaching Hospital. Elizabethan collar was placed on some of the patients that tried to mutilate their skin wounds. Procaine penicillin at a dose rate of 10,000 i.u/kg and streptomycin (10 mg/kg) were administered intramuscularly daily for five days. The dogs were fed and given water after they gained full consciousness and were removed on the seventh postoperative day. Euthanasia was carried out on all the surgical patients at two weeks postoperatively by using saturated solution (1.1) of magnesium sulfate at 50°C injected rapidly by intracardiac route at the fifth intercostal space. Postmortem examination was conducted and the postoperative

adhesion was studied. The bladder mucosa was also observed for any possible deposition on the suture line, which might lead to formation of calculi.

RESULTS

The results obtained at postmortem examination are shown in Table I. Four of the ten dogs in the ventral approach had omentum adhering to the bladder incision. Omental adhesion to the bladder occurred in 5 dogs following the dorsal approach. Two of the 10 dogs with ventral cystotomy had omentum adhering to the apex of the bladder, while it occurred in 5 dogs following the dorsal approach. One out of the ten of the ventral approach had omentum adhering to the ventral abdominal wall. Two out of the ten in the ventral approach and one out of the ten with the dorsal approach had adhesion between the bladder and the loops of the intestine. One out of the ten of the ventral incision had the intestinal loop adhering to each other.

TABLE I: Occurrence and distribution of site of adhesions following cystotomy incision

Types of Adhesion	Type of surgery performed		
	Dorsal Incision n= 10	Ventral Incision n=10	Control n=2
1. Omentum adhered to bladder incision	5	4	0
2. Omentum adhered to apex of bladder	5	2	0
3. Omentum adhered to ventral abdominal wall	5	5	1
4. Adhesions between other structure and bladder	1	2 (Intestinal Loops)	0
5. Adhesion of any other structure to the abdominal wall	0	1(colon)	0
6. Adhesion of abdominal structure to themselves	0	1(intestinal loops)	0

One out of the ten following the ventral approach had the colon adhering to the ventral abdominal wall, while there was no similar adhesion following the dorsal approach. The incision line was only identified by a thickening of the bladder at the region of the incision.

In both approaches, the wounds on the urinary bladder were healed and no suture materials were seen on the 14th postoperative day. In both cases, there was no smell of urine in the peritoneal cavity and there was no peritonitis observed.

DISCUSSION

There was no difference between the occurrence of postoperative adhesion in both the dorsal and ventral cystotomies. In the dorsal approach, adhesion occurred in five out of ten dogs (50%), while it was four (40%) out of ten dogs in the ventral approach. Crowe (1986) also found no difference in the incidence of adhesion between the two groups. Omental adhesion to the urinary bladder was a frequent finding in a study carried out by Desch and Wagner (1986). Omental adhesion to the sites of incision can be explained by the fact that the omentum, "the policeman of the abdomen" was capable of moving to sites of inflammation (Vegad, 1995). Omental adhesion to the apex of the bladder was probably associated with the sites of placement of the stay suture; much difference did not exist between the occurrence of the adhesion to the apex of the bladder in either of the approaches.

The incidence of omental adherence to the ventral abdominal wall seems to suggest that this finding is not solely due to cystotomy but rather partly as a result of the

laparotomy incision since the omentum also adhered to the ventral abdominal wall in one out of the dogs in the control group. Omentum would adhere to any areas of inflammation and in this study the areas include the incision sites, the areas for the placement of the stay suture and the laparotomy sites. There was no adhesion between the bladder and the ventral abdominal wall in any of the three groups. This in agreement with the finding of Crowe (1986), Desch and Wagner (1986). One would have expected that there would be adhesion between the ventral wall of the bladder that touches the pelvic abdominal floor. This however was not the case in this study possibly because of the movement of the bladder as it fills up and contracts during micturition. Dobson and Bushing (1985) made a similar observation in their study.

Adhesion of the small intestine to the ventral wall of the bladder was more frequent

because the ventral aspect of the bladder is in closer proximity with the intestines. At the 14th postoperative day, no sutures were found at the incision area on either of the approaches to the bladder. This can be explained by the fact that chromic catgut is an absorbable suture and also explains why the fear of formation of calculi following ventral cystotomy is unlikely to occur. Incisional wounds that have support are also known to heal by first intention with healing beginning in about 12 hours (Venugopalan, 1997) and this explain why in the bladder, incision was only identified by a thickening of the incision area.

Following surgical incision, the incisional gap immediately fills with clotted blood containing fibrin and blood cells. The

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primary function of the serosal layer of the visceral organs is the secretion of fibrin and explains why there was no urine leakage from the urinary bladder incisions into the peritoneal cavity and also the non-occurrence of peritonitis following cystotomy. From the study, it is clear that either of the approaches could also be used where a cystotomy is indicated. However, the choice of the approach will depend on the site that adequately exposes the lesion.

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