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Unilateral Hydroureteronephrosis caused by Adhesion of the Ureter following Ovariohysterectomy in a Bitch

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ABSTRACT

A 10-year-old spayed female Yorkshire Terrier visited for a physical checkup. The bitch had a history of ovariohysterectomy for treatment of pyometra a year ago. On physical examination, the dog was bright and alert. Complete blood counts, serum biochemistry and blood gas analysis results did not show any deviations within normal ranges. Radiographic and ultrasonographic examinations revealed unilateral hydronephrosis and hydroureter of the right kidney and ureter, and obstruction of the distal ureter was observed. On the basis of these results, nephroureterectomy was performed. During the operation, the adhesion of the distal ureter and surrounding tissue cells were observed without the evidence of the ureteral ligation. The distal ureteral obstruction was presumed to be adhesion caused by fibrous tissue formation between ureter and retained broad ligament, or incompletely removed blood clots following ovariohysterectomy. This case report describes the occurrence of hydroureteronephrosis caused by adhesion of the distal ureter following ovariohysterectomy in a bitch.

(Key word: adhesion, bitch, hydroureteronephrosis, ovariohysterectomy)

INTRODUCTION

The urological complications following ovariohysterectomy such as hydronephrosis or hydroureter are uncommon (Ewers and Holt, 1992; Bradley *et al.*, 2000; Apparício *et al.*, 2007). Hydronephrosis after ovariohysterectomy is mostly caused by the iatrogenic ureteral ligation. Also, hydronephrosis can be induced by the inadequate and undesirable postsurgical wound healing with uterine or vaginal stump tissue (Ruiz De Gopegui *et al.*, 1999; McEvoy, 1994; Apparício *et al.*, 2007).

Postsurgical adhesions take place when injured tissue surfaces, following incision, cauterization, suturing or other means of trauma, fuse together to form scar tissue (Liakakos *et al.*, 2001). The incidence of intraperitoneal adhesions ranges from 67 to 93% after general abdominal surgery in human (Menzies and Ellis, 1990). But in small animals (dog and cat), adhesions are rarely a problem after laparotomy because that they have an active fibrinolytic system for preventing adhesion formation from becoming a clinical problem (Kirby, 2003).

In dogs, only one case of colonic obstruction following ovariohysterectomy due to the formation of fibrous adhesions has been reported (Coolman *et al.*, 1999).

But to date, no reports of the occurrence of urologic complication due to the adhesion of the ureter after ovariohysterectomy was received.

This report describes the occurrence of unusual hydroureteronephrosis caused by adhesion of the distal ureter after ovariohysterectomy in a bitch.

CASE

A 10-year-old spayed female Yorkshire Terrier visited for a physical checkup. The owner reported that the bitch had a history of ovariohysterectomy for treatment of pyometra a year ago.

On physical examination, the bitch was bright and alert. Complete blood count, serum biochemistry and blood gas analysis didn't show any significant problems.

Radiographic examination revealed the round structure of the soft tissue density in right cranial abdomen. Through the abdominal ultrasonography, loss of the renal parenchyma and a thin fluids-filled wall were observed in the right kidney, and obstruction of the distal ureter was founded (Fig. 1). And the left kidney appeared normal.

On the basis of these clinical findings, the tentative diagnosis was hydroureteronephrosis resulted from the distal ureteral obstruction. Thus, it was recommended to perform the neph-

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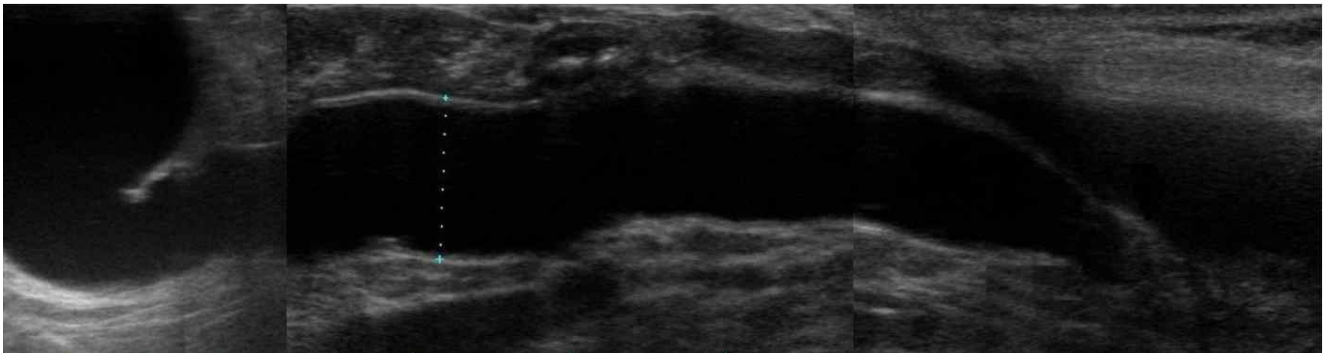


Fig. 1. Serial ultrasonographic images of the right kidney and ureter. The hydronephrosis and ureteral dilation with obstructive urophathy were caused by constriction of the distal ureter.

roureterectomy.

A ventral midline laparotomy was performed. During the surgery, the right kidney and ureter were enlarged within fluids, and the adhesion between ureter and nearby tissue was observed in the distal ureter without evidence of the ureteral ligation (Fig. 2). The right kidney and ureter were successfully removed, and the abdomen was routinely closed.

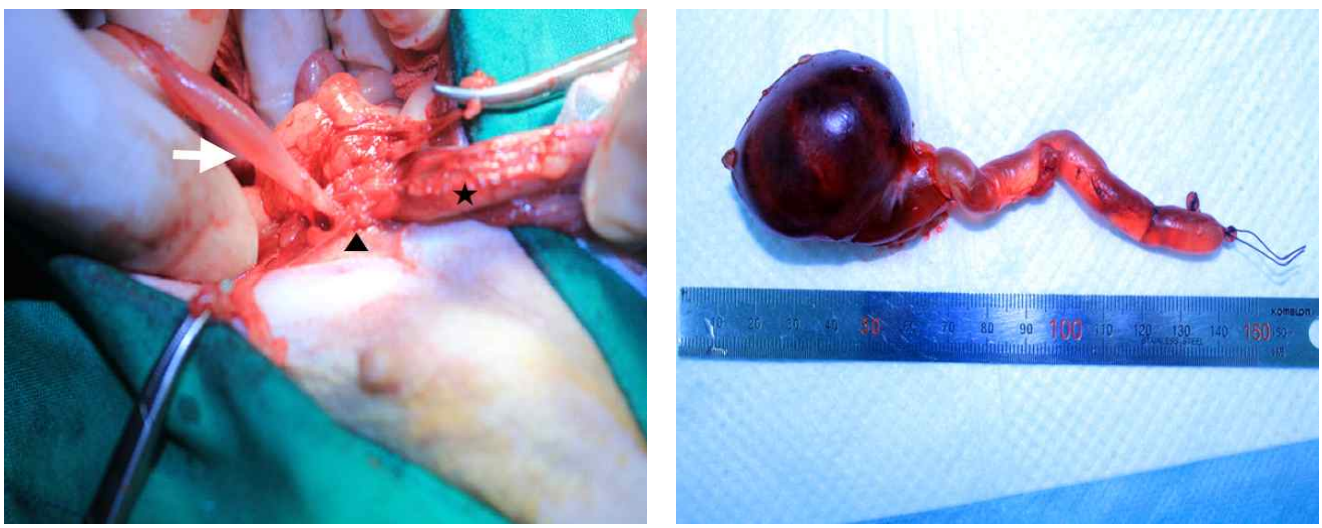
The bitch recovered uneventfully from surgery. A week later, the bitch became clinically normal and had a favorable prognosis.

DISCUSSION

Ovariohysterectomy is a common surgical procedure for an owner's convenience or the treatment of the most ovarian and uterine diseases (Fingland, 1998; Carbonell, 2010).

Urological complications following ovariohysterectomy are less frequent and usually related to inadvertent ligation or transection of part of the urinary tract (Bradley *et al.*, 2000). A few reports have been published about the accidental ureteral ligation at the surgery, or the involvement of a ureter in adhesions with uterine or vaginal stump (McEvoy, 1994; Kyles *et al.*, 1996; Apparício *et al.*, 2007).

In the present case, the distal ureter was adhered between ureter and around tissue without ligation. We believe that this adhesion had caused the ureteral obstruction, and this obstruction resulted in block of the urine outflow and the dilation of the renal pelvis and ureter leading to hydroureteronephrosis, as described by Finco (1995).



(A) (B)

Fig. 2. Operative and postoperative photographs of removed hydronephrosis and hydroureter. (A) Dilated distal ureter (arrow) and ureteral adhesion (arrow head) around the urinary bladder (asterisk), (B) Dilated right kidney and ureter was resected.

In human, Peritoneal adhesions may result in infertility, pain, or bowel obstruction and may increase the technical difficulty of subsequent abdominal or pelvic surgery (Ahmad *et al.*, 2008). According to Kirby (2003), the causes of adhesions related to laparotomy are to occur intestinal manipulation, intestinal distention, desiccation of serosal surfaces, foreign body (gauze, cotton fibers, glove powder), and blood or blood clots which are not rinced away during surgery have also been associated with adhesion formation.

Also, according to Ahmad *et al.* (2008), incomplete haemostasis and saturation of blood are increases the likelihood of subsequent adhesion formation by pro-coagulant and fibrin deposition at site.

In the present case, we observed adhesion between distal ureter and surrounding tissue without evidence of the ureteral ligation and uterine stump tissue. So, we are thought to be that cause of the adhesion are fibrous tissue formation between retained broad ligament and distal ureter, and incomplete removed blood clots based on transient bleeding from retained broad ligament after surgery.

Although, pharmacological and physical techniques to minimize adhesion formation are rarely required in small animals, prevention of tissue desiccation, gentle tissue handling, meticulous hemostasis, complete removal of blood clots and foreign debris and thorough lavage minimize adhesion formation are needed (Kirby, 2003).

In conclusion, this report is a presentation of urological complication caused by adhesion following ovariohysterectomy in a bitch. This case reminds us that meticulous care must be needed in order to avoid any damage of the urinary tract during ovariohysterectomy.

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