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CASE REPORT

Masked Urethral Injury by Urinary Catheter in a Female Dog

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ABSTRACT

This report describes the importance of careful diagnosis of intrapelvic urethra in cases of pelvic fractures. A 2-year-old intact female Spitz with multiple pelvic fractures following traffic accident was treated with internal fixation. Urethral catheter was dislodged and patient discharged in good conditions. Next day, the patient was readmitted with vomiting and dysuria. Retrograde urethrography (RUG) revealed a urethral rupture by a broken bone fragment at bladder outlet which repaired by urethral anastomosis. A delayed diagnosis of urethral rupture was because of absence of the signs at the time of first visit. Moreover early urethral catheterization can mask the problems of urinary tract. As urethral rupture in female dog has been reported uncommon compared with male, examination including RUG should more careful.

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INTRODUCTION

Severe traumatic conditions affect the vertical structure of the pelvis (Koraitim *et al.*, 1996). For occurrence of pelvic displacement and fractures, the pelvis must be disrupted in at least two places (Bjorling, 2003). This mechanism also affects the soft tissue injuries relating with pelvic fracture (Lee *et al.*, 2010). Urethral injuries are not commonly reported, but may result due to urinary calculi (Hay and Rosin, 1997), bite wounds (Lee *et al.*, 2010), catheterizations (Meige *et al.*, 2008), and the pelvic fractures (Bjorling, 2003). The sharp ends of pelvic fractures might lacerate the urethra (Fossum *et al.*, 2007). The urethral injury accounts for 12.8% of urinary tract trauma with pelvic fractures (Bjorling, 2003).

It has been announced that urethral disruption can be diagnosed by a positive contrast urethrogram (Fossum *et al.*, 2007). Clinical signs associated with urethral rupture were often subtle, vague or normal (Bjorling, 2003) and depended on the location, severity and duration of the injury (Meige *et al.*, 2008). Depression and anorexia might be the only presented clinical signs and the ability to void urine might remain unaffected (Meige *et al.*, 2008).

The management of traumatic urethral injuries involves accurate assessment and stabilization of the patient, recovery from the shock and the correction of metabolic disturbances (Meige *et al.*, 2008). Surgical

procedures involved temporary urinary diversion through a urinary catheter or cystostomy tube to second intention healing as conservative therapy and permanent urinary diversion through urethrostomy to primary repair (Koraitim *et al.*, 1996; Meige *et al.*, 2008).

The urethral injury in female dog is a rare condition seen by veterinarians. This case report was emphasis on masking effect which is the dangerous to do not diagnose urethral injury by urinary catheter.

History and clinical examinations: A 2-year old intact female Spitz was admitted with ataxia caused by traffic accident. On the physical examination, severe pain at the pelvic lesion was observed, while neurological functions were normal. Blood examination was normal except for the levels of blood urea nitrogen (BUN) (31.0 mg/dl; reference range, 7-27 mg/dL) and creatine (1.9 mg/dl; reference range, 0.5-1.8). Through the radiological examinations including X-ray, CT and excretory urography, the dog was found to have suffered from multiple fractures at right ilium shaft, ischium and pubis. On the other hand, the conditions of liver, kidney, ureter and urinary bladder were normal. Subsequently, the urinary catheterization with balloon catheter and fluid therapy were performed to control BUN and creatine levels.

After correction of BUN and creatine levels, the surgery was performed by approaching the ilium through

dorsolateral recumbency. After reduction of fracture, stabilization was achieved with the help of dynamic compression plate and screws. After operation, no abnormalities were observed at the surgical lesion. Subsequently, cefazolin (25 mg/kg i.v., q12h), enrofloxacin (5 mg/kg s.c., q24h) and tramadol (3 mg/kg i.v., q12h) were administered to the patient. After 6 days from the surgery, the urinary catheter was removed and the patient was discharged from the hospital. However, on the following day, the dog was re-admitted to the hospital with clinical signs like moderate depression, vomiting and the local inflammation in operated wound surface. Severe azotemia with elevated BUN (137 mg/dl) and high creatine (5.8 mg/dl) levels was observed.

Diagnosis and differential diagnosis: Secondary urethral rupture by pelvic fracture was hypothesized. On retrograde urethrography (RUG), leakage of contrast medium at proximal urethra was found (Fig. 2B). A drawn peritoneal fluid was found as urine by its specific gravity of 1.015.

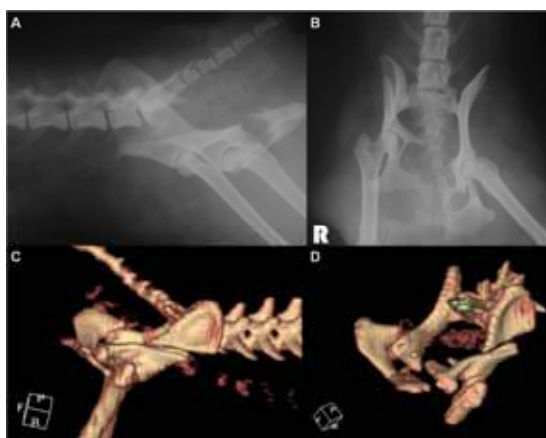


Fig. 1: Radiological examination (A and B) and CT (C and D) was initially performed. Right sided ilium shaft oblique fracture can be clearly seen in lateral view (A). Ischium and pubis fracture can also be observed in ventrodorsal view (B). The CT was used for further surgical approach (C, D).

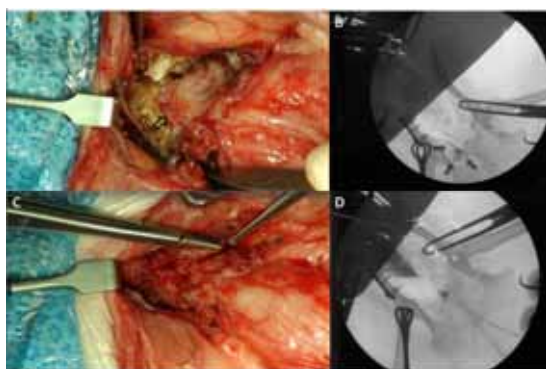


Fig. 2: In the intrapelvic region, ruptured urethra was found which is clearly revealed through retrograde urethrography using C-arm (B). A fractured pectineal pubis line (closed arrows) and tear urethra (an opened arrow) was found in gross observation (A). A sutured urethra and removal of fractured bone fragment was confirmed (C). After suturing ruptured urethra, extravasation of contrast medium, so called as, "jet lesion" was not observed (D).

Treatment: During the operation, 10 mm long longitudinal rupture of urethra was found below the broken pubis nearby the bladder outlet (Fig. 2A). The rupture was repaired with an interrupted suture by using the 8-0 polygalactin 910. Next, the broken bone fragment was removed (Fig. 2C). After closure of rupture, the urethra was examined by C-arm and contrast media. No leakage of contrast media was observed (Fig. 2D). Ten days after the surgery, the dog recovered from the trauma with normal urination.

DISCUSSION

Urethral injury, itself, has been generally regarded as a rare occurrence in bitches; however, a rare case was reported with related injury to the urethra due to iatrogenic trauma (Hay and Rosin, 1997). Anatomically, the female urethra was less prone to injury, because the urethra is short and mobile and has no significant attachments to the bone (Bjorling 2003). Both, the scarcity and anatomical structures related to the females rule out the urethral rupture in initial stages of diagnosis.

The clinical signs of pelvic fracture, which mask the urethral rupture, also serve as another cause of overlooking the urethral injury. Leakage of the urine by rupture leads to appearance of the clinical signs (Bjorling, 2003). However, most of the clinical signs do not appear in a typical manner. The clinical signs of urinary rupture were often vague and masked by other signs of trauma (Fossum *et al.*, 2007). In this case, signs related to pelvic fracture subjugated the signs of urethral injury because initial diagnosis based on the clinical signs, except both, clinic-pathological and imaging, an incomplete diagnosis of urethral rupture was made.

Indwelling of the catheter to urethra or bladder was to reduce the volume of bladder as one of the first aids to prevent the rupture (Bjorling, 2003; Fossum *et al.*, 2007). Catheterization also used to treat partial urethral rupture by delayed union unless it has higher incidence rate of stricture formation than surgical realignment (Santucci and Bartley, 2010). Urinary catheter was not permitted to all patients with urethral injury. Physical exam or clearly identified as distended based on ultrasound examination should be performed prior to place urinary catheterization, if available (Martinez-Pineiro *et al.*, 2010; Smith *et al.*, 2010). In this case, preventive urinary catheterization would have inhibited the diagnosis and avoided the imaging diagnosis using a contrast medium.

RUG by positive-contrast was widely known to diagnose the urethral rupture (Koraitim *et al.*, 1996; Martinez-Pineiro *et al.*, 2010; Watcyn-Jones *et al.*, 2010) unless proximal urethral injured lesion may be difficult to distinguish (Bjorling, 2003). Patients with urethral lacerations are able to urinate normally that is often made inserting urinary catheter into the bladder despite disruption of the urethra (Bjorling 2003). If urethral injury is suspected RUG performed to exclude bladder-neck injuries (Martinez-Pineiro *et al.*, 2010) and performed prior to fixing the urinary catheter in bladder (Watcyn-Jones *et al.*, 2010).

In this case, initial urethral instrumentation masked the urethral injury. The extravagated urine is relatively

harmless that provides adequate time for resuscitation and treatment of other major injuries. In the conclusion, uncertain clinical signs and urethral catheterization masked the findings of urinary injury at initial time of trauma. So, the patient with pelvic fracture, especially in pubis, was required to be examined thoroughly.

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