

SURGICAL MANAGEMENT OF CYSTIC BLOOD CLOT CONSEQUENT TO FLUTD AND FREQUENT URETHRAL CATHETERIZATION IN A PERSIAN CAT

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SUMMARY: A young Persian tom cat was presented to the college clinic with a history of haematuria, stranguria, pollakiuria, anuria, dehydration, and anorexia for the last two days. The urinary bladder was repeatedly catheterised by a local veterinarian to treat feline lower urinary tract disease over two weeks period. On palpation, the abdomen felt tensed with a moderately distended urinary bladder. Urethral catheterisation and percutaneous cystocentesis proved futile. Abdominal survey radiography revealed moderately distended bladder without calculi and bilateral mild nephromegaly. Abdominal ultrasonography revealed thickened bladder wall, a large hyperechogenic structure occupying most of the bladder lumen suspected of blood clot or bladder wall tumour. Therefore, an emergency laparo-cystotomy was performed as per standard procedure, and a large blood clot was removed, followed by placement of a catheter. With optimum post operative care and management, the cat recovered uneventfully.

Keywords: Persian cat, FLUTD, cystotomy, blood clot, Tomcat catheter

BACKGROUND

Conditions affecting the urinary system in cats are among the most common problems seen in pet animal practice. Among these, feline lower urinary tract disease (FLUTD) (Williams, 2009), cystoliths (Walter *et al.*, 1988), bacterial cystitis (Ebrahim *et al.*, 2019), trauma, neoplasia of the bladder (Bartges *et al.*,

2004), urethral plugs (Houston and Moore, 2009), etc., were on record. In all these malfunctions, signs such as dysuria, haematuria, pollakiuria and partial or total urethral obstruction were observed (Gunn-Moore, 2003). The quality and quantity of food and water provided to cats, neuter status, exercise, surrounding habitat,

environmental changes and age play an important role in causing these conditions. Dry diets, cold environment, castration, and improperly maintained surroundings were the major predisposing factors (Buffington and Chew, 2017). Male cats are highly prone to obstructions by urinary crystals or plugs due to their relatively long and narrow urethra when infected by bacteria (Buffington, 2011). Imaging methods such as ultrasonography, radiography and cystoscopy were employed to diagnose urinary tract diseases. During abdominal ultrasound, the thickness of the bladder wall, urolithiasis, intravesical blood clots, ruptures, neoplasms and diverticula can be examined in detail (Ergin *et al.* 2018).

CASE PRESENTATION

A two- year old intact tom cat weighing 3.5 kg was brought to the Surgery section of Veterinary Clinical Complex, NTR College of Veterinary Science, Gannavaram, Andhra Pradesh, India, with a history of passing blood in urine, straining to urinate, and no food and water intake for the previous two days. Earlier, it was on ceftiofur sodium, bethanechol and renal probiotics. It was also revealed that the cat had been frequently catheterised over the past month to relieve signs of feline lower urinary tract disease. Although temporary relief was achieved after each procedure, the condition recurred repeatedly within a few days. The attempts to catheterise it two days before

presentation were reported to be unsuccessful.

Clinical examination revealed pain on abdominal palpation, expressed as a mild grunt and discomfort to the animal. The cat was dull, dehydrated, tired and had stranguria, pollakiuria and haematuria. Temperature, heart rate and respiratory rate were 99⁰F, 130 beats per minute and 40 breaths per minute, respectively. Manual bladder compression failed to express urine. Retrograde urethral catheterisation under xylazine and ketamine anaesthesia could not proceed beyond the level of the caudal pelvic urethra. Survey radiograph of the lateral abdomen confirmed a moderately distended bladder without any radio-opaque cystic calculi, and bilateral mild nephromegaly. Per-cutaneous caudal paramedian abdominal cystocentesis was performed under aseptic precautions, but the material inside the bladder blocked the needle and flow of urine. Trans-abdominal ultrasonography showed a large mixed to hyper echogenic structure (blood clot or tumour mass) occupying most of the bladder lumen in the anechoic background representing urine or urine mixed with blood. (Figure 1). In addition, a few free-floating sludge or blood clots were observed, and the bladder wall was found to be thick and hyperechoic. As the cat could not be catheterised and percutaneous cystocentesis was failed, it was decided to perform an emergency laparo-cystotomy to rectify the problem.

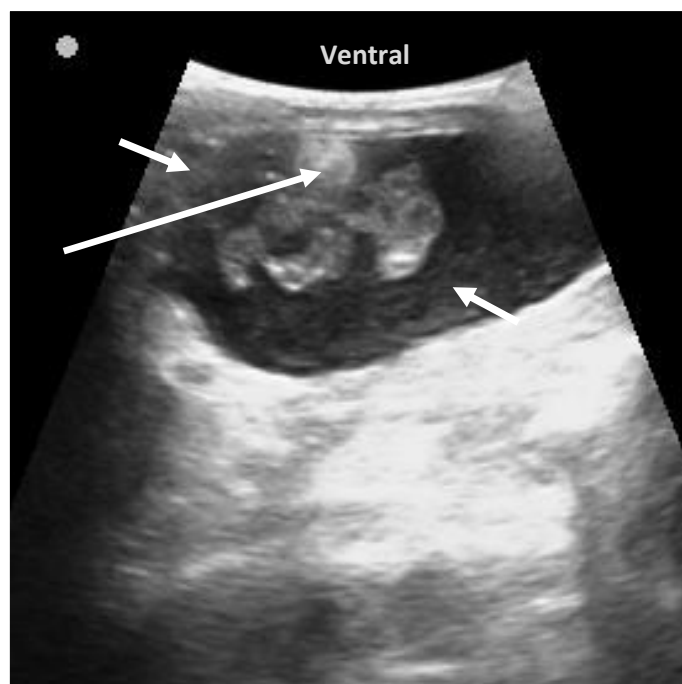


Figure. 1: Sonogram showing a mixed to hyperechogenic irregular mass (long arrow) appeared to be hanging from the ventral wall of the urinary bladder. Note: Anechoic and mixed echogenic surrounding of the mass, representing urine mixed with blood/sludge (short arrows).

TREATMENT AND OUTCOME

Preoperatively, the animal was stabilised with an infusion of Ringer's lactate (20 ml/kg); amoxicillin plus sulbactam (20 mg/kg) as prophylactic antibiotics and meloxicam (0.2 mg/kg) as an analgesic administered intravenously (IV), intramuscularly (IM) and subcutaneously (SC), respectively. General anaesthesia was induced using a combination of ketamine hydrochloride (10 mg/kg) and midazolam (0.2 mg /kg) IV and maintained with 1.5% isoflurane in oxygen. The ventral abdominal area was prepared aseptically after placing the cat in dorsal recumbency.

A linear caudo-ventral midline incision was made on the skin, *linea alba* and

peritoneum. The urinary bladder was gently exteriorised and moist gauze sponges were placed around its neck. The urinary bladder wall was thick, congested, dark cherry red coloured and moderately distended (Figure 2. A). Cystotomy incision was made on the ventral aspect over the least vascular area. A large blood clot was observed inside the bladder (Figure 2.B) and was carefully retrieved (Figure 2.C). On everting the mucosa, a few tiny openings leaking blood were observed (Figure 2. D) and bleeding was arrested by instilling haemocoagulase drops (Botroclot®- Jagdale Industries, India). The bladder lumen was thoroughly irrigated with normal saline, and a Tomcat catheter was inserted in a normograde manner to probe and relieve the blockage in

the urethra. Subsequently, another Tomcat catheter was inserted in a retrograde manner through the distal urethral opening guided by the normograde catheter, and the hub of the second catheter was sutured to the prepuce using 2-0 polyamide. Cystorrhaphy was performed with double inversion pattern using 2-0 polyglactin 910

(Figure 3. A), and the urinary bladder was repositioned in the abdomen. The *linea alba* was closed in continuous interlock pattern (Figure 3. B), followed by subcutaneous sutures using 3-0 polyglactin 910 and the skin in horizontal mattress pattern using 1-0 polyamide (Figure 3.C).

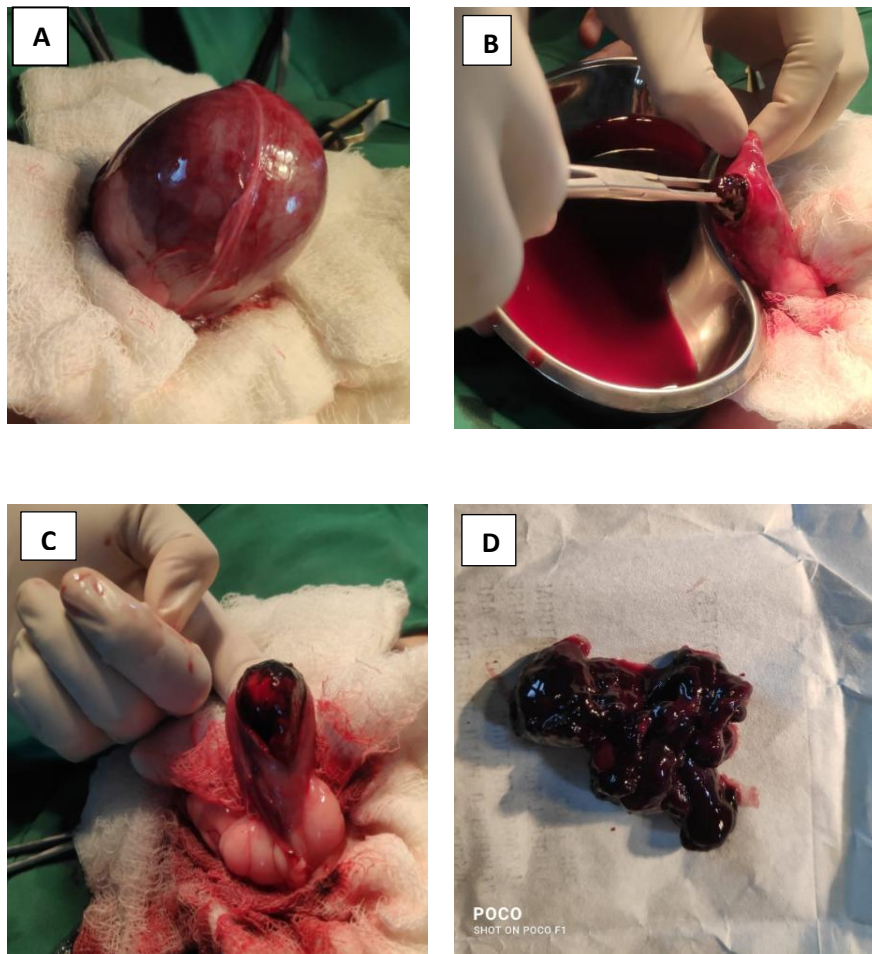


Figure 2. Steps followed in the retrieval of the cystic blood clot. **A.** exteriorisation of the urinary bladder. Note: severely congested bladder serosa; **B.** retrieval of the blood clot; **C.** mucosa of the urinary bladder showing haemorrhagic spots and small blood clots adhered to the mucosa; **D.** retrieved blood clot.

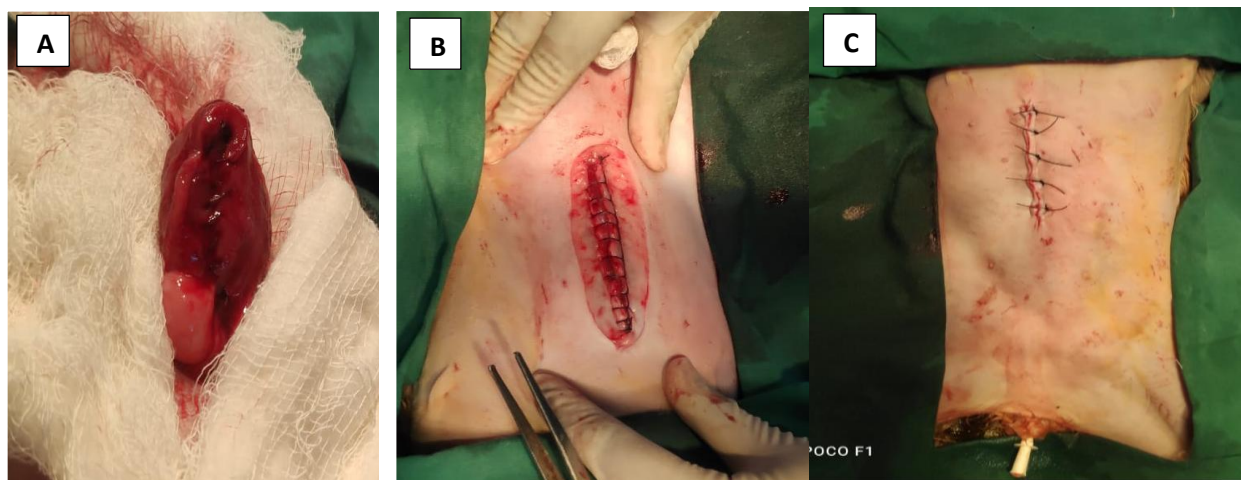


Figure 3. Closure. **A.** sutured urinary bladder; **B.** closure of the linea alba in Ford's interlock pattern; **C.** cutaneous sutures in horizontal mattress pattern. Note: Tomcat catheter in position (arrow).

The sutured site was dressed, and a protective bandage was applied. Postoperatively, amoxicillin and sulbactam (20 mg/kg) 12 hourly, IM for the next five days and meloxicam (0.2 mg/kg) once a day, SC for three days, along with fluid therapy with Ringer's lactate IV for three days were administered. The owner was informed to observe the colour and quality of urine output post-surgery. The wound was dressed every alternate day, and skin sutures and the catheter were removed on the 12th postoperative day. The cat passed urine in the normal manner after removing the catheter. The cat regained appetite two days after surgery.

DISCUSSION

Pollakiuria, stranguria, dysuria, and inappropriate urination might be observed with lower urinary tract infections and FLUTD which were relatively consistent regardless of the cause of the disease viz., severe cystitis, cystoliths, tumours of the bladder wall, etc. (Osborne *et al.* 2000). No urethral plugs were identified in this case and site of obstruction was found to

be caudal to the pelvic urethra. Urinalysis could not be carried out in this case due to difficulty in collecting urine. The effect of diet and husbandry on feline lower urinary tract disease has long been debated. Previous studies have described feline urologic syndrome, in which affected cats are usually overweight, kept indoors and fed predominantly dry food (Jones *et al.*, 1997; Buffington and Chew, 2017). Comparatively lower water consumption and continuous feeding on a dry diet might be the factors causing this condition in the present case, which was supported by earlier records of decreased water intake in winter months and dry diets, by Willeberg and Priester (1976). According to literature, 55-69% of cats with FLUTD suffer from feline idiopathic cystitis (FIC), while 12-22% of affected cats have urolithiasis (Willeberg and Priester, 1976).

In the present case, repeated urethral catheterisation, improper and forceful passing of Tomcat catheter might have led to urethritis (Gunn-Moore, 2003). Forceful catheterisation while there was urethritis would also have led to the formation of a small false blind sac in the penile urethra,

into which the catheter tip would have been directed making retrograde catheterisation impossible.

In the present case, the large blood clot formed within the urinary bladder may have resulted from severe cystitis, compounded by repeated and forceful urethral catheterisation, which likely caused trauma to the bladder mucosa. Studies have reported that the risk of FLUTD and FIC is higher in middle-aged cats, and it is more frequently encountered in males and overweight cats (Kim *et al.* 2018). This case was also a male cat, but contrary to the literature, it was an intact young patient aged two years. Although it is possible to detect radiopaque uroliths, other pathologies in the urinary bladder, such as radiolucent uroliths, haematomas, vesicular tumours, polyps and thickness of the bladder wall cannot be diagnosed with radiography. The latter vesicular abnormalities can be detected easily by ultrasonographic examination. In our case, the diagnosis was made using ultrasonography (Walter *et al.*, 1988; Ebrahim *et al.*, 2019). Normally, cystotomy was indicated in cases of cystorrhoeis, urethral rupture, intramural

tumours, cystoliths, etc. (Osborne *et al.*, 2000). However, in the present case, an emergency cystotomy was warranted as both the retrograde catheterisation and cystocentesis were unsuccessful. Ventral bladder wall incisions are often recommended because dorsal incisions are thought to predispose to complications as result of decreased visualisation and the anatomic proximity of the ureters (Williams, 2009). Perineal urethrostomy is the last resort for many urethral abnormalities such as FLUTD, recurrent FIC, stricture, tumours, etc. This would result in the male cat urinating in a manner resembling that of a female and lead to an unaesthetic appearance (Nye and Luther, 2018). This outcome could be avoided by performing a cystotomy with normograde catheterisation, guided by retrograde catheterisation.

CONCLUSION

Cystotomy facilitated the removal of the large blood clot. Retrograde catheterisation, guided by normograde catheterisation, successfully relieved the urethral obstruction, thereby obviating the need for a perineal urethrostomy.

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