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Diagnosis and surgical management of urolithiasis in a three-month-old male puppy

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Abstract

A three-month-old male crossbred puppy presented with a history of dysuria and anorexia for past two days, suspected for a urinary tract obstruction was diagnosed with multiple cystic and urethral calculi by radiography and ultrasonography. The urethral calculi flushed in to urinary bladder by retrograde urohydropropulsion along with multiple cystoliths were retrieved by cystotomy. Animal recovered smoothly and no recurrence observed for one year post-operatively.

Keywords: Cystolith, cystotomy, retrograde urohydropropulsion, urolithiasis

Introduction

Uroliths are aggregates of crystalline and occasionally non crystalline solid substances that form in one or more locations within the urinary tract (Koehler *et al.*, 2009) ^[1], in the kidneys, ureters, urinary bladder or urethra (Fossum, 2007) ^[2]. Urolithiasis is a major cause of lower urinary tract disease in dogs and cats, which is mostly encountered in middle-aged to older dogs (Slater, 2003) ^[3]. Most canine uroliths are found in the bladder or urethra. Struvite and calcium oxalate calculi are the most common uroliths, followed by urate, silicate, cystine and mixed types (Fossum, 2007) ^[2].

Several causes such as infectious, non-infectious, dietary and genetic have been associated with the aetiopathogenesis of uroliths (Osborne *et al.*, 1999 and Bartges, 2016) ^[4, 5]. The crystals are formed by the salts which are eliminated in the urine and are constituted by minerals which accumulate in the urine because of urine saturation and bacteria that produce urease (Yool, 2012) ^[6]. Urethral obstruction from stones is more common in males and show varied clinical signs based on obstruction and occasionally the bladder ruptures causing uroabdomen (Dehmiwal, 2016) ^[7]. The present case points occurrence of urolith in a three-month-old male puppy and its surgical management.

Case History and Observations

A three-month-old male crossbred puppy was presented to Multispecialty Veterinary Hospital, Kudappanakunnu, Thiruvananthapuram, with a history of dysuria and anorexia since two days. The physiological parameters of the animal were normal and animal exhibited pain on abdominal palpation. A fully distended bladder of massive size could be felt. Lateral pelvic radiography was performed which revealed the presence of multiple cystoliths and urethral calculi (Figure 1).

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Fig 1: Lateral pelvic radiograph showing radio-opaque uroliths in urinary bladder and urethra below the ischial arch

Ultrasonography revealed a flaccid bladder and the presence of echogenic sediments inside the urinary bladder (Figure 2). Both the kidneys were having normal confirmation and cortico-medullary details.

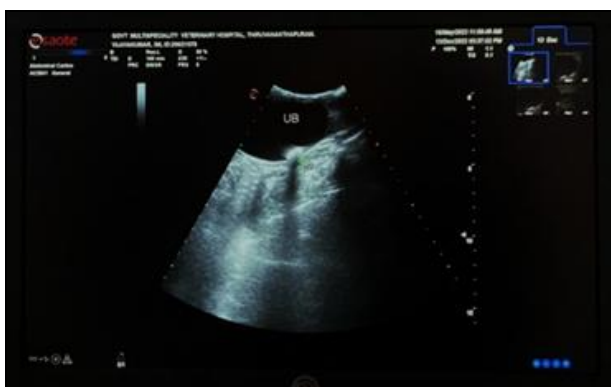


Fig 2(a): Presence of echogenic sediments within the urinary bladder on ultrasonographic examination



Fig 2(b): Distended urethra due to urinary tract obstruction by calculi on ultrasonographic examination

Surgical Correction

The animal was pre-medicated using Inj. Atropine sulphate at 0.045 mg/kg body weight subcutaneously. Anaesthesia was induced using Inj. Xylazine hydrochloride at 1mg/kg body weight in combination with Inj. Ketamine hydrochloride at 7.5 mg/kg body weight, intramuscularly. The surgical interventions were done by keeping the animal in dorsal recumbency. A long para-preputial incision was made across the ventral abdomen. Located and exteriorized the distended urinary bladder and emptied the urine by a cystotomy incision on the less vascular area of the bladder (Figure 3).



Fig 3: Cystotomy incision made on the urinary bladder.

The multiple calculi in the bladder and those urethral calculi flushed in to the urinary bladder via retrograde urohydropulsion using catheter in penis were removed (Figure 4). The lumen of the bladder was flushed with normal saline. The mucosa and outer muscular layer of the urinary bladder were sutured in simple continuous suture pattern, separately using polyglycolic acid 2-0 (Figure 5).

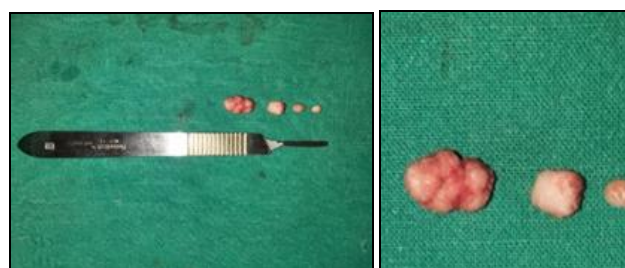


Fig 4: Uroliths retrieved from urinary bladder and urethra.



Fig 5: Sutured incision on the urinary bladder

A sterile urinary catheter was retained in the urethra to empty the urine and was fixed to the preputial sheath using stay sutures. The incised muscle fascia and subcutis were also closed using polyglycolic acid 2-0 in simple continuous suture pattern. The incised skin was closed using nylon 2-0 in horizontal mattress suture pattern. Post-operative medical management was given for two weeks along with dietary modifications. The catheter and skin sutures were removed 14 days after surgery. No recurrence noticed one year post-surgically.

Discussion

Urolithiasis is a prevalent condition in small animals. Urolithiasis is influenced by congenital and pathophysiological factors including urinary pH, dehydration, urinary infection, anatomical abnormalities and drug

administration (Junkee and Taulescu, 2015) ^[8]. Dogs eating canned food with a high amount of carbohydrates were found to be at high risk for calcium oxalate urolithiasis. Dogs fed dry diets formulated to contain high concentrations of protein, calcium, phosphorus, magnesium, sodium, potassium and chloride appears to have fewer calcium oxalate calculi (Fossum, 2007) ^[2]. The aetiology of this case was unknown. Parent dogs didn't have any history of urolithiasis. From weaning onwards owner used to give dry food along with cooked rice. That can be a reason for urolithiasis in a puppy. Undiagnosed urolithiasis in puppies may cause complications like hydronephrosis, hydroureter, and urinary bladder rupture and may end up in death (Junkee and Taulescu, 2015) ^[8].

Surgical intervention is more advised in cases of emergencies of urinary tract obstructions. Even though uroliths and cystoliths are best managed by surgical methods (Rana *et al.*, 2022) ^[9], but that procedure has many complications such as urine leakage, loss of luminal diameter, haematuria, urinary incontinence, tissue devitalization, urinary tract infection and even death (McLoughlin, 2011) ^[10]. Fortunately, no such complications came across in this case. There are many advanced less invasive techniques available nowadays such as cystoscopy-guided basket retrieval, cystoscopy-guided laser lithotripsy and percutaneous cystolithotomy, but the chances of recurrence are comparatively high (Cl  roux, 2018) ^[11].

Conclusion

Urolithiasis can occur in puppies also and it can be dietary in origin. Early detection and surgical correction are necessary to save the life of patient.

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Conflict of Interest

Not available

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Reference

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