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Surgical management of urolithiasis in a male dog

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Abstract
A 3 ½ year old male Labrador dog, weighing 37 kg was presented to the Teaching Veterinary Clinical Complex, Post Graduate Institute of Veterinary and Animal Sciences, Akola with the complaint of anorexia, vomition and adipsia since last 3 days. There was anuria and passing of tarry coloured stool. On physical examination it was found that there was slight degree of dehydration with subtle loss of skin elasticity, abdominal pain on palpation, rectal temperature was within normal range (101.4ºF), pink mucus membrane, distended abdomen due to tensed bladder because of accumulation of urine. The case was diagnosed tentatively as urolithiasis. For confirmative diagnosis abdominal radiography, abdominal USG, blood and serum analysis was carried out and the case was finally diagnosed as urolithiasis.

Keywords: dog, urolithiasis, cystoliths, urethroliths, retrograde hydropropulsion, os penis

Introduction
When urine becomes supersaturated with dissolved salts, the salts may precipitate to form crystals (crystalluria). If the crystals are not excreted, they may aggregate into solid concretions known as calculi. Urolithiasis is a term that refers to having urinary calculi or uroliths in the kidney, ureter, bladder, or urethra. Cystolithiasis and cystolithectomy refers specifically to urinary bladder calculi and their removal, respectively. Most canine uroliths are found in the bladder or urethra. Struvite (magnesium ammonium phosphate) and calcium oxalate calculi are the most common canine uroliths, followed by urate, silicate, cystine, and mixed types [1].
Urolithiasis poses an acute life-threatening emergency and most frequently obstructs the lower urinary tract in male dogs [2]. The most probable causes of urolithiasis include infections, nutritional deficiencies and mineral imbalances. The mineral deposits which form in the bladder of male dogs get flushed out of the bladder with urine and lodge in the penis just behind the os penis which is the most commonly reported site of obstruction followed by ischial arch in male dogs [2].
Treatment of urolithiasis can be attempted by retrograde urethral hydropropulsion for urethroliths followed by cystotomy [3], failing of which urethrotomy or urethrostomy is indicated [4]. Cystotomies are commonly performed in small animal practice, most often to remove cystic calculi [5].

Materials and Methods
A 3 ½ year old male Labrador dog, weighing 37 kg was presented to the Teaching Veterinary Clinical complex, Post Graduate Institute of Veterinary and Animal Sciences, Akola with the complaint of anorexia, vomition and adipsia since last 3 days. As per owner's information initially there was dribbling of blood tinged urine from urethral orifice which leads to anuria in later stage. The dog was passing tarry coloured feces when presented to the TVCC. On physical examination it was found that there was slight dehydration with subtle loss of skin elasticity, pink mucus membrane, temperature was within normal range (101.4ºF), distended abdomen due to accumulation of urine in the urinary bladder (Fig. 1). At prima facie we suspected the case was of urolithiasis. We tried to pass infant feeding tube number 8 through the external urethral orifice up to the bladder but it could not pass behind the os -penis. Retrograde hydropropulsion was attempted by infusing normal saline through infant feeding tube so as to facilitate the movement of the urolith into the urinary bladder.

We decided to go for confirmatory diagnosis with the help of abdominal radiography, abdominal USG and hematological and biochemical estimations. On the basis of history, clinical signs, reports of abdominal radiography, abdominal USG and hematological and biochemical analysis the case was diagnosed as urolithiasis (urethrolith and cystoliths). There was systemic infection (polymorphs 96%) and post renal azotemia (BUN: 308 mg%, creatinine: 16.94 mg%). Radiograph revealed multiple uroliths in the urinary bladder and a single large urolith was obstructing the urethra just behind the os penis (Fig. 2). USG examination revealed the tensed urinary bladder filled due to accumulated urine (Fig. 3).

Fig 1: Dog with distended abdomen

Fig 2: Radiograph revealing Urinary Bladder calculi

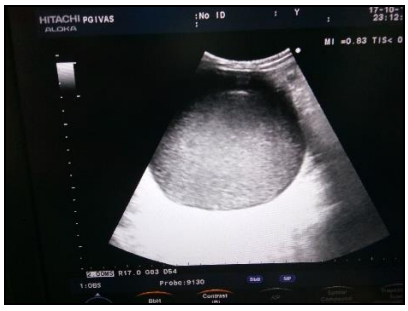

Fig 3: Sonogram revealed bladder filled with urine

Emergency surgery was planned for cystotomy. Dog was sedated with Inj. Xylazine @ 1mg/Kg BW, IM. After 10 minutes induction was achieved with Inj. diazepam @ 0.25mg/Kg BW, IV and Inj. Ketamine @ 3mg/Kg BW, IV and dog was maintained on Isoflurane 1-2%.

A right paramedian longitudinal incision was taken starting from the prepuce up to the base of the penis. After entering into abdominal cavity, a tensed bladder was identified with severe cystitis (Fig. 4 and 7). Cystocentesis was carried out using 22G needle and 20 ml syringe to evacuate bladder. (Fig. 5 and 6). Cystotomy was performed to retrieved large number of bladder stones (Fig. 8). Retrograde hydropropulsion of urethral calculi was attempted, failing of which prescrotal urethrotomy was undertaken to relieve urethral obstruction (Fig. 9). After ensuring the patency of urethra it was closed by suturing catgut No. 2-0. Urinary bladder was sutured with 1 No. catgut by placing Cushing followed by Lembert suture. Abdominal cavity and skin were sutured in routine manner. Urethra was catheterized with 8 No. infant feeding tube from urethral orifice up to urinary bladder. The catheter was anchored to prepuce with a single simple interrupted nylon suture.

Fig 4: Exposed bladder

Fig 5: Cystocentesis

Fig 6: Blood mixed urine

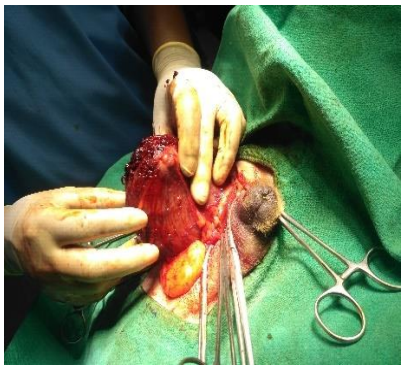

Fig 7: Exploration Urinary bladder

Fig 8: Cystoliths

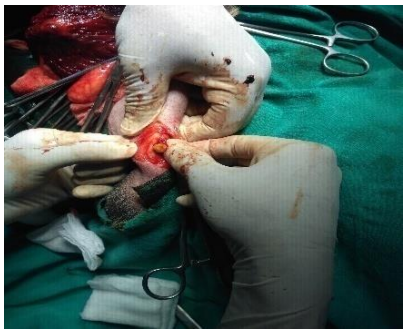

Fig 9: Urethrolith

Post-operative treatment was carried out using Inj. Amoxirum forte@15mg/Kg BW I/V, Inj. Vetalgin 1ml I/V, Inj. Pantoprazole@ 0.5mg/Kg BW I/V, Inj. Metronidazole@ 15mg/Kg BW I/V, Inj. Sodium Bicarbonate 10ml I/V, Inj. Chlorpheniramine Maleate 1ml I/M and fluid therapy using Inj. NS and Inj. RL. Syrup Cital 2tsp BID and Syrup Liv. 52 2tsp BID was prescribed. Flushing of catheter with NS every day and application of Elizabethan collar was advised to prevent early catheter removal or self-mutilation.

Results And Discussion

The urethral groove runs ventrally along the base and body of the os penis. The urethral groove is of clinical importance because the narrow entrance to the groove at its base may obstruct the passage of urinary calculi through the urethra and require surgical intervention [6]. Calcium oxalate and struvite uroliths are generally radiopaque; however, 1.7% to 5.2% of these uroliths are not apparent on survey radiographs. These undetected uroliths are usually small (< 1mm) [7]. Urate, cystine and calcium phosphate calculi are variably radiopaque, and approximately 25% of survey radiographs are interpreted as negative for these uroliths. The incidence of false negative results with survey radiography is 13% for urolith types [7]. Ideally, the suture pattern should not penetrate the mucosa to avoid producing a potential nidus for calculi formation [8]. Urocystoliths associated with clinical signs should be removed by minimally invasive procedure such as intracorporeal lesser lithotripsy [9]. Foreign bodies such as suture material, may contribute to recurrence of urolith [3,10].

Urination was closely monitored to detect obstruction caused by tissue swelling, fibrosis, or necrosis [1]. As per owner's information dog has initiated feeding on the very next day of surgery. Owner was advised to increase the water consumption of dog so as to encourage diuresis and reduce aggregation and crystallization of mineral deposits. In the present case dog was recovered uneventfully and started to void urine on its own on 11th post-surgical day.

Conclusion

Cystoliths and urethroliths are potential post renal causes of acute renal failure. Their early diagnosis and surgical removal on emergency basis can prevent aggravation of azotemia and subsequent progression of ARF to CRF.

Fig 10: Catheterized dog

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