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K Jagan Mohan Reddy
Department of Veterinary Surgery & Radiology, College of Veterinary Science, Rajendra nagar, Hyderbad, PVNR Telangana Veterinary University, Telangana, India

Correspondence
K Jagan Mohan Reddy
Department of Veterinary Surgery & Radiology, College of Veterinary Science, Rajendra nagar, Hyderbad, PVNR Telangana Veterinary University, Telangana, India

Surgical management of canine Urolithiasis a report of 3 cases

K Jagan Mohan Reddy

Abstract
Three dogs of which two female and one male dog with ages ranging from 5-12 years old were presented to the clinics with a history of urinary incontinence, haematuria, anorexia and dehydration. Clinically the dogs found to be dull, depressed and dehydrated. Palpation of abdomen revealed urinary bladder distention and the same was evident on lateral abdominal radiograph as radio-opaque cystic calculi Cystolithectomy was performed via caudal ventral midline laparotomy under general anesthesia and an indwelling catheter was fixed. The calculi measuring various sizes from approx. 4 to 25 mm. Cystolithoectomy should be performed over urethrotomy in male dogs, if stones can be flushed into the bladder pre-operatively or intraoperatively. The indwelling catheter was removed after 10 days and the three dogs recovered uneventfully.

Keywords: Calculi, Cystolith, Cystolithoectomy, Cystotomy, hematuria, Urinary bladder and 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). 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 *et al*., 2016) [1]. Survey abdominal radiographs or ultrasonography is indicated with urolithiasis for confirmative diagnosis. Medical dissolution of calculi is impossible, if the urolith size is bigger enough to obstruct the urine flow and surgical removal is necessary (Yadav *et al*., 2011) [4] Cystolithectomy in female dogs and Cystolithoectomy over urethrotomy in male dogs are the surgical options (Fossum 2013) [2] The present paper reports surgical management of cystic calculi in three dogs.

History and clinical signs
In the first case, 5 years old female dog with the history of haematuria, anorexia, dehydration and abdominal pain. Anamnesis revealed that the animal had hematuria for the last 10 days. Upon clinical examination the dog was found dull, depressed and dehydrated. In the second case, 8 years old male dog with the history of urinary incontinence, anorexia, dehydration. Upon clinical examination the dog was found dull, depressed and dehydrated. The third, female dog aged 10 years having clinical signs of haematuria and straining on urination. In all the cases, palpation of abdomen revealed urinary bladder distended which was evident on lateral abdominal radiograph. Radio-opaque cystic calculi were evident on radiographic examination (Fig. 1).

Surgical Management and Treatment
After confirmation of the calculi in urinary bladder, the two female dogs were operated for Cystolithectomy, and the third, male dog for Cystolithectomy and urethrotomy as per the procedure adop;ted by Fossum (2013) [2]. The surgical procedure was done under induction with xylazine (@1mg/kg) and ketamine (@10mg/kg) intramuscularly and maintenance with propofol (@4mg/kg). The operative site was prepared aseptically. Animal was controlled in dorsal recumbency. The bladder was approached through caudal midline incision. Urinary bladder was exteriorized, Sterile, moistened mops were packed around the bladder to prevent urine spillage into the abdominal cavity. The avascular margin of bladder was located and stab incision was made on its dorsal surface. (Fig. 2) The interior of the bladder were searched for calculi and concretions.

The calculi were located and removed and rinsed with normal saline, then a sterile polyethylene catheter was attempted to pass from urinary bladder through the urethra in normograde manner. In male dog, the catheter got stucked behind os penis. Then prescrotal urethrotomy incision was given along the midline of the of penis just caudal to os penis (Fig.3). The calculi were removed and urethra was rinsed with normal saline. The polyethylene catheter was then passed from external urethral orifice to the urinary bladder. The external end of the catheter was fixed with prepuce skin by stay sutures. The incision of the urinary bladder was closed by double layer cushings suture pattern using 3-0 chromic catgut (Fig.4). The urethral incision was also closed using 3-0 chromic catgut in simple continous suture pattern. The calculi measuring various sizes from approx. 4 to 25 mm were found (Fig.5 and 6). Post operatively systemic antibiotics, intravenous fluids, Non steroidal anti-inflammatory drugs were given for 5 days. The catheter and skin sutures were removed on 10th post operative day.

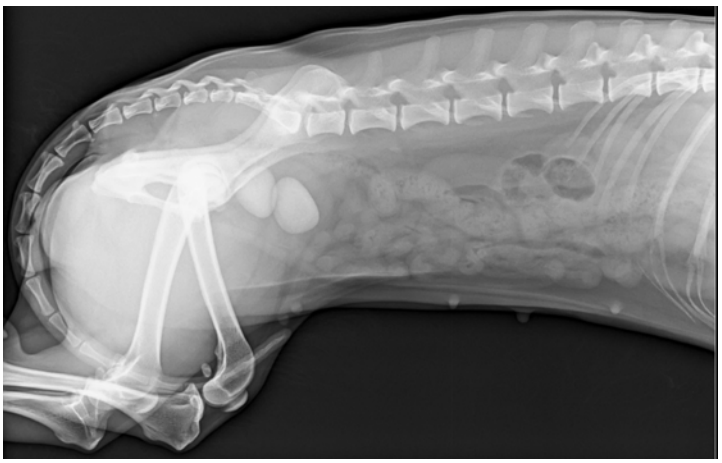

Fig1: Radiography of the left lateral abdomen of Female dog evident of cystolith

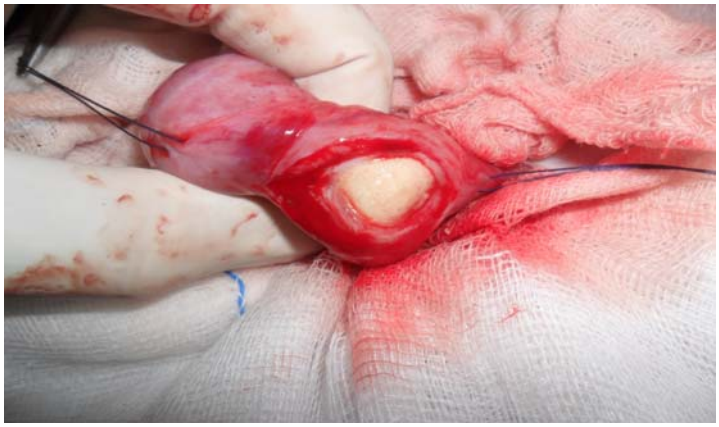

Fig 2: Cystolecthectomy and cystolith seen

Fig 3: Prescrotal Urethrotomy incision in male dog

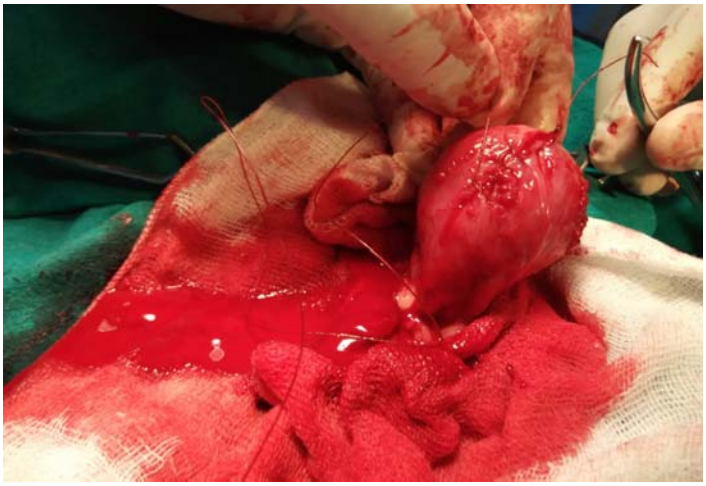

Fig 4: closing the bladder incision by double layer cushings suture pattern

Fig 5: Cystoliths removed from the Bladder

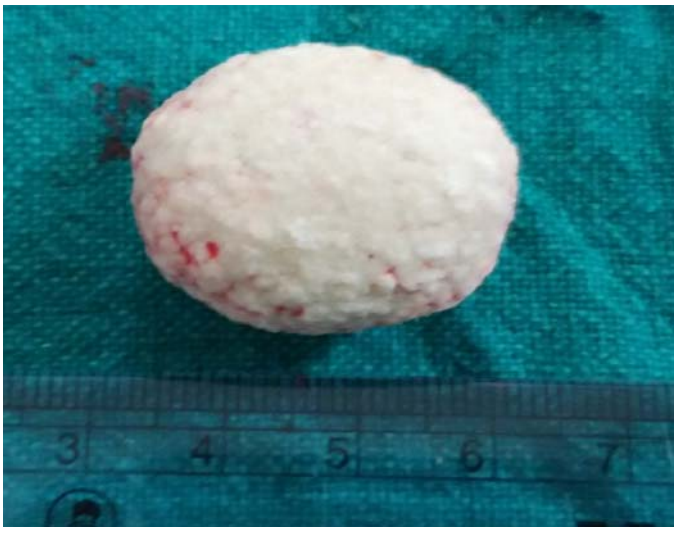

Fig 6: Cystolith removed from the bladder.

Results and Discussion

Post operatively, the three dogs recovered uneventfully and restoration to normal urination after 10 days of surgery. Confirmatory diagnosis is done by using radiography shows the presence of radio-opaque masses located in the bladder. The choice of the management of the patient arrived based on the size of the calculi. Cystolithectomy to remove the calculus is recommend for large calculus in female which cannot be dissolved by medical management. When urine becomes over saturated with lithogenic substances, uroliths may be formed and these can interfere with the complete or frequent voiding of urine.

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). Urethral obstruction from stones is more common in males. Clinical signs of urinary tract infection (i.e. hematuria, pollikiuria, and stranguria) are common in dogs with cystic or urethral calculi (Dehmiwal *et al*., 2016) [1]. Small stones lodging in urethra of male dogs may cause partial or complete obstruction. Bladder distension, abdominal colic, stranguria, perceived incontinence due to partial obstruction and or signs due to post – renal azotemia (i.e. anorexia, vomiting and depression) may develop. Occasionally the bladder ruptures causing uroabdomen. Survey abdominal radiographs or ultrasonography is indicated with urolithiasis. Although medical dissolution of calculi is possible, surgical removal is necessary if the urolith size is bigger enough to obstruct the urine flow (Yadav *et al*. 2011) [4]. Cystolithectomy in female dogs and Cystolithoectomy and urethrotomy was performed in male (Fossum 2013) [2] as in the present case.

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