

Retrograde Urethrography with Diatrizoate Meglumine Sodium for Detection of Xanthine Urethrolithiasis in Dalmatian: A Case Report

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Abstract

Xanthine urolithiasis occurs less frequently in dogs. An 8-year male cross bred Dalmatian dog was presented with painful micturition since the past month. The dog was treated in the field with antibiotic and analgesic, but no improvement observed. The owner reported that change of urine colour to reddish yellow. Clinical examination revealed dullness, lethargy, discomfort and reactive on palpation of the abdomen. Plain radiograph in lateral and ventrodorsal view was unable to detect the calculi. Grey scale ultrasonography revealed normal echotexture of urinary tract with no apparent obstruction. Retrograde contrast radiography in lateral view with Diatrizoate Meglumine Sodium @0.5mg/kgbw revealed three circular radiolucent calculi at the os penis. Hydropulsion of urinary calculi followed by cystotomy was performed by mid-ventral celiotomy to extract all calculi. The patient recovered uneventfully with non-recurrence for 1 month post-surgery.

Keywords: Diatrizoate Meglumine Sodium, Mixed Breed Dog, Retrograde Urethrography, Xanthine

Introduction

Uroliths are common in dogs and the most commonly reported uroliths are struvite (Magnesium ammonium phosphate) (Osborne *et al.*, 1999, Ling *et al.*, 1998, Osborne *et al.*, 1995, Ling *et al.*, 1998, Ling *et al.*, 1998, Ling *et al.*, 1998, Escolar *et al.*, 1990, Weichselbaum *et al.*, 1998). The struvite uroliths in dogs occur mainly due to infections, female dogs are more prone as compared to their male counterparts (Osborne *et al.*, 1999, Ling *et al.*, 1998, Weichselbaum *et al.*, 1998, Seaman and Bartges, 2001). Xanthine urolithiasis occurs less frequently in dogs. Xanthinuria has been reported in Cavalier King Charles spaniels and in Dachshund (Ling *et al.*, 1998, Bartges *et al.*, 1992, Ling *et al.*, 1991, Van Zuilen *et al.*, 1997, and Kucera *et al.*, 1997). The occurrence of xanthine uroliths have been reported to administration of a xanthine oxidase inhibitor in the management of urate uroliths (Ling *et al.*, 1998, Bartges *et al.*, 1992, Ling *et al.*, 1991, Van Zuilen *et al.*, 1997, Kucera *et al.*, 1997). The defects in metabolism of purine are also cited as cause and have been reported mostly in male dogs (Ling *et al.*, 1998, Bartges *et al.*, 1992, Ling *et al.*, 1991, Van Zuilen *et al.*, 1997, Kucera *et al.*, 1997). The early diagnosis of smaller uroliths may allow for removal by hydropulsion (Lulich *et al.*, 1993, Lulich and Osborne, 1995). The radiograph, contrast radiograph and ultrasonography are essential for diagnosis of uroliths, however ultrasonography being the gold standard for diagnosis of the uroliths in veterinary patients. The present case report takes an opportunity of reporting the role of an occurrence of Xanthine uroliths in a male cross bred Dalmatian dog with retrograde urethrography using Diatrizoate Meglumine Sodium and surgical correction of the condition.

Case Presentation and Treatment

An 8-year male cross bred Dalmatian dog was presented to the Department of Surgery and Radiology, having difficulty in urination for the past one month. The dog was treated in the field with antibiotic, analgesic; however, the condition didn't improve. The owner reported that for the past few days colour of the urine had changed to mild reddish. Clinical examination of the dog revealed dullness, unwillingness to move, discomfort, tensed abdomen and reactive on palpation of the abdomen. The mucous membrane was congested, rectal temperature (39.55° C), heart rate (105 beats /min), and respiration rate (45/min) with mild dehydration. Plain abdominal radiograph in lateral and ventrodorsal view was done (Fig. 1 and Fig. 2) using computed radiography (500 mA X-ray machine by SIEMENS and the radiographic images were evaluated by computed radiography system by FUJIFILM, FCR PRIMA, T2) at KVp (46-60) and mA (160), respectively.



Figure 1: Plain abdominal radiograph lateral view



Figure 2: Plain abdominal radiograph ventrodorsal view

Ultrasonography revealed normal echotexture of urinary tract with no apparent evidence of obstruction. Retrograde contrast radiography in lateral view at same KVp and mA with Diatrizoate Meglumine Sodium @0.5mg/kgbw was performed (Fig. 3a and Fig. 3b) and revealed three circular radiolucent calculi at the penis. The infant feeding tube (No: 7) was passed via the urethral orifice however it could not be forwarded beyond the Os penis. Intravenously diazepam was given @0.5mg/kgwt and hydropulsion was attempted. As a result, the infant feeding tube could be advanced beyond the Os penis and reaching the approximate length of bladder. The animal was given intravenous fluid comprising of inj. Dextrose in normal saline solution (DNS 5%) o.d. inj. Ceftriaxone (Intacef) @15mg/bwt (IV) bid, inj. pantoprazole (Pantop) @0.05mg (IV) o.d., inj. metronidazole (Metron) @10mg/kg (IV)b.i.d and inj. meloxicam (Melonex) @0.02mg (IV) o.d. for two days.

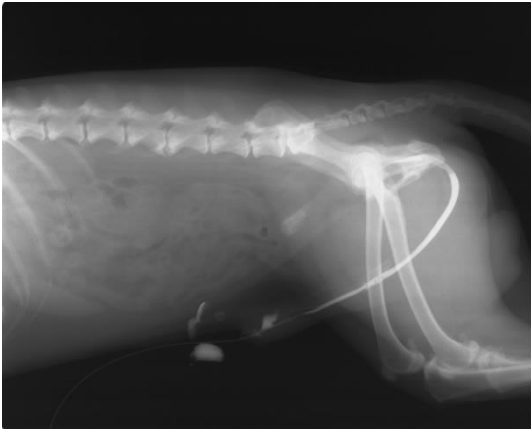


Figure 3a: Retrograde Urethrography with Diatrizoate Meglumine Sodium confirming presence of Urethrolith at the area of Os-penis



Fig. 3b: Retrograde Urethrography with Diatrizoate Meglumine Sodium confirming presence of Urethroliths at the area of Os-penis (magnified view)

Food and water were withheld for 12 hours; the dog was premedicated with midazolam @0.3mg/kg bwt i/m. The caudal left para median surgical site was prepared for aseptic surgery. The induction for general anaesthesia was achieved with inj. Propofol @4mg/kg wt. i/v. and the dog was maintained under isoflurane with oxygen throughout the surgery. The left para-median celiotomy revealed rupture of urinary bladder and uroperitoneum with thickening of the peritoneum, adhesion with the mesentery (Fig. 4) and thickened urinary bladder and devitalized tissue (Fig. 5).

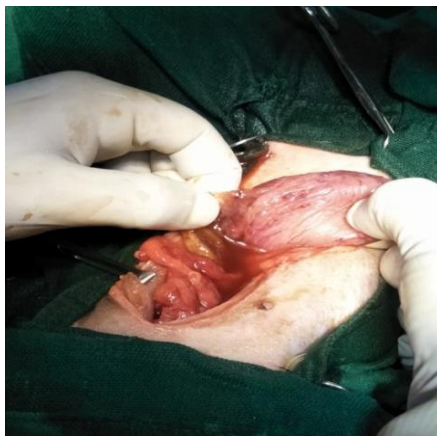


Figure 4: Showing ruptured urinary bladder and uroperitoneum, thickened peritoneum and mesentery, adhesion of mesentery



Figure 5: Showing devitalized tissue

The uroperitoneum was sucked out with the help of a low-pressure suction machine and abdominal cavity was lavaged with ringer lactate and metronidazole. Inside of the urinary bladder was entered through the ruptured site, the calculi were removed and a new infant feeding tube was forwarded retrograde from the penile urethra to the urinary bladder. The urinary bladder was sutured in two layers with chromic cat gut (#2-0) by Cushing and Lambert pattern (Fig. 6). The left para median celiotomy surgical wound was closed with polyglactin 910 (#1) followed by subcuticular suture with polyglactin 910 (#2-0) and the skin was closed by simple interrupted suture with nylon (#2-0). The infant feeding tube was removed on 4th day. The retrieved calculi were sent for salt analysis. Post-operative treatment comprises of inj. Dextrose in normal saline solution (DNS 5%) 500ml i/v b.i.d, inj. Ceftriaxone (Intacef) @15mg/bwt i/v bid, inj. pantoprazole (Pantop) @0.05mg i/v o.d., inj. metronidazole (Metron) @10mg/kg i/v bid for 7 days and inj. meloxicam (Melonex) @0.02mg i/v o.d. for 3 days. The dog was asses at one-week interval after the post-operative treatment for one month.

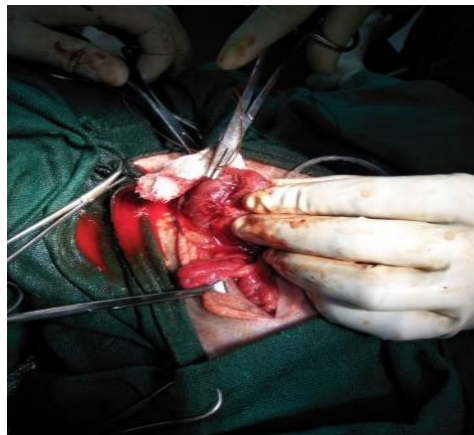


Figure 6: Closing of ruptured opening with Cushing and Lambert's suturing pattern

Results and Discussion

The dog showed uneventful recovery and didn't show any clinical sign of recurrence till one month. The urinalysis for salt revealed xanthine calculi. The plain radiograph didn't show calculi as the stones were radiolucent in nature. Ultrasonography could not detect the calculi as the sonic waves could not pass through the bony os penis to detect the calculi lodged at the urethra within. The retrograde urethrography with Diatrizoate Meglumine Sodium revealed three small circular objects in the urethra at the level of os penis (Fig. 2) indicating the radiolucent nature of the calculi and also confirmed by salt analysis. The urethra caudal to obstruction was distended (Fig. 2), this might be because of the pooling of urine caudal to the obstruction. The retrograde urethrography with Diatrizoate Meglumine Sodium was effective in aiding in diagnosis of radiolucent calculi. The maximum price (MRP) of the 2ml ampule was INR (Indian National Rupee) 189. It might be an economical procedure for the institutions or private veterinary clinics for diagnosis of radiolucent calculi, where the ultrasonography is not available. The early detection of small uroliths allowed hydropulsion, however it was achieved after using diazepam intravenously. The diazepam might have relaxed the urethra which might have aided in in hydropulsion of the calculi from the urethra to the urinary bladder. The urinary bladder was ruptured which might be due to long standing of the condition. Due to spillage of the urine in the abdominal cavity might have caused inflammation of the peritoneum and mesentery. This might have led to adhesion of the peritoneum and thickening of the mesentery and peritoneum. The abdominal lavaged with ringer lactate and metronidazole might have aided in non-complication of the condition and uneventful recovery of the dog. To the authors knowledge the occurrence of xanthine calculi in Cross bred Dalmatian has not been reported.

Conclusion

Diatrizoate meglumine sodium retrograde urethrography is an economical diagnostic procedure for detection of radiolucent urethral calculi in dog. It aids in early detection and initiation of appropriate therapy in radiolucent urethral calculi.

Conflict of Interests

There is no conflict of interest.

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