

Submucosal Uroliths in the Vesica Urinaria of a Male Dalmatian Dog

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Abstract: A 1-year-old male Dalmatian dog with urinary obstruction was examined on an emergency basis. The macroscopic urine examination, direct radiography, positive contrast cystography, and ultrasonography revealed urolithiasis. Histology of the vesica urinaria showed urolith particles deeply embedded in a membrane on the mucosa. This is not commonly seen in dogs with urolithiasis.

Key Words: Dog, urolithiasis, urate

Dalmaçyan Erkek Köpekte Vezika Ürinarya'da Submukozal Ürolitler

Özet: Bir yaşında erkek Dalmaçyan bir köpek üriner obstrüksiyon şikayetiyle kliniğimize getirildi. Makroskobik idrar analizi, direkt radyografi, pozitif kontrast sistografi ve ultrasonografi sonucunda ürolitiazis tanısı konuldu. Vezika ürinaryanın histolojisinde ürolit partiküllerinin idrar kesesi üzerinde bir membranın içine gömülü olduğu izlendi. Bu vaka, ürolitiazisli köpeklerde daha önce görülmemiştir.

Anahtar Sözcükler: Köpek, ürolitiazis, ürat

Introduction

Urolithiasis is a common urinary tract disorder in dogs (1). Some risk factors that are known to affect canine uroliths include breed, gender, age, anatomical and metabolic abnormalities, urinary tract infections, diet, and urine pH (2-5). Previous studies have shown that the breed most affected by urate urolithiasis is Dalmatians (6-9). Although Dalmatians are known to be predisposed to urate uroliths due to their unique metabolism of purines (1,2,4,7), the definitive mechanism of urate urolith formation in Dalmatian dogs remains unknown (2).

The present report documents urate urolithiasis in a Dalmatian dog with emphasis on clinical features and treatment.

Case Report

A 1-year-old male Dalmatian dog with urinary obstruction was examined on an emergency basis. According to the owner, the dog had not been given fresh water, not fed a complete and balanced adult dog food, and not taken out for urination on a regular basis. Survey radiography was unremarkable but ultrasonography revealed urolithiasis. On ultrasonographic examination of the vesica urinaria, a large amount of crystals, thickening of the walls, and dilatation in the preprostatic urethra were observed. On positive contrast cystography, the wall of the vesica urinaria was irregular (Figure 1). Hematuria, cloudy appearance, dark yellow color, pH 6.5, +++protein, 7-8 leukocytes per high power field, 1.008

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Figure 1. Positive contrast cystographic appearance of mucosal irregularity of vesica urinaria.

specific gravity (SG), and urate crystals were detected in a urine sample collected by cystocentesis. Urate sodium hydrogen monohydrate was diagnosed by both biochemical and X-ray diffraction methods (10,11). Urethral catheterization was not successful due to obstruction with uroliths. Removal of the uroliths by both anterograde and retrograde flushing was unsuccessful. Urethrotomy was performed followed by cystotomy. Macroscopic examination of the vesica urinaria revealed uroliths embedded in the mucosa (Figure 2). Samples for histological examination were taken from the ventral mucosa of the vesica urinaria. Later, samples were sent to a laboratory (Yorum Patoloji Laboratuvarı, Ankara) for sectioning. Uroliths deeply embedded in a membrane on the ventral mucosal portion of the vesica urinaria were noted (Figure 3).

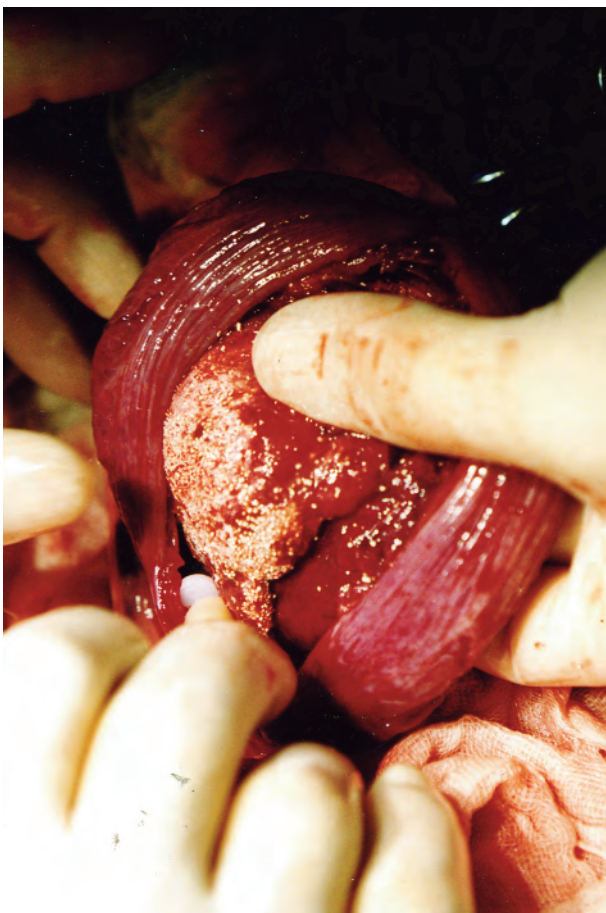


Figure 2. Macroscopic appearance of uroliths in the vesica urinaria.

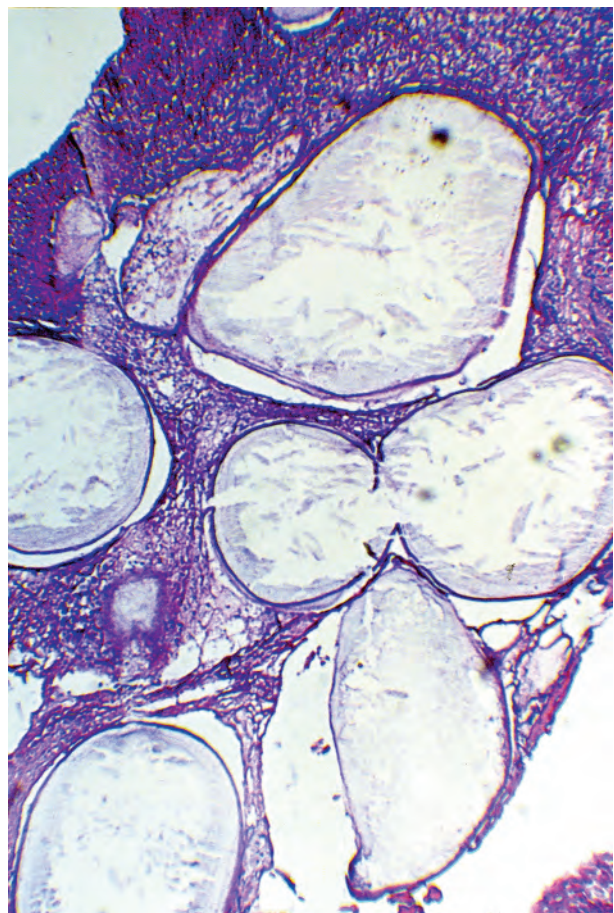


Figure 3. Microscopic appearance of uroliths in the vesica urinaria.

Table. Urine analysis findings on the 15th, 30th, and 60th days.

Day	Hematuria	Appearance	pH	Protein	Leukocyte	Crystals	SG
15	+	Cloudy	6.8	++++	4-5	Many	1008
30	-	Clear	7	+++	1-2	Few	1008
60	-	Clear	7	+	1-2	Few	1008

Macroscopic uroliths in vesica urinaria were successfully removed during surgery and antibiotic treatment (Enrofloxacin, 2.5 mg/kg, PO q12h) was given for 1 week postoperatively. Postoperative 15th, 30th, and 60th day urine analysis findings are shown in the Table.

Medical prevention of urate urolithiasis included Allopurinol (15 mg/kg, PO q12h), sodium bicarbonate (1/4 tsp/5 kg PO q8h), and a low purine diet, Canine u/d (Hill's, USA) (9).

Results and Discussion

Urate urolithiasis in Dalmatians is considered a common occurrence (3,6,12,13), and is reported more

commonly in male Dalmatians than in females (3,4,6,7,9). Medical and dietary therapy was used postoperatively to help prevent recurrence of the uroliths (3,6,7). The optimal dietary regimen for canine urate urolithiasis has been suggested according to the urinary pH and type of the urolith that is analyzed in the laboratory including both nucleus and the outer covering of the urolith (9). Cystolithiasis in Dalmatians with uroliths embedded in the vesica urinaria has not been reported to the best of the authors' knowledge. This case shows that urinary stones not only cause obstruction by freely moving within the urinary system but can be attached or embedded in the mucosa in Dalmatians.

References

- Bartges, J.W., Osborne, C.A., Lulich, J.P., Kirk, C., Allen, T.A., Brown, C.: Methods for evaluating treatment of uroliths. *Vet. Clin. North Am. Small Anim. Pract.*, 1999; 29: 45-57.
- Bartges, J.W., Osborne, C.A., Lulich, J.P., Kruger, J.M., Sanderson, S.L., Koehler, L.A., Ulrich, L.K.: Canine urate urolithiasis. Etiopathogenesis, diagnosis and management. *Vet. Clin. North Am. Small Anim. Pract.*, 1999; 29: 161-191.
- Brown, N.O., Parks, J.L., Greene, R.W.: Recurrence of canine urolithiasis. *J. Am. Vet. Med. Assoc.*, 1977; 170: 419-422.
- Osborne, C.A., Lulich, J.P., Polzin, D.J., Sanderson, S.L., Koehler, L.A., Ulrich, L.K., Bird, K.A., Swanson, L.L., Pederson, L.A., Sudo, S.Z.: Analysis of 77.000 canine uroliths. Perspectives from the Minnesota Urolith Center. *Vet. Clin. North Am. Small Anim. Pract.*, 1999; 29: 17-38.
- Osborne, C.A., Lulich, J.P., Bartges, J.W., Ulger, L.K., Thumchai, R., Koehler, L.A., Bird, K.A., Felice, L.J.: Canine and Feline Urolithiasis: Relationship of Etiopathogenesis to Treatment and Prevention. In: Osborne, C.A., Finco D.R. Eds. *Canine and Feline Nephrology and Urology*. Lippincott Williams & Wilkins, Philadelphia. 1995; 798-889.
- Brown, N.O., Parks, J.L., Greene, R.W.: Canine urolithiasis: retrospective analysis of 438 cases. *J. Am. Vet. Med. Assoc.*, 1977; 170: 414-418.
- Bartges, J.W., Lane, I.F.: Medical treatment of urolithiasis. In: Slatter, D. Ed. *Textbook of Small Animal Surgery*. 3rd edn., Vol 2, WB Saunders Co., Philadelphia. 2002; 1661-1672.
- Hoppe, E.A.: Canine lower urinary tract disease. In: Wills, M.J., Simpson, K.W. Ed. *The Waltham Book of Clinical Nutrition of the Dog and Cat*. W.B. Saunders Co., Philadelphia. 1994; 335-352.
- Lulich, J.P., Osborne, C.A., Bartges, J.W., Leckharoensuk, C.: Canine Lower Urinary Tract Disorders. In: Ettinger, S.J. Ed. *Textbook of Veterinary Internal Medicine*. 3rd edn., Vol 2, WB Saunders Co., Philadelphia 2000; 1747-1781.
- Saka, A.H.: Mineralojik Analizlerde X-ışınları Toz Kırınım Yönteminin Temel Prensipleri ve Laboratuvar Şartlarının Standardizasyonu. In: *Maden Teknik Arama ve Genel Müdürlüğü Yayını*, Ankara 1997.
- Kleeberg, J.: Systematic Analysis of Uroliths. *J. Clin. Pathol.*, 1976; 29: 1038-1039.
- Picavet, P., Dettleux, J., Verschuren, S., Sparkes, A., Lulich, J., Osborne, C.A., Istasse, L., Diez, M.: Analysis of 4495 canine and feline uroliths in the Benelux. A retrospective study: 1994-2004. *J. Anim. Physiol. Anim. Nutr. (Berl.)*, 2007; 91: 247-251.
- Houston, D., Patterson, J., Moore, A., Smith, S., Favrin, M., Villagonzalo, M., Hoff, B.: Preliminary results from the Canadian Veterinary Urolith Center. *Can. Vet. J.*, 2000; 41: 318-319.