

Uncommon Case of Bladder Struvite Urolithiasis in a Two Month Old Puppy

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Abstract : A 2-month-old, intact female, maltese puppy was presented with an acute onset of hematuria and stranguria. The dog was diagnosed as uroliths in bladder using radiography of abdomen. Struvite uroliths in bladder were confirmed by Minnesota Urolith Center after surgical removal of uroliths on local clinic. There were 3 struvite uroliths in bladder and it caused hematuria. The dog had no problem including hematuria for 2 months after surgical removal of uroliths with preventative diet for struvite uroliths.

Key words : bladder, puppy, struvite.

Introduction

Struvite is the most common bladder urolith in dogs, and it forms when urine is supersaturated with magnesium, ammonium, and phosphate. Females and younger dogs (mean age of 5.7 years) have a greater risk of developing struvite uroliths than males and older dogs because of their greater risk of urinary tract infection (1).

In this case, a 2-month-old, intact female, maltese was presented with an acute onset of hematuria and stranguria, and was diagnosed as uroliths in bladder using radiography of abdomen. Considering the fact that the mean age of dogs with struvite uroliths is known to be 5.7 years, this is very unusual case of struvite uroliths in dogs.

Case

A 2-month-old intact female, maltese weighing 0.84 kg presented with an acute onset of hematuria and stranguria. Physical examination revealed the dog was depression and had mild hypothermia (37.3°C) and tachycardia (174 beats per minute) and respiratory rate was 24 breaths/minute. The body condition score was 4 out of 9. There was no evidence of trauma or hemostatic disorder. A complete blood count (CBC) demonstrated all results were in normal reference range. The results of the serum biochemistry analyses revealed a mild hyperglycemia (125 mg/dl; reference range, 60 mg/dl - 110 mg/dl), hyperphosphatemia (7.1 mg/dl; reference range, 2.9 mg/dl - 6.6 mg/dl), and hypoproteinemia (4.7 g/dl; reference range, 5.4 g/dl/L - 8.2 g/dl). A urinalysis revealed proteinuria, inflammation of urinary tract and acidic urine (pH was 6 at initial

hospitalization). The radiographical findings showed 3 uroliths in bladder on the dorsoventral and right-left lateral view (Fig 1).

The surgical removal of uroliths was performed immediately after diagnosis of bladder stone by radiography. 3 uroliths in bladder were confirmed and the diameter was about 0.7 cm respectively (Fig 2). Struvite uroliths in bladder were confirmed by Minnesota Urolith Center after surgical removal of uroliths. The results showed that the nidus of the uroliths was 50% magnesium ammonium phosphate and 50% calcium phosphate carbonate. The stone of urolith was 100% magnesium ammonium phosphate (struvite). Samples for bacteriological culture were not performed from either the stone or the dog's bladder. Antibiotics (amoxicillin-clavulanate and cephalosporin) were continued until the infection was confirmed to have cleared. At the same time therapeutic diet (special food called S/D diet is made by Hills for the specific purpose of dissolving struvite stones) was feed for prevention of recurrent struvite stones. There were no recurrent uroliths until now (for 6 months) after surgical removal of uroliths.

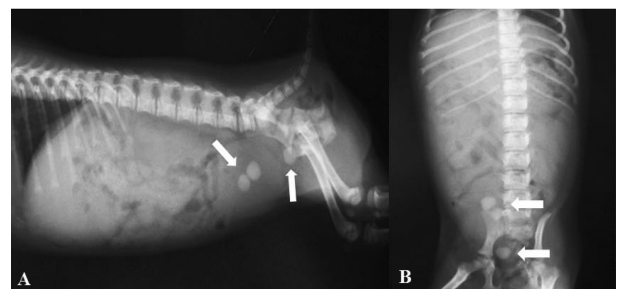


Fig 1. Right lateral (A) and dorsoventral (B) abdominal radiographs of a 2-month-old, intact female, maltese puppy that presented with hematuria and stranguria. Three bladder stone was found (arrow of A and B).

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Fig 2. Struvite uroliths (0.6 cm × 0.5 cm, 0.7 cm × 0.7 cm) removed from the urinary bladder of a 2-month-old female maltese puppy. The other one was referred to Minnesota Urolith Center.

Discussion

Bladder uroliths come in several mineral compositions. The most common types of urinary stone are struvite and oxalate. Females and younger dogs have a greater risk of developing struvite uroliths than males and older dogs because of their greater risk of urinary tract infection that is usually caused by urease positive bacteria such as staphylococci (1-4). Thus, prevention of urinary tract infection is most important to prevent formation and recurrence of struvite uroliths (3). In a report, mean age of dogs with struvite uroliths was 5.7 years, whereas the mean age of dogs with CaOx urolith was 8.2 years (1). In this case, however, the dog was just 2-months old. Struvite urolithiasis in dogs is usually caused by urinary tract infection as well as other conditions that induce crystallization of magnesium ammonium phosphate such as alkaline urine, diet, and genetic predisposition (5,6). However, urine pH of this patient was acidic (pH 6). There was no predisposition factor of urinary struvite uroliths such as alkaline urine, foreign body and diet except inflammation of urinary tract. There were some reports about foreign body inducing urinary calculi. In humans, urinary calculi was induced by foreign body that is caused by catheters, fragments of foley balloon catheters, and non-absorbable suture materials (7). In a report,

struvite urolith was produced by a sewing needle (5). In this case, however, there was no foreign body inducing urinary calculi in bladder.

To the author's knowledge, there has been no report about struvite uroliths in 2-month-old dog. In this case, exact cause of the struvite uroliths was not clear. After surgical removal of 3 bladder struvite uroliths, the patient had normal urination without hematuria and stranguria. And the patient had no relapse of urinary calculi for 6 months with preventative diet (Hills S/D diet; therapeutic diet for struvite urolithiasis contains decreased amounts of protein, phosphorus, and magnesium to lower substrate concentrations; increased amounts of sodium chloride to enhance diuretic effect; and the addition of a urinary acidifier) for struvite urolithiasis (3).

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2개월령의 강아지에서 발생한 흔하지 않은 방광내 스트루바이트 결석에 관한 증례

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요 약 : 2개월령의 중성화하지 않은 암컷 말티즈가 급성의 혈뇨와 핏뇨를 주증으로 내원하였다. 환축은 복부 방사선 검사를 통해 방광 내 결석으로 진단되었다. 결석의 수술적 제거 후 미네소타 결석 센터로 의뢰하여 스트루바이트 결석을 확인하였다. 방광 내에는 3개의 스트루바이트 결석이 존재하였고 이로 인해 혈뇨가 생성되었다. 결석의 수술적 제거와 스트루바이트 결석의 생성에 대한 예방적 처방식 급여로 환축은 결석 제거 후 2달 동안 혈뇨와 같은 문제를 발생시키지 않았다.

주요어 : 방광, 강아지, 스트루바이트