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Medical dissolution of struvite cystolith in a pomeranian dog

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Abstract

A 11 years old male pomeranian dog was presented to Small Animal Medicine Unit of Veterinary Clinical Complex with a history of vomiting, hematuria, stranguria, and pollakiuria since two days. Clinical examination revealed congested conjunctival mucous membrane and enlarged popliteal lymph nodes. Hematobiochemical analysis revealed increased leucocyte count, blood urea nitrogen, creatinine and phosphorus levels. Radiography revealed cystic calculi. Microscopic examination revealed numerous struvite crystals. Hence, urohydropropulsion was performed with parenteral administration of fluids and antibiotics for 8 days. The case was recommended a therapeutic diet for 3 months.

Keywords: Struvite cystolith, retrograde urohydropropulsion, azotemia, medical dissolution

Introduction

Struvite-containing uroliths are the most common uroliths which comprise 36% to 43% of urolith samples from dogs (Wingert *et al.*, 2021) [4]. Although struvite urolith occurs most often in the bladder, they can also develop in kidneys and ureters of dogs (Dear *et al.*, 2019) [1]. Koehler *et al.*, (2009) [2] reported that the rate of dissolution is related to the size and surface area of urolith exposed to the under saturated urine. Hence, this paper reports the medical management of struvite cystolith in a dog by dissolution and antibiotic coverage as combined therapy.

History and Clinical observations

A 11 year old male pomeranian dog was presented to Small Animal Medicine Unit of Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli with a history of vomiting, hematuria, stranguria, and pollakiuria since two days. Physical examination revealed congested conjunctival mucous membrane, enlarged lymph nodes, sunken eyeball with moderate dehydration. Hemato-biochemical analysis revealed an increased leucocyte count (16600/cmm), elevated BUN (72.75mg/dl), creatinine (2.4mg/dl) and phosphorus (7.5mmol/dl) level. A plain right lateral abdominal radiography revealed distended bladder with cystic calculi (Fig.1). Urinalysis revealed straw yellow urine, specific gravity (USG) of 1.020, pH (8.5), protein (+) and blood cells (+). Microscopic examination of urine sediment revealed presence of numerous struvite crystals (Fig.3, 4), RBCs, WBCs, moderate bacterial rods. Hence the case was diagnosed as cystolithiasis associated with struvite crystals.



Fig 1: Radiography showing distended bladder and numerous radio opaque cystic calculi (Yellow coloured arrow)



Fig 2: Urine collection by retrograde Urohydropropulsion

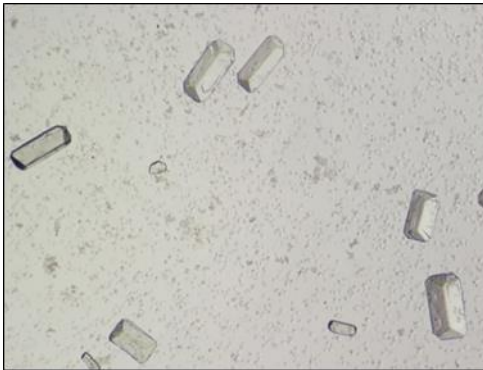


Fig 3: Microscopic examination of urinary sediment laden with struvite crystals (X10)

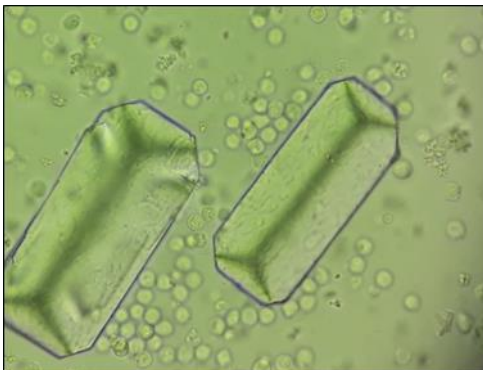


Fig 4: Struvite crystals (X40)

Treatment and Discussion

By retrograde urohydropropulsion, partial urethral obstruction was relieved by pressure infusion of thoroughly mixed sterile saline (17.5mL) and KY jelly (2.5mL) using 6 french (Fr) size catheter which was passed into the bladder with a mild resistance at the level of prostate and bladder was emptied (Fig.2). The dog was treated with Inj. Ringers lactate @ 10 mL/Kg B.Wt I/V, Inj. Amoxicillin sodium+ sulbactam @ 15 mg I/V and Inj. Ondansetron @ 0.1 mg I/V for 7 days. Post treatment, haemato-biochemical values were leucocytes (7500/cmm), BUN (50.53 mg/dl), creatinine (1.6mg/dl) and phosphorus (6.5mmol/dL). The case was recommended oral medications which contains Tab. Flavoxate hydrochloride 200 mg (1-0-1) (Urispas®) for 15 days and Royal Canin® Urinary SO dry dog food (75gms/day) for 3 months. The dog is under the above dry food with a favorable prognosis. Pollakiuria, stranguria, haematuria suggest the possibility of cystoliths. Struvite stone constituents exist within normal urine but stone formation depends on local micro environment, metabolic factors and concurrent therapy

(Palma *et al.*, 2013) [3]. Medical dissolution of struvite cystoliths encompasses relief of obstruction to outflow, elimination of existing calculi, eradication or control of urinary tract infection, and prevention of recurrence (Koehler *et al.*, 2009) [2]. The medical dissolution was adopted due to the smaller size of the calculi and larger surface area of the urolith exposed to the urine which was in concordance with Koehler *et al.*, (2009) [2]. In an *ex vivo* model, Royal Canin® Veterinary Diet canine urinary SO 13, Royal Canin® USA, Inc., St. Charles, MO was found to be effective in dissolving struvite calculi (Palma *et al.*, 2013) [3]. Hence, dry therapeutic urinary diet combined with antimicrobial therapy was recommended as Dear *et al.*, (2019) [1] also reported that combination therapy could effectively dissolve struvite cystoliths in dogs with urease-producing bacterial urinary tract infection (UTI). The dietary regimen was followed for 3 months because the average duration of dissolution therapy in dogs was 3-3.6 months as Palma *et al.*, (2013) [3] suggested that medical therapy should be continued one month beyond radiographic clearance because calculi <3 mm cannot be accurately detected by radiography (Palma *et al.*, 2013) [3].

In summary, struvite is the most common calculi found in dogs of any age and gets complicated by lower urinary tract infection. The location, size and surface area of the calculi determines the therapeutic plan of removing the calculi either by medical dissolution or surgical exploration. Periodical urinalysis is the greater tool for screening and post-medical dissolution evaluation tests. Dietary Management with water supplementation is the major therapy in preventing the formation of cystoliths. If on poor dietary regimen, the condition may relapse as obstructive nephrolith or ureterolith where the calculi exposure to the urine is zero to minimal, with a fatal outcome.

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