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Clinical Article

DIAGNOSIS AND THERAPEUTIC MANAGEMENT OF CYSTOLITHIASIS IN A GOLDEN RETRIEVER DOG

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SUMMARY

A seven-year-old male Golden Retriever dog was presented with a history of dysuria, pollakiuria, hematuria, dribbling of urine, inappetence and vomition. Hemato-biochemical examination revealed neutrophilic leukocytosis and azotemia. Urinalysis showed marked proteinuria and raised bilirubin level. Lateral and ventro-dorsal radiography showed distension of urinary bladder. Ultrasonographic examination of urinary bladder showed presence of cystoliths with cystitis. Microscopic examination of urine sediment confirmed the presence of ammonium urate uroliths. On the basis of history, clinical and laboratory findings, a confirmatory diagnosis of cystolithiasis was made. The patient was initially stabilized by medicinal therapy followed by cystotomy for complete removal of calculus. Animal made an uneventful recovery after the surgical management.

Keywords: Ammonium urate, Cystitis, Cystolithiasis, Cystotomy, Pollakiuria

Urolithiasis is a common disease condition in veterinary practice (Robinson *et al.*, 2008). It is a multifactorial condition due to combined influences of physiological, nutritional and managemental factors. Urolith formation is a complex process which occurs due to the successive physiochemical events such as super saturation, nucleation, growth, aggregation and retention within the renal tubules (Yadav *et al.*, 2011). Cystoliths (bladder stones) are concretions of solid mineral and organic compounds that cause disease through direct trauma to the urinary tract and obstruction of urinary outflow (Kalim *et al.*, 2011). Cystoliths composed predominantly of struvite, calcium oxalate, calcium carbonate, calcium phosphate, silica, uric acid, cystine and tyrosine crystals (Samal *et al.*, 2011). Urine pH is one of the important factors which favour the formation of urinary calculi. In general, alkaline pH (pH>8.0) favours the formation of phosphate, carbonate and struvite calculi whereas acidic pH (pH<7.0) favours the formation of urate and silicate calculi. Diagnosis of the condition is mainly by clinical, ultrasonographic, radiological and microscopic examination of urine sediment (Kalinski *et al.*, 2012).

A seven-year-old male Golden Retriever dog was presented to the Teaching Veterinary Clinical Complex, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University, Selesih, Aizawl, Mizoram with a history of dysuria, pollakiuria, hematuria, dribbling of urine, inappetence and vomition since 3 days. Animal was being fed diet containing rice and boiled meat for almost a year. Vaccination and deworming history was improper. Clinical examination revealed euthermia (100.8 ^{o}F), pink mucous membrane, normal capillary refill time, heart and respiratory rates. Physical examination revealed tensed abdomen attributed to distended urinary bladder.

Haematology revealed marked neutrophilic leukocytosis (Table. 1). Serum biochemistry revealed elevated levels of blood urea nitrogen (BUN), creatinine, alanine aminotransferase (ALT) and aspartate aminotransferase (AST) (Table 1). Urinalysis revealed marked proteinuria with increased bilirubin level and leukocyte count (Table 2). Direct microscopic examination of urine sediment showed presence of ammonium urate crystals (Fig. 1). Ultrasonography of caudal abdomen revealed moderately distended bladder, thickened urinary bladder (avg. wall thickness 0.6 cm) indicative of cystitis along with intraluminal hyperechoic structures with clear acoustic shadow indicative of cystoliths (Fig. 2). No uroliths could be seen in radiographic examination as urate crystals are radiolucent in nature but distension of bladder was appreciable (Fig. 3). Based on case history, clinical and laboratory examinations, it was diagnosed as a case of cystolithiasis.

Initially, the dog was stabilized by using inj. Enrofloxacin @ 10 mg/kg, IV, OD (based on antibiotic sensitive test), inj DNS+RL @ 30 ml/kg slow IV, inj. Pantoprazole 1 mg/kg, IV, SID, inj. Ondansetron @ 0.2 mg/kg, IV, BID, urinary alkalinizer (Syp. AlkasolTM 10 ml, PO, BID), hepatoprotectant (Syp. Sylibon TM 10 ml, PO, BID), renoprotectant (Tab. Nefrotec-DSTM 2 tabs, PO, BID) and multivitamin supplements for 3 days. After stabilizing the animal, the cystoliths were removed by cystotomy. Numerous urate stones of variable sizes were removed from the bladder (Fig. 4). Post-surgical management included Inj. Enrofloxacin @ 10 mg/kg, IV, OD, Inj. Meloxicam @ 0.2 mg/kg, IM, BID for 5 days.

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Table 1

Haemato-biochemical changes in dog with cystolithiasis on days 0 and 28 post- therapy

Parameter	Day 0	Day 28	Reference range*
Hematology			
Hemoglobin (g/dl)	12.5	12.1	12-19
PCV (%)	35.1	35.6	35-57
RBC count (millions/mm^3)	5.82	5.95	5.0-7.9
Total WBC count (x 10^3 cells/mm^3)	27.36	13.25	5.0-14.1
Neutrophils (%)	86	69	58-85
Lymphocyte (%)	09	22	8-21
Monocytes (%)	03	06	2-10
Eosinophils (%)	02	02	0-9
Basophils (%)	00	01	0-1
Platelets (lakhs/mm^3)	2.86	2.78	2.11-6.21
Serum biochemistry			
Albumin (g/dl)	2.54	2.9	2.3-3.1
Globulin (g/dl)	3.0	3.3	2.4-4.4
A:G ratio	0.846	0.878	0.6-1.3
ALT (U/L)	172	47	10-109
AST (U/L)	108	19	13-15
BUN (mg/dl)	41.4	21.6	8-28
Creatinine (mg/dl)	1.95	1.14	0.5-1.7

Table 2

Qualitative analysis of urine in dog with cystolithiasis on days 0 and 28 post- therapy

Parameter	Day 0	Day 28
Urobilinogen	+	Nil
Bilirubin	+	Nil
Protein	++	Trace
Leukocytes	++	Nil
Ketone	Nil	Nil
Nitrite	Nil	Nil
Glucose	Nil	Nil
Specific gravity	1.025	1.005
pH	6.0	7.5

Oral hepatoprotectant, renoprotectant, urinary alkalinizer, multivitamins and essential amino acids were continued for next 4 weeks. The owner was advised to keep the dog on Hill's™ Prescription Diet™ u/d™ Canine for a period of minimum of 4 weeks. Animal made an uneventful recovery after post-surgical management and thereafter the case was followed up to 3 months without recurrence. The present case report describes occurrence and successful management of cystolithiasis in a seven-year-old male Golden Retriever dog. Urate uroliths belonging to purine family are the third most commonly occuring uroliths in dogs. Urate calculi can be associated with upper urinary tract bacterial infections and signs like pollakiuria, dysuria and hematuria are commonly present due to blockade of urinary tract (Nelson and Couto, 2014). Neutrophilic leukocytosis noticed in the present case may be due to presence of bacterial infection. Culture of the urine revealed presence of multi drug resistant *Escherichia coli* as the predominant organism. In the present case, it was evident that the dog was having hepatic dysfunction as suggested by increased liver specific enzymes. In most of dog breeds and cats, urate uroliths are predominantly associated with liver disorders (Paepe *et al.*, 2007).

Treatment for cystolithiasis may be either medical or surgical management. Medical management involves the dissolution of the crystals by altering urine pH, antilithiatic agents and supportive therapy. In the present case, medical management alone was unable to cure the condition because of the number and size of the cystoliths. Hence, cystotomy was advised.

CONCLUSION

Confirmative diagnosis of cystolithiasis was done by microscopic and macroscopic urine examination, radiography and ultrasonography. Surgical management

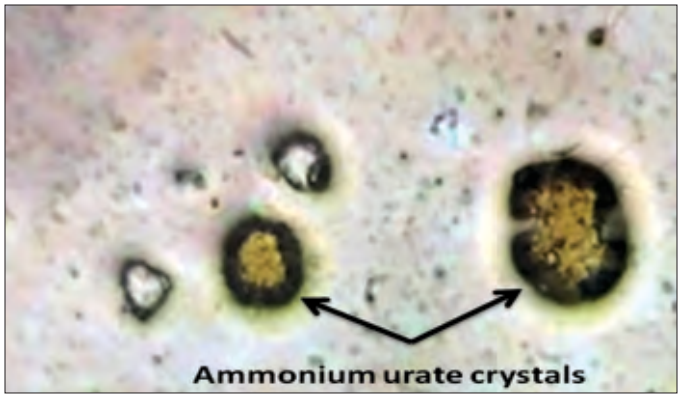

Fig. 1. Microscopic examination of urine sediment depicting urate crystals

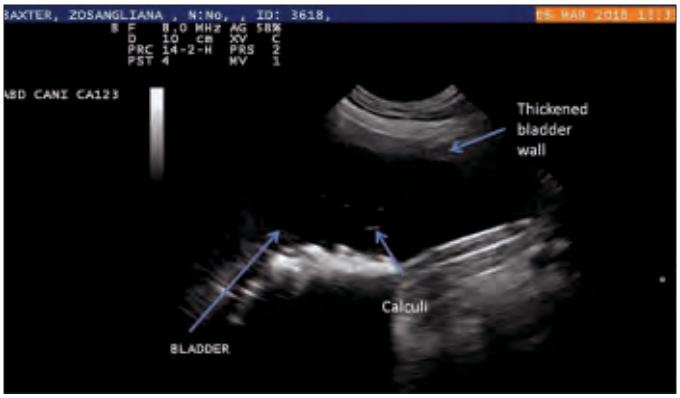

Fig. 2. Ultrasonography of abdomen revealing thickened urinary bladder wall (cystitis) along with presence of hyperechoic structures with clear acoustic shadow indicative of cystoliths

Fig. 3. Lateral radiographic view of caudal abdomen revealing distension of urinary bladder

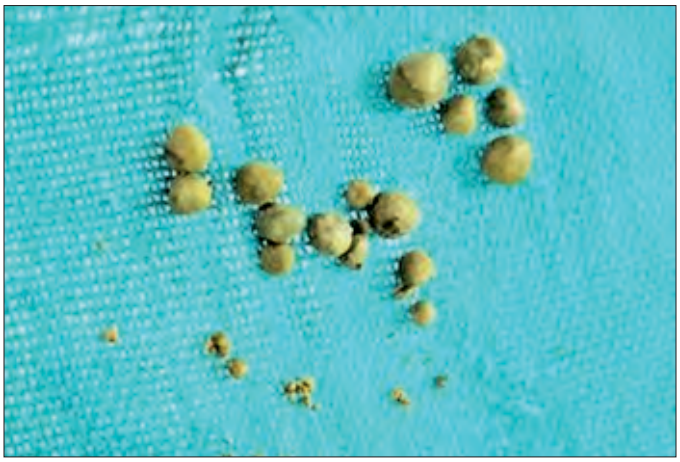

Fig. 4. Cystoliths of variable sizes recovered after cystotomy

was recommended as the calculi were numerous in numbers and of bigger in size.

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Conflicts of interest

The authors declare no conflicts of interest.

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