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Diagnosis and management of cystic calculi in a pug

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Abstract

Five-year-old male pug dog with a month-long history of dribbling of urine, anorexia, dehydration, and abdominal pain was comprehensively examined. Radiography and abdominal ultrasonography, identified condition as urinary bladder calculi. Urine analysis suggested urolith type and bacterial infection involvement. A large struvite calculus was removed from the bladder through cystotomy. The dog was placed on a modified diet and the dog had uneventful recovery with no recurrence in 3 months period.

Keywords: Cystotomy, Radiography, Struvite, Ultrasonography

Canine Urolithiasis is a commonly encountered condition in canine practice. Among all types of uroliths, struvite (magnesium ammonium phosphate) urolith is one of the most frequently reported canine urolith followed by calcium oxalate (Kopecny *et al.*, 2021). The present presents successful management of struvite cystic calculi in a pug.

A five-year-old intact male pug experiencing urinary incontinence, haematuria, abnormal urination, and restlessness was presented at Kothari Veterinary Hospital, DUVASU, Mathura. Clinical, haematobiochemical, radiographic, ultrasonographic examinations and urinalysis were carried out. Clinical examination revealed elevated heart rate (140 beats per minute), an increased rectal temperature (105°F), and severe dehydration. Increased haematocrit and leukocytosis with neutrophilia was appreciated. Radiography confirmed the presence of radiopaque structures in the urinary bladder (Fig. 1). Ultrasonography revealed a large hyperechoic urolith with an acoustic shadow (Fig.2). Urinalysis revealed numerous coffin-shaped struvite uroliths (Fig.4), leukocytes, blood, proteinuria, with a positive urine culture for *Staphylococcus spp.* infection (Fig. 5).

Pre-operative tramadol (@ 2 mg/kg slow IV) and ceftriaxone (@ 25mg/kg IV) were administered. Dog was premedicated with atropine sulphate (@ 0.04mg/kg I/M) and sedated with xylazine hydrochloride (@ 1mg/kg intramuscularly). Anaesthesia was induced using Ketamine (@ 5mg/kg intravenously) with diazepam (@ 0.25 mg/kg) and maintained with isoflurane (at 1.5-2.5%). The surgical site was aseptically prepared, cystotomy was done as per standard procedure and a large calculus was removed. Dog was administered with ceftriazone and pantaprozole for 7 days.

Fig 1: Radiograph: calculi

Fig. 2: Ultrasonogram: hyperechoic calculi

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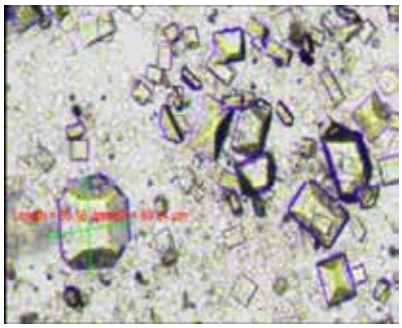

Struvite crystals- (40x)

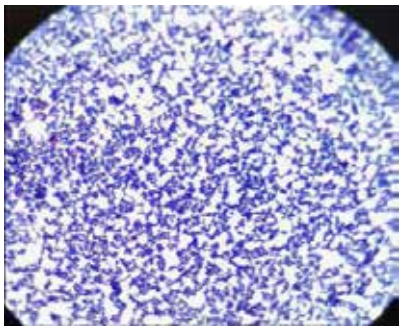

Fig. 5: Gram+ve cocci *Staphylococcus spp.*

Fig. 6: Urinary calculi retrieved from urinary bladder

Table 1: Haemato-biochemistry of the dog with cystic calculi

Sl.No	Parameters	Before treatment	After treatment
1.	Hb (gm%)	10.7	12
2.	RBC x 10^6/cm^3	3.68	4.12
3.	WBC cells/cm^3	15800	8300
4.	Polymorphs %	85	79
5.	Lymphocytes %	13	18
6.	Eosinophils %	01	01
7.	Monocytes %	01	01
8.	Basophils %	-	01
9.	Total Protein (g/dl)	5.8	6.5
10.	Albumin (g/dl)	3.8	4.2
11.	Ca/P ratio	2: 1.3	2:1
12.	BUN (mg)	90	22
13.	S. Creatinine(mg)	0.8	0.9
14.	ALT (U/L)	28	30
15.	AST(U/ L)	25	32

Urine analysis

a	Leucocytes cells/µl	175	110	i	ColourRed	Clear	
b	Protein g/dl	3.0	1.0	ii	RBC	Positive	-ve
c	pH	7.6	5.5	iii	Gram staining	Positive	-ve
d	Specific Gravity	1.015	1.09	iv	*Staphy. spp.*	Positive	-ve

Canine urolithiasis can be formed by multiple physiological and pathological processes (Osborne *et al*., 1999). Most of the canine uroliths are composed of triple phosphate such as magnesium ammonium phosphate hexahydrate and rarely with calcium carbonate. Bacterial infection itself increases the organic debris which serve as nidus for crystallization (Osborne *et al.,* 1999). In the present case, urinalysis revealed morphological characteristics of struvite calculi. Struvite are formed due to gram positive urease producing bacteria *Staphylococcus spp.* that causes recurrent cystitis. Increased total leukocyte count and

increased urinary bladder wall thickness in sonography are also suggestive of chronic cystitis. Post-surgery a balanced diet and high-water intake is important for prevention of calculi. Additionally, to modify urine pH, powder ammonium chloride@ 200 mg orally once a day for 3 days was introduced. A urinary tract protectant, Syrup- Neeri KFT, was prescribed @ 5 ml BID for 10 days. To provide antioxidant support, Tab Celin 500 mg OD along with Tab Vit. A 50000 IU OD was given for 10 days along with dietary modification.

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