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MANAGEMENT OF CYSTOLITHIASIS IN A 5-YEAR-OLD LHASA APSO BITCH: A CASE REPORT

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ABSTRACT

A 5-year-old Lhasa Apso bitch weighing 6 kg was brought to the BlueBlood Veterinary Clinic with chief complaints of hematuria, pollakiuria. Physical examination revealed a pinkish mucous membrane, normal capillary refill time, normal skin coat and a small hard mass on the pelvic region on palpation. Vital parameters were normal; however, the complete blood count revealed a moderate neutrophilic leukocytosis. Ultrasonography revealed a round hyperechoic object about 25 mm long in the urinary bladder and a radio-opaque structure in the urinary bladder in the radiograph. The condition was surgically managed and the cystolith was removed. The bitch was stabilized with post-surgical management.

Keywords: Cystolithiasis, Lhasa Apso, Urinary bladder, Calculi, Urolith

INTRODUCTION

Urolith are formed when urine becomes supersaturated with dissolved salts which precipitate to form smaller fine crystals [1,2]. These crystals, when not excreted may aggregate to a solid concentration known as calculi. When this occurs in the kidney, ureter, urinary bladder and urethra, it is termed urolithiasis which is a common disease condition in veterinary practice [3]. Specifically, the presence of urinary calculi in the urinary bladder is known as cystolithiasis and their removal is called cystolithotomy [4]. In canines, urolith are found in the urinary bladder and urethra. Struvite (magnesium ammonium phosphate) and calcium oxalate calculi are the most common canine uroliths, followed by urate, silicate, cystine, and mixed types [5,6]. Urolithiasis is an acute life-threatening emergency and most frequently obstructs the lower urinary tract in male dogs [7,8]. Urolithiasis may be caused by urease-producing bacteria (*Proteus mirabilis*, *Proteus vulgaris* and *Klebsiella* species) [9,10], nutritional deficiency and mineral imbalance with trace elements such as strontium [11]. Urine pH is one of the important factors which favours the formation of urinary calculi [12,13]. 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 [14].

The mineral deposits which form in the bladder of male dogs may get flushed out of the bladder with urine and lodge in the penis just behind the os penis which is the most commonly reported site of obstruction followed by the ischial arch in male dogs [15], but this is usually minimal in bitches due to the anatomy of the urinary tract which favours the excretion of small urinary calculi but might lead to irritation of the urinary tract. Diagnosis is usually through physical examination, clinical, ultrasonographic, radiological and microscopic examination of urine sediment [16]. The treatment approach for urolithiasis is through attempting retrograde urethral hydro propulsion for urethritis cases, followed by cystotomy [17,18], failing of which urethrotomy or urethrostomy is indicated [19]. Cystotomies are commonly performed in small animal practice, most often to remove cystic calculi [20].

Case history and Signalment

A 5-year-old Lhasa Apso bitch weighing 6 (six) kilograms was brought to the BlueBlood Veterinary Clinic with chief complaints of bloody

urine (hematuria) and increased frequency of urination (pollakiuria). Further history revealed that the symptoms started three days before presentation to the clinic. Also, the bitch was housed mostly indoors with other dogs.

Clinical examination: On physical examination, the bitch presented a pinkish (normal) mucous membrane, 2 (two) seconds capillary refill time, normal skin coat and a small hard mass felt on palpation of the pelvic region. The vital parameters were all normal at the temperature of 38.2^{0}C, pulse rate of 80 beats/minute and respiratory rate of 28 cycles/minute. The blood sample was collected to carry out a complete blood count (CBC), and abdominopelvic ultrasonography and abdominopelvic radiography were later carried out to visualize the structures felt on palpation around the pelvic region.

Laboratory findings: The complete blood count revealed a normal hemogram with neutrophilic leukocytosis. The white blood cell count was 22.58 10^3/uL (Reference range: 5.0 – 14.1) and neutrophil 18.52 (Reference range: 2.9-12.0) **(Table 1)**. The ultrasonography revealed a round hyperechoic object about 25 mm long in the urinary bladder (**Plate 1**). Also, the radiograph showed a radio-opaque structure in the urinary bladder (**Plate 2**).

Confirmatory diagnosis: The case presented was subsequently confirmed to be cystolithiasis, and the bitch was scheduled for surgery.

Surgical procedure: Cystotomy was carried out 3 (three) days later. A skin incision was made to access the abdominal muscles which were subsequently incised to access the abdominal cavity, and the urinary bladder was identified and isolated. The urinary bladder was incised and the cystolith was removed **(Plate 3 and Plate 4)**. The incised structures were sutured routinely. The surgical site was cleaned, and antiseptic spray was applied on the surface.

Post-surgical treatment included ceftriaxone (30 mg/kg IV o.d x 5/7), vitamin B-complex (0.1 ml/kg IM o.d x 3/7) and diclofenac sodium (2 mg/kg IM o.d x 3/7). The bitch recovered with no further symptoms of hematuria and pollakiuria.

Table 1: Complete Blood Count of Lhasa Apso bitch diagnosed of Cystolithiasis

Parameters	**Patient's values**	**Reference values***
Haemoglobin (g/dL)	14.8	11.9-18.9
Red Blood Cell count (10^6/uL)	7.02	4.95- 7.87
Packed Cell Volume (%)	44.25	35.00- 57.00
Mean Corpuscular Volume (fL)	66.00	66.00- 77.00
Mean Corpuscular haemoglobin Concentration (g/dL)	33.50	32.00- 36.30
White Blood Cells (10^3/uL)	22.58	5.00- 14.10
Lymphocytes (10^3/uL)	2.36	0.40- 2.90
Neutrophils (10^3/uL)	18.52	2.90-12.00
Monocytes (10^3/uL)	1.44	0.10- 1.40
Eosinophils (10^3/uL)	0.17	0.00- 1.30
Basophils (10^3/uL)	0.07	0.00- 1.30
Platelets count (10^3/uL)	302	211- 621

Source: MSD Veterinary Manual [21]

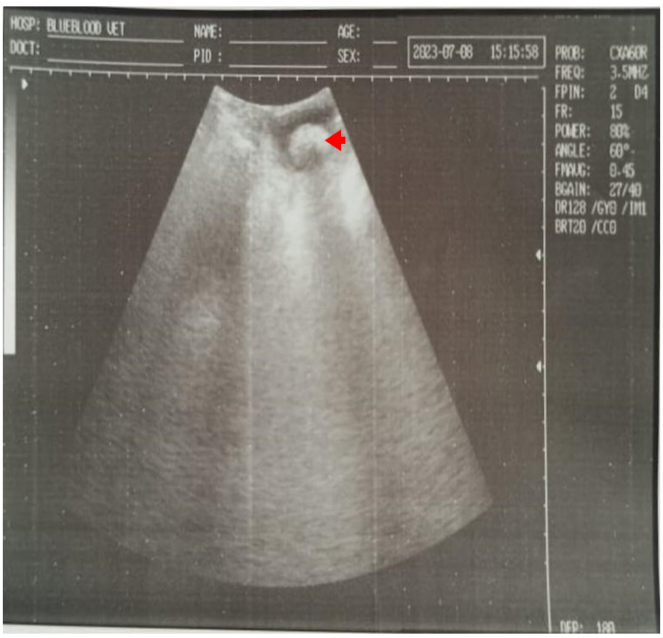

Plate 1: Abdominopelvic ultrasonography showing a round hyperechoic object of about 25 mm long in the urinary bladder (red arrowhead).

Plate 2: Abdominopelvic (left lateral) radiograph showing a radio-opaque structure (asterisk)

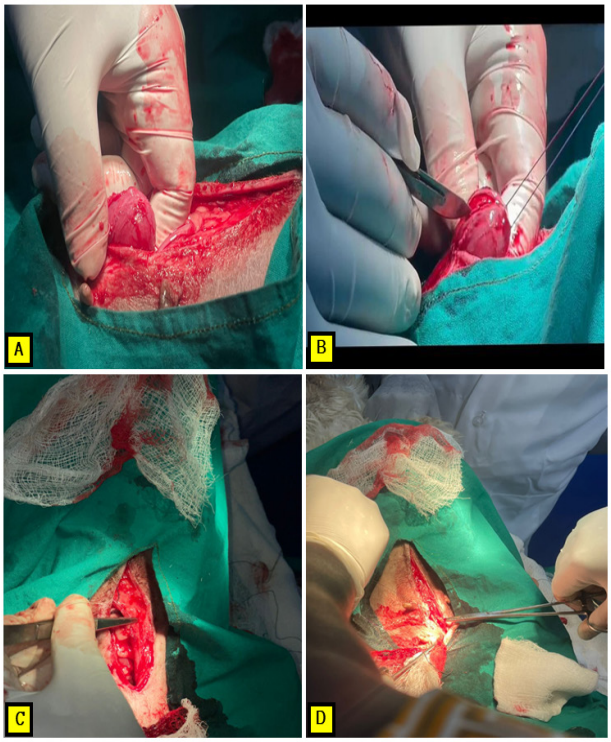

Plate 3: Surgical procedure for removal of cystolith; (A) identification and isolation of the urinary bladder; (B) incision into the urinary bladder to allow the removal of the cystolith; (C) suturing of the abdominal muscles and (D) suturing of the sub-cuticular layer.

Plate 4: The cystolith removed from the urinary bladder: A-before cleaning; B- after cleaning

DISCUSSION

The confirmatory diagnosis for urolithiasis is the presence of the urolith crystals in the urine which is usually observed using microscopy or with the use of laparoscopy [22,23]. Usually, cystolithiasis shows few symptoms such as difficulty or increase in the frequency of micturition and in some cases hematuria which was also observed in this case report [24]. The urine, usually not in large volume but in small volume, may be due to slight obstruction of the urinary tract and a sense of feeling that the urinary bladder is full due to the presence of urolith filling the urinary bladder. In this case, there was no effect of cystolithiasis on the complete blood count which had also been observed by Sarma and Kalita [25]. Although, we observed neutrophilic leukocytosis. Depending on the size and number of cystoliths in the urinary bladder, they might be palpable during physical examination of the pelvic region which was observed in this case. When not palpable, microscopic examination of the urine, ultrasonography and radiograph are the recommended methods of diagnosis. Depending on the location and size of the urolith, different treatment plans have been suggested. These include attempting retrograde urethral hydro propulsion for urethritis cases especially when it lodges close to the urethral

orifice and in few millimetres size (1 -5 mm), it is easier to be pushed back into the urinary bladder, followed by cystotomy [17]. But when the urolith ranges from 10-30 mm [26], urethrotomy or urethrostomy is usually indicated [19]. Since what was observed in the present case according to ultrasonography and radiographic imaging was about 25 mm, this suggests that the best intervention procedure in the present situation was to use cystotomy.

CONCLUSION

This case report showed the management of cystolithiasis through diagnosis, surgical intervention, and appropriate post-operative care. It underscored the importance of integrating clinical signs, diagnostic imaging, and laboratory findings to guide treatment options. While surgical intervention remains the mainstay for large uroliths, understanding the lethal implication of delayed intervention is quite relevant. Future management strategies should focus on stone composition analysis and long-term counter measures to prevent recurrence, including dietary modification and infection control.

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