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## Surgical treatment of cystic stones in 7 bitches

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### Abstract

A total of seven dogs of different age groups and breeds presented themselves at the BSDPHA an Hospital affiliated with Mumbai Veterinary College, Parel, Mumbai with history of blood in urine from 15 to 30 days. Clinically, the dogs were found to be lethargic, depressed and dehydrated. Abdominal palpation revealed a distended bladder and the same was seen on a lateral abdominal radiograph. The radiograph also revealed the presence of multiple radiopaque cystic calculi. Surgical correction, cystolithectomy, was performed through a caudal ventral mid-abdominal incision under general anesthesia. Stones measuring different sizes are removed. All dogs recovered without problems.

**Keywords:** Cystic stones, Cystotomy, Bitches

### Introduction

Urolithiasis (ie, a condition with urinary stones or uroliths in the organs of the urinary system) is one of the most common surgical conditions affecting the urinary system (Leidinger, 1999) [2]. It is considered the third most common disease of the lower urinary tract in dogs (Lulich *et al.*, 1992) [3]. The bladder (i.e., part of the upper urinary tract) and the urethra (i.e., part of the lower urinary tract) are the most common sites for stone/urolith deposits (see cystolith and urethrolith).

It is reported that cystolith formation has no correlation with the sex of the animal. The incidence of cystolith is more common in men than in women due to the long and narrow anatomical structure of the male urinary tract. In women, they are also formed as a result of a change in eating habits. However, obstruction is not noted because smaller stones can pass through a small and dilated passage, but larger stones remain in the bladder unnoticed for a long time in this animal. In this study, the surgical treatment of cystic stones in different age groups of seven bitches of different breeds was processed.

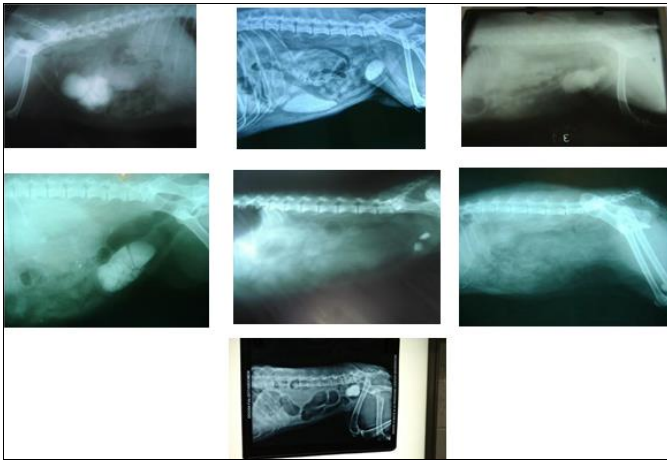
### History

A total of 7 bitches of various age groups and breeds were exhibited at Bai Sakrabai Petit Hospital for Animal's, Affiliated Animal Hospital of Mumbai Veterinary College, Parel, Mumbai with history of blood in urine for the last 15 – 30 days. To the physical examination, all bitches were dehydrated with a distended abdomen attributed to pain and a distended bladder. Clinical examination revealed a mildly elevated rectal temperature, heart rate, and respiratory rate. A radiograph of the lateral abdomen revealed a distended bladder occupying multiple Radiodense Calculus of various sizes (Figs. 1 – 7).

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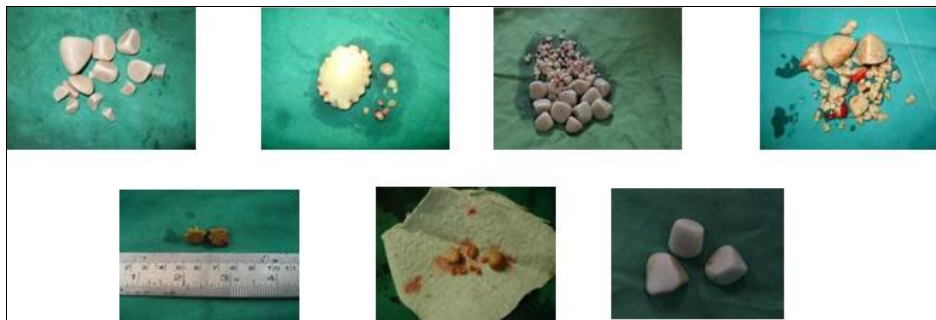


**Fig 1-7:** A radiograph of the lateral abdomen revealed a distended bladder occupying multiple Radiodense Calculus of various sizes

**Surgical Management**

Because the condition of the animals was low and anemic, 150 ml of Ringer's lactate and 150 ml of 5% dextrose were administered intravenously before surgery. The ventral abdomen was prepared for surgery and the animal was premedicated with atropine sulfate @ 0.04 mg/kg B.W. and followed by Inj. Triflupromazine @ 1 mg/kg B.W. intravenously. Inj. Propofol was administered at a dose of 4 mg/kg body weight. Intravenously, to induce general anesthesia and maintain inhalation anesthesia with isoflurane

(2-2.5%). The animals were placed in the dorsal position. The bladder was approached through a caudal midline incision just 1-2 inches behind the umbilicus. After opening the abdomen, the bladder was exteriorized and sterile gauze squares moistened with saline were used to pack the bladder to prevent urine from leaking into the abdominal cavity. After externalizing the bladder, a long incision was made on the dorsal wall of the less vascularized bladder and all stones were retrieved. A sterile female metal catheter was then inserted through the external urethral opening and normal saline was injected to flush out stones present in the urethra. All stones were removed through an incision in the bladder. In most cases, the exposed mucosa appeared slightly thickened and hyperemic. The cystotomy incision was closed with continuous layers of Cushing & Lambert sutures using #3-0 chrome catgut, and the abdominal incision was closed with #1-0 chrome catgut, and the skin was sutured with nylon in the usual fashion. After the operation, the animal was given Inj. Ceftriaxone @ 25 mg/kg body weight intravenously daily for five days, Inj. Meloxicam @ 0.2 mg/kg body weight intramuscularly for 3 days and oral Cystone tablets for one month. Antiseptic covering of the surgical wound was performed with povidone iodine daily for 10 days until the skin sutures were removed. The animals were kept on a low protein diet, adequate drinking water and minimal salt intake, which resulted in uneventful recovery and no recurrence of urinary stones, was reported during the 2-year follow-up period.



**Fig 8-14:** Macroscopic view of pedunculated squamous papilloma uvula.

**Discussion**

Urolithiasis is the medical term used for the presence of stones in the urinary tract. Gender is one of the risk factors that facilitate the development of urolithiasis in the urinary tract of domestic animals, therefore urolithiasis is more common in male than in female domestic animals (Tiruneh and Abdisa).

Urolith can be from struvite, oxalate, cysteine or urateurolithiasis. It is caused by calcium oxalate, cysteine (amino acid), etc. An unusual case of foreign body struvite urolithiasis, calcium oxalate urolithiasis, cysteine urolithiasis and urate urolithiasis are some types of urolithiasis. Struvite urolithiasis in dogs is commonly induced by infection of the urinary tract with urease-producing bacteria. Hypercalciuria is considered to be an important factor in its development.

Cystine is a non-essential sulfur-containing amino acid made up of 2 cysteine molecules joined by a disulfide bond. It is found in most high-protein foods, including pork, poultry, eggs and dairy products, as well as oats and wheat germ. Urateuroliths belong to the purine family and are the third most common type of urolith found in dogs and cats. Urateuroliths are also predominantly associated with liver disease, specifically portosystemic vascular anomalies. In

women, these do not cause obstruction and thus remain unnoticed in the bladder for a long time. The patient shows symptoms like haematuria, difficulty urinating and abdominal pain, etc., but they remain unnoticed by the owner. It is diagnosed only when the condition worsens or as incidental findings.

**Struvite**

Struvite urolithiasis in dogs is commonly induced by infection of the urinary tract with urease-producing bacteria; however, other conditions that promote magnesium ammonium phosphate crystallization, such as alkaline urine, diet, and genetic predisposition, may be associated with struvite calculogenesis. Females have a higher incidence than males. Struviteuroliths can occur at any age and occur occasionally.

**Calcium Oxalate**

Hypercalciuria is thought to be an important factor in the formation of this urolith. Most affected dogs are normocalcemic. However, hypercalciuria may occur after hypercalcemia. Calcium oxalate uroliths cannot be dissolved. Calcium oxalate cystolithiasis can be ruled out by urinary tract hypertension or cystoscopy. molecular composition. It is

also found in protein foods such as pork, chicken, eggs, and dairy products such as oats and wheat.

**Cystine:** It is absorbed by the small intestine, freely filtered by the glomerulus, and then reabsorbed by active cells in the proximal tubule. Decreased tubular reabsorption of cystine causes cystinuria. Cystinuria (>75-125 mg cystine/g creatinine) is the most important and important factor in cystine urolithiasis, but it is not the only cause of cystine urolithiasis; cystine crystals in their urine; Unknown mechanism of cystine urolith formation. Cystine is mostly soluble in alkaline solutions, so cystine uroliths often form in acidic urine. Cystinuria can be diagnosed with the cyanide-nitroprusside test, but solutions containing ampicillin and sulfur in the urine may cause negative results. The stone family is the third most common urolith in dogs and cats. An autosomal recessive genetic trait of hyperuricosuria and susceptibility to urinary tract stones occurs in Dalmatians. In other breeds of dogs and cats, urinary stones are often associated with liver disease, especially vascular abnormalities. Idiopathic urolithiasis can also occur in animals without liver disease. Ammonium urinary tract stones are the most common. Urinary tract stones are designed for recreational use. Consuming protein and endogenous protein turnover are sources of purines, which are metabolized to hypoxanthine. Under the action of xanthine oxidase, hypoxanthine is converted into xanthine and uric acid.

**Urate:** Urateuroliths belong to the purine family of uroliths and are the third most common urolith type in dogs and cats. In Dalmatians, an autosomal recessive trait is responsible for hyperuricosuria and a predisposition to urateurolithiasis. In other breeds of dogs and cats, urateuroliths are predominantly associated with liver disease, specifically porto systemic vascular anomalies. Idiopathic urateuroliths may occur in animals without liver disease. Ammonium urateuroliths are most common. Urateuroliths are amenable to medical dissolution. Ingested protein and endogenous protein turnover are sources of purines, which are metabolized to hypoxanthine. Through the action of xanthine oxidase, hypoxanthine is converted to xanthine and uric acid.

### Conclusion

The surgical management described involved careful pre-operative preparation and anesthesia induction to ensure the safety of the animals. The ventral approach to the bladder allowed for effective access to the urinary tract. Upon exteriorizing the bladder, meticulous techniques were employed to retrieve all stones while minimizing the risk of contamination. Closure of the cystotomy incision with appropriate sutures and post-operative administration of antibiotics and pain management ensured proper healing and reduced the likelihood of complications. Additionally, dietary modifications and long-term monitoring contributed to the successful outcome, with no recurrence of urinary stones reported during the follow-up period. Overall, the comprehensive surgical approach combined with post-operative care facilitated the successful resolution of urolithiasis in the affected animals.

### Conflict of Interest

Not available

### Financial Support

Not available

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