



Incidence and Management of Cystic Calculi in Dogs in and Around Meerut

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A total of 54 animals of either sex with cystic calculi were prospectively studied. Most often the mature adult dogs aged between 3 to 10 years were affected and the juveniles (<1 year) were less commonly affected. Prevalence was maximal in extreme winter and summer. Cystic calculi were diagnosed either by radiography or ultrasonography. All the dogs were given urinary alkalizer and calculolytic drugs to dissolve the calculi and the dogs with urinary obstruction were treated surgically. Majority of the cases showed uneventful recovery.

Keywords: *Cystic calculi; cystotomy; calculolytic drugs; dogs; incidence; Meerut.*

1. INTRODUCTION

Cystic calculi (urinary bladder stones) are a common condition responsible for retention and

obstruction of urine in dogs. The formation of cystic calculi is generally associated with precipitation and crystal formation of a variety of minerals [1]. Though, it is a multifactorial disease

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[2]. The sequence of events that triggers stone formation is not fully understood. Less water and a high dietary intake of minerals and protein in association with highly concentrated urine may contribute to increased saturation of salts in the urine [3]. Disease conditions such as bacterial infections in the urinary tract can also increase urine salt concentration [4]. The understanding of incidence is important for the treatment and prevention of urinary stones in dogs. Surgery is the primary treatment of obstructive urolithiasis [5]. Surgical procedure of cystostomy together with medical dissolution of calculi is considered an effective technique for resolution of calculi in small animals [6]. Animals with prolonged obstruction have high morbidity due to subsequent uremia. Surgical management of such patients should be done very cautiously. In the present study, incidence, diagnosis, surgical and medical management of cystic calculi in 54 cases were reported.

2. MATERIALS AND METHODS

All the cases were treated and examined as per standard treatment and examination protocols so the ethical approval was not necessary for this study. A total of 54 apparently healthy dogs of either sex with complaint of dribbling of urine, urinary retention and urinary obstruction were prospectively studied (Table 1). These cases were presented to Veterinary Clinical Complex, College of Veterinary and Animal Sciences, SVPUA&T, Meerut, from the adjoining areas between the years 2018-2021. Physical examination was done to check the status of the urinary bladder. Further, radiography or ultrasonography was performed to establish the diagnosis (Fig. 1A and B). All the animals with urinary obstruction were treated surgically by cystostomy technique and animals with dribbling of urine were treated by urinary alkalizer and calculolytic drugs.

After the confirmation of calculi in urinary bladder, all the animals were aseptically prepared for surgery and administered general anesthesia as per the standard protocols. The surgical interventions were done by keeping dogs in dorsal recumbency. Intravenous infusion

of normal saline was maintained during surgery. A 5-6 cm-long caudal midline skin incision was given in females and a right paramedian skin incision lateral to the penis was given in males. Penis along with incised skin was retracted to the left lateral side till the midline was visualized followed by routine laparotomy. The distended urinary bladder was located and exteriorized (Fig. 2A). The urine in the bladder was removed by suction through a sterile syringe. Then, an incision was given on the dorsal aspect of the urinary bladder to reach the lumen. The lumen was searched for calculi/concretions and then the calculi were removed (Fig. 2B) and the lumen of the urinary bladder was flushed with normal saline. A sterile polyethylene catheter was passed from urinary bladder through urethra to check the urethral patency. If, the urethra was found obstructed, urethrotomy was also performed to remove concretions/calculi. A sterile polyethylene catheter (infant feeding tube) was passed from external urethral orifice to urinary bladder. The external end of catheter was kept fixed with preputial skin by stay sutures. Cystostomy, urethrotomy and laparotomy wounds were closed, dressed and protected in routine manner.

Postoperatively, amoxicillin-sulbactam antibiotic combination (15 mg/kg, IM) for 5 days, analgesic meloxicam (0.2 mg/kg, IM) for 3-5 days and antacid pantoprazole (1 mg/kg, PO) for 5 days were administered. The urethral catheter was removed on 8-12 days and skin sutures were removed after healing of the wounds generally on 12th day.

In animals with dribbling of urine and diagnosed with very fine concretions in the urinary bladder, a sterile polyethylene catheter (infant feeding tube) was passed to urinary bladder through urethra to dislodge and push back any concretions. Catheter was secured to preputial skin and urinary flow was maintained. After this maneuver, the affected animals were given urinary alkalizer disodium hydrogen citrate (Syp. Alkasol) and calculolytic drug (Tab. Cystone) as per their body weight till the cystic concretions were not seen ultrasonographically and the catheters were removed accordingly.

Table 1. Incidence of cystic calculi as per the age groups

S. No.	Age group	Group code	Number of cases
1.	Juvenile (<1 year)	J	06
2.	Young adult (1-3 years)	Y	15
3.	Mature adult (3-10 years)	M	26
4.	Geriatric (>10 years)	G	07
Total			54



Fig. 1. Radiographic (A) and ultrasonographic (B) diagnosis of cystic calculi in dogs

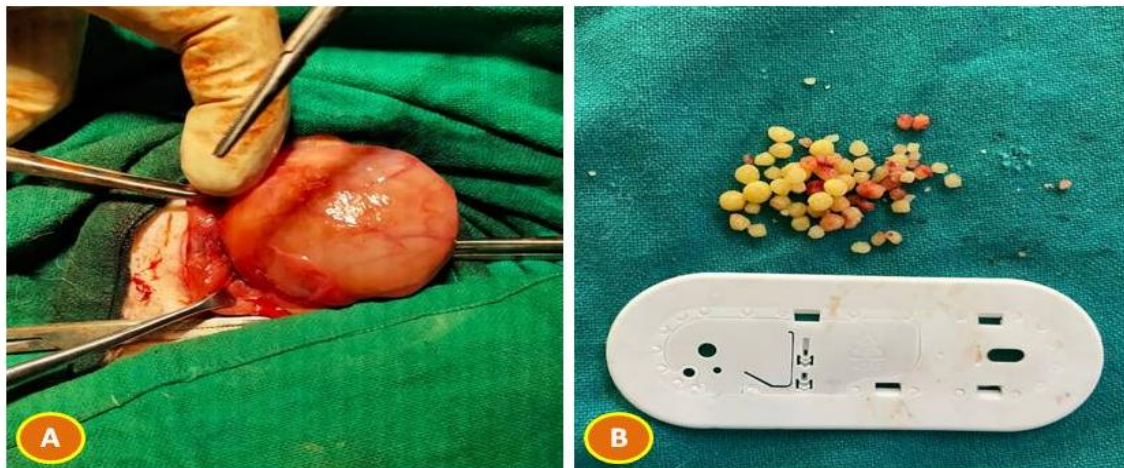


Fig. 2. Intra-operative view of exteriorization of urinary bladder (A) and removed calculi (B)

3. RESULTS AND DISCUSSION

Cases of cystic calculi were more prevalent in the extreme winter and summer. Mature adult dogs (3-10 years) 48% were most affected followed by young adult dogs (1-3 years) 28% and juvenile dogs (<1 year) 11% were least affected followed by geriatric dogs (>10 years) 13% (Fig. 3). Anesthesia, cystotomy and urethrotomy procedures along with catheterization of urinary bladder and fixation of external end of catheter with preputial skin were achieved without difficulties. Majority of the dogs showed uneventful recovery except few minor incidences of infection and pus formation at surgical sites.

Cystic calculi are a common problem in dogs [7] and seen mostly in extreme winter and summer [8]. This may be associated to less water intake

and more water losses during winter and summer, respectively. Diagnosis of cystic calculi can be made either by radiography or ultrasonography. Sometimes, diagnosis of the cystic calculi by radiography becomes difficult, if they are radiolucent [9] or very fine. By ultrasonography, radiolucent and very fine calculi/concretions can be diagnosed easily as hyperechoic structures showing acoustic shadowing below them. Acoustic shadowing distal to floating calculi/concretions was not seen. Similar findings were also reported by Verma et al. [10] and Dehmiwal et al. [11]. Surgery is the primary treatment for obstructive cystic calculi except very fine calculi/concretions which can be managed by urinary alkalizers and calculolytic drugs [12]. Nutritional management may reduce the occurrence of calculi formation significantly in the dogs.

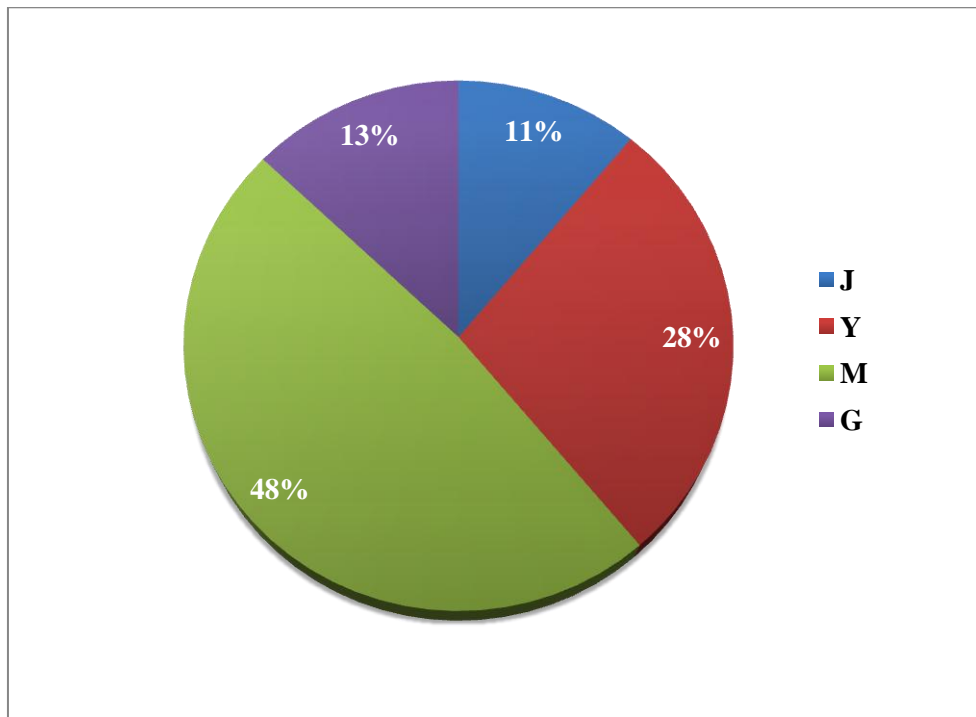


Fig. 3. Incidence of cystic calculi in different age groups

4. CONCLUSION

In this study, incidence of cystic calculi in dogs in and around Meerut was recorded. Such cases were managed by surgery and medicinal treatment effectively after diagnosing either by radiography or ultrasonography. Further, elaborative research is required on nutritional management to prevent the occurrence of the urolithiasis in dogs.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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