

PNEUMOCYSTOGRAPHY TECHNIQUE FOR DIAGNOSIS OF RADIOLUCENT UROLITHIASIS IN A DOG

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Introduction

Urolithiasis is reported to arise due to deposition of sediments in the urinary tract which may consist of one or more types of the poorly soluble crystalloids of urine. A wide variety of pathological conditions have been presumed to cause this clinical situation (Osborne *et al.*, 1996). Small sized calculi which may be numerous in number may pass out of the urinary system without any discomfort, but larger size uroliths which are most commonly found in bladder lead to obstruction of the urethral tract thereby causing the typical signs of obstructive urolithiasis (Ettinger and Feldman, 2000). The condition seems to be subclinical in most of the dogs and clinical evident situation comes only when the offending urinary stone causes obstruction anywhere in the urinary tract. The formation of urolith occurs over a long period of time when inorganic and organic urinary solutes get accumulated around a nidus (Lulich *et al.*, 1995). Numerous techniques have been reported for diagnosis of the urinary stones in small animals which include ultrasonography, conventional radiography and special radiographic procedures like positive, negative or double contrast radiography (Waldron, 2003) The present communication puts forth a clinical case of multiple urolith obstruction in a dog diagnosed by pneumocystography technique and its successful surgical management.

Case History

A 10 year old, dachshund male dog was presented with the history of intermittent urination since last 7 days with complete cessation of urination for last 12 hours. The animal was being treated by administration of broad spectrum antibiotics, nervine tonics and urinary alkalizer suspecting it to be a case of bladder atony. The clinical examination of the patient revealed elevated body temperature (103.6⁰F), heart rate (140 beats per min) and respiration rate (36 breaths per min). Upon palpation of the caudal abdomen region, an abnormally enlarged bladder could be

diagnosed. Based on clinical signs of the patient, a lateral radiograph was performed which revealed the absence of any radiopaque urolith anywhere in the urinary tract. Presuming it to be negative for presence of urolith, catheterization of urinary bladder was done and while evacuation of urine it was seen that numerous small crystals were coming out. Hence it was suspected that the urinary obstruction might have been due to presence of radiolucent uroliths. Thus, pneumocystography was carried out which revealed presence of numerous small sized stones lodged in the urinary bladder. Hence, it was planned for surgical removal of the urinary stones in bladder via cystotomy.

Surgical treatment

Premedication of the patient was carried out using atropine @ 0.04mg/kg IM followed 10 minutes later by xylazine @ 1 mg/kg IM. Induction of anaesthesia was carried out with ketamine @ 10 mg/kg IV followed by administration of incremental doses as and when needed during the surgical procedure. With the animal was restrained in dorsal recumbency, cystotomy was performed at left paramedian site. Numerous uroliths which were felt to be lodged inside the bladder cavity were removed followed by retrograde urohydropulsion was using a polythene catheter to remove any other small sized calculi lodged inside the urethral tract. Cystotomy incision was closed in lembert pattern followed by abdominal muscle closure in simple continuous manner using catgut no. 1 while the skin incision was closed by application of horizontal mattress sutures using braided silk.

Postoperative antibiotic therapy with ceftriaxone @ 20mg/kg IM for 5 days while meloxicam @ 0.5mg/kg IM for 3 days was prescribed to the patient. Oral administration of urinary alkalizer (alkasol @10 ml twice daily) was also advised for 1 month. Topical application of povidone iodine and application of fly repellent spray around the suture site was carried out for 10 days. Skin sutures were removed 12th day postoperatively.

Discussion

Survey abdominal radiographs and/or ultrasonography is most commonly used techniques for diagnosis of urinary bladder stones in small animals (Fossum, 2003). However, for better visualization of the bladder, administration of contrast media which may be either negative, positive, or the combination of both (Kealy, 1979; Raw, 1986) may be carried out as these agents can more clearly define disease processes (Mendoza, 1987).

As negative contrast medium the use of air, nitrous oxide and carbon dioxide has been demonstrated by various workers and these agents do not cause irritation of the bladder mucosa (Herrtage and Dennis, 1987). These agents are radiolucent in nature and contrast with radiopaque wall of urinary bladder and hence, the bladder becomes visualized as a different organ from the surrounding viscera and filling defects (intrinsic as well as extrinsic) (Rhodes and Biery, 1967). However, fatal air embolization as a complication of pneumocystography in small animal patients has been also reported (Ackerman *et al.*, 1972; Zontine and Andrews, 1978).

Uroliths are most commonly seated in the bladder or os penis region in canine patients. Numerous methods have been employed with variable success rate for the management of these uroliths from the urinary tract which include medical dissolution, surgical removal and laser lithotripsy (Hoppe *et al.*, 1988; Lulich and Osborne, 1992; Adams and Lulich, 2006). In the present clinical case, cystotomy was performed in combination with retrograde urohydropulsion to rule out the chances of any remaining urolith anywhere in the lower urinary tract. This technique has been found to prevent chances of recurrence in dogs that have concurrent uroliths at various sites in the urinary tract (Grant *et al.*, 2010). However, even with the most effective methods of urolith removal, the possibility of recurrence of the condition exists and the rate of recurrence has been reported to be around 36% over a 1 year period (Lulich and Osborne, 1995). It was concluded that numerous small sized uroliths might have formed over a long period of time and these uroliths were radiolucent in nature for which they were not detected on conventional radiographic examination for which pneumocystography using air proved to be of diagnostic value without any complications.

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