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SURGICAL AND MEDICAL MANAGEMENT OF BILATERAL URETEROLITHIASIS IN A DWARF RABBIT

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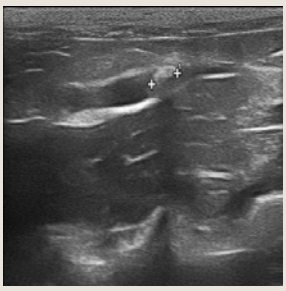
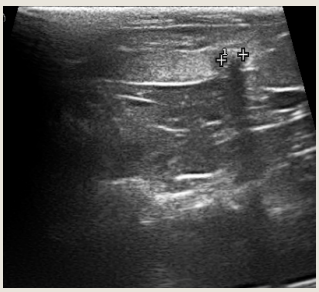
INTRODUCTION

The cause of urolithiasis in rabbit is not fully understood, but several factors are involved, including nutrition, anatomy, and rarely, infection[1]. In rabbit, calcium is absorbed in direct proportion to the amount ingested in the diet. When rabbits are fed a high-calcium diet, urinary calcium excretion increases, but urine volume remains constant, increasing the likelihood of crystal aggregation and stone formation[2].
Urolithiasis can be cystic, urethral, renal and ureteral. Clinical signs of urolithiasis include depression, anorexia, weight loss, lethargy, hematuria, anuria, stranguria, urine scald or it could be a subclinical disease[1]. The diagnosis is carried out by clinical signs, blood and urine analysis, radiographic and ultrasonographic examination. Uroliths obstructing the ureters may need surgery.

CASE HISTORY

A 2-year-old entire female dwarf rabbit was presented with a medical history of one-week depressed appetite, lethargy, disuria and abdominal pain. Clinical and laboratory findings with abdominal radiographic and ultrasonography (Fig.1, 2, 3) exams indicated a diagnosis of bilateral ureterolithiasis with partial ureteral obstruction and the presence of mineralized opacities within the renal pelvis of both kidneys. Results of a CBC were within reference limits, serum biochemical analysis revealed mildly increased creatinine concentration (2,7mg/dL; reference range, 0'5-2'5mg/dL), BUN (52,6mg/dL; reference range, 13-29mg/dL), Glucose (301'2mg/dL, reference range, 75-155mg/dL) and Calcium concentration (14'4mg/dL; reference range 5,6-12,5mg/dL). Urine grossly appeared turbid and pasty. Urinalysis by dipstick test revealed proteinuria (1+) and hematuria (1+). Crystaluria (calcium oxalate crystals) with no bacteria was observed by microscopic evaluation of the urine sample.





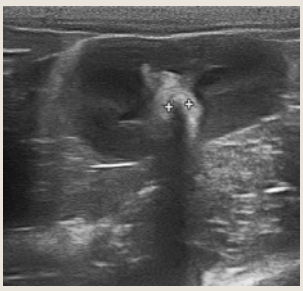


Fig.1: Ultrasonographic image of the right ureter. 10MHz, PD: 35mm. Notice the proximal ureteral dilatation and the hiperechoic structure with acoustic shadowing within.
Fig. 2: Left ureter. 10MHz, PD: 40mm. Notice sludge urine within ureter obstructed by hiperechoic structure.
Fig. 3 : Left kidney. 10MHz. Hiperechoic structure within renal pelvis.

The Rabbit was placed with intravenous fluids with 2'5% dextrose in lactated Ringer's solution (10ml/kg/h) and anaesthetised with dexmedetomidine (0'05mg/kg), ketamine (10mg/kg) and buprenorphine (0'02mg/kg) intramuscular. The rabbit was intubated with #3 cuffed endotracheal tube. Anesthesia was maintained with isofluorane (1%), and fentanil (2'5ug/kg/h) plus ketamine (0'3mg/kg/h) by constant rate IV infusion.
Bilateral ureterostomy was made with the aid of an operating microscope, and uroliths were removed. At surgery, both ureters were approached by midline celiotomy, an urolith was palpable in each ureter between the kidneys and urinary bladder. The peritoneum was incised over the ureters and uroliths were isolated by penrose tubing passed under the ureters (Fig.4). A longitudinal incision was made into the ureters wall at the level of uroliths. The uroliths were removed, and ureters were flushed with sterile saline solution. The ureteral incisions were closed in a simple continuous pattern, longitudinally, using 6-0 violet poliglecaprone monofilament. The ureter was then flushed with sterile saline in both directions to confirm patency. The abdomen and subcutaneous tissue were closed with 3-0 poliglecaprone monofilament in a simple continuous pattern (Fig.5). The skin was closed with a subcuticular suture with the same pattern and material.

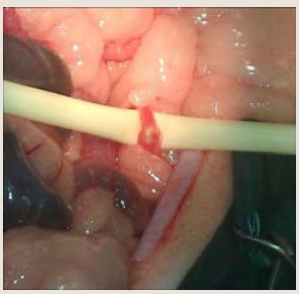


Fig. 4: Intraoperative image, midline approach. Notice the urolith within the ureteral lumen isolated by penrose tube.
Fig. 5: Ureteral incision closed in a simple longitudinally continuous pattern, 6-0 violet poliglecaprone monofilament.
Fig. 6: The ureter is flushed with sterile saline in both directions to confirm patency.

Post surgery management included parenteral fluids (3ml/kg/h lactated Ringer's solution) with fentanil (2'5 u/kg/h) plus ketamine (0'3 mg/kg/h) by constant rate IV infusion until the animal started eating.
Long term management included low calcium diet. Recovery was complicated by the occurrence of new uroliths**.** Ultrasonography controls showed they were not obstructing and they moved from the urinary bladder to outside. Potassium citrate was added (33mg/kg/8h Po). Assessment of serial serum calcium and potassium concentration, and ultrasonography studies were done and six months after surgery no longer urolith recurrence was observed.

DISCUSSION

Treatment of urolithiasis varies with stone location and severity of disease[3,4,5]. Ureterotomy may be performed for retrieval ureterolits when kidney damage is potentially reversible[3]. In the rabbit of the present report the bilateral ureteral obstructions where partially, and no signs of hydronephrosis or pyelonephrosis were observed by ultrasonography.
Previous reports of ureterotomy in the rabbit appear to be rare[4].This procedure is best performed with the aid of an operating microscope[3]. In our opinion the operating microscope is almost necessary in this microsurgical procedure.
Urolithiasis post surgical management in rabbit includes exercise and well balanced diet, with appropriate calcium concentration[1,4,5]. A diet comprising grass hay versus legume hay, a small portion of commercial pellets composed of timothy hay, fresh green vegetables, and fresh drinking water have been recommended[2,6]. Potassium citrate has been advocated in calcium stone prevention because of its capacity to bind calcium, reduce ion activity, and inhibit crystal formation[3,7], but the efficacy of this treatment was unclear. In the present case, long term management seems to be sufficient in the prevention of urolith recurrence.

CITATION INDEX

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