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S Kokila
Assistant Professor,
Department of Veterinary Surgery and Radiology,
Veterinary College and Research Institute, Tirunelveli,
TANUVAS, Tamil Nadu, India

M Bharathidasan
Assistant Professor,
Veterinary Clinical Complex,
Veterinary College and Research Institute, Tirunelveli,
TANUVAS, Tamil Nadu, India

S Dharmaceelan
Professor and Head,
Department of Veterinary Surgery and Radiology
Veterinary College and Research Institute, Tirunelveli,
TANUVAS, Tamil Nadu, India

Corresponding Author:
S Kokila
Assistant Professor,
Department of Veterinary Surgery and Radiology,
Veterinary College and Research Institute, Tirunelveli,
TANUVAS, Tamil Nadu, India

Surgical management of urolithiasis and unilateral cryptorchidism in a German shephard

S Kokila, M Bharathidasan and S Dharmaceelan

Abstract
A four year old male German shepherd weighing around 30kg was presented with the history of anuria for the past two days and dribbling urine for the past six months. Clinical examination of animal revealed congested mucous membrane, restlessness, ptyalism, distended painful abdomen, severely dehydrated and cryptorchid. Survey radiography revealed numerous cystic and urethral calculi. Attempt of lithohydropropulsion under Xylazine sedation was unsuccessful. Under general anaesthesia a mid ventral ceiliotomy performed. Exploration of abdominal cavity revealed uroabdomen, cystorrhexis. Calculi from the bladder was removed. Prescrotal urethrotomy was performed and caliculi removed from the penile urethra. The retained testicle in the abdomen was identified and removed. The testicle in the scrotal sac was removed by prescrotal method.

Keywords: Urolithiasis, cystotomy, prescrotal, urethrotomy, cryptorchidism

1. Introduction
Urolithiasis is the presence of urinary calculi in the kidney, ureter, bladder or urethra. There are various factors that influence the development of urolithiasis namely genetic predisposition, pH of the urine, concentration of the calculi constituents in the urine and the presence of bacterial infection (Lulich *et al.* 2011) [1]. Canine uroliths may be struvite, calcium oxalate, urate, silicate or cystine. Among the congenital anamolies of the reproductive system in mammals, Cryptorchidism is the most common defect caused by the failure of one or both testes to descent (Pinart *et al.* 1999) [2]. Cryptorchidism is highly heritable and is an expression of sex-limited autosomal recessive trait in dogs. The rate of incidence of cryptorchidism is found to be 0.8-9.7% in dogs.

2. Materials and Methods
A four year old male German Shepherd weighing around 30kg was presented to Veterinary Clinical Complex, Tirunelveli with the history of anuria, anorexia for the past two days and dribbling urine for the past six months, which was treated by a field Veterinarian. Clinical examination of animal revealed congested mucous membrane, moderately sunken eyeball, restlessness, ptyalism, distended painful abdomen, dehydration (7%) and cryptorchid. Survey radiography revealed numerous cystic and urethral caliculi at the level of penile urethra (fig 1). Lithohydropropulsion under Xylazine sedation was attempted, but it failed. Emergency surgery was advised to the owner. Whole blood was collected for hematology and serum biochemical analysis. Haemogram was performed by automated cell counter (3 part celenium junior, Trivitron). Serum biochemical values were measured spectrophotometrically with standard diagnostic kits (Trivitron) by using semi-automated bio chemical analyzer (Lab Mate).

3. Results and Discussion
Hematology and serum biochemical results (Table 1) revealed elevated levels of Blood urea nitrogen, Creatinine, ALP, Potassium and Phosphorus. Preoperative fluid therapy, cefotaxime @ 20 mg/kg body weight and Tramadol hydrochloride @ 2mg/kg analgesics were administered. Under Diazepam - Ketamine induction and maintainenance with Isoflurane at variable vapourizer settings, a mid ventral ceiliotomy was done extending from the umbilicus to the pubis. Exploration of abdominal cavity revealed uroabdomen (fig 2), cystorrhexis and diffused grey/yellow multi nodular foci on the parietal surface of the spleen. Serosanguinous fluid around 1000ml aspirated using suction.

Bladder wall was thickened and about four caliculi were removed (fig 3). Attempt of urohydropropulsion was again unsuccessful hence prescrotal urethrotomy was performed and about ten caliculi removed from the penile urethra (fig 4). Bladder and urethra was closed using PGA 3-0 in a simple interrupted pattern and an indwelling catheter was fixed with prepuce.

The retained testicle in the abdomen was identified and removed (fig 5). Abdomen was closed using polyamide-0. The testicle in the scrotal sac was removed by prescrotal method.

Post operative dressing for a week, oral antibiotic Tab. Cefotaxime for 5 days and Tramadol 50mg for two days was advised. To prevent recurrence of calculi, syrup Ammonium chloride, Cystone tablet and dietary management was advised to the owner. The peritoneal fluid analysis revealed serosanguinous coloured fluid with specific gravity of 1.030, pH 6, Protein 4g/dl, creatinine7.2 mg/dl. Increased level of creatinine in peritoneal fluid when compared with serum clearly indicates the presence of urine in the abdominal cavity due to rupture of bladder.

Among the various types of calculi, struvite and calcium oxalate are the most common uroliths recorded in dogs. In the present case, depending on the jack fruit shape of the calculi it was concluded as silicate calculi. Silica containing uroliths are rare in dogs ranging from 0.4 – 9.6%. The factors responsible for the formation of silicate uroliths are dietary intake of Silicates, silicic acid or Magnesium. Silicates are rich in soil, plants especially rice hull, soyabean hull, corn gluten. In this case the dog was kept on commercial diet which contained corn gluten. This may be the etiology for the formation of calculi combined with chronic UTI for the past 6 months which was not treated completely.

The study results of silica containing urinary calculi from 773 dogs [3] concluded that male German shepherd and Old English Sheepdogs are at high risk for formation of silicate calculi. This correlates with the present case.

The locations of silicate calculi were mostly seen in bladder and urethra (99%) [3] which is in accordance with our present case. In this case lithohydropropulsion failed may be because of the numerous jack fruit shaped calculi obstructing the urethra. The animal evinced severe pain during the lithohydropropulsion procedure, this may be due to the spine like projections present in the calculi (fig 6)

Recurrence rate of urolith formation is usually high. It can be prevented by increased water consumption, dietary change, urine alkalization and eradicating urinary tract infection. Foods containing moderate quantity of animal protein and lower quantity of plant products especially grains can minimize the recurrence of silicate urolith

The frequency of occurrence on cryptorchidism was found to be highest in Chihuahuas, Boxers, and German Shepherds, with incidence rate of 30.4, 20.6, and 14.0%, respectively [4]. Unilateral cryptorchidism results in morphological defects in spermatogonia and spermatocytes of testis leading to the change in size of the efferent ductule of the epididymis [5]. It also increases the proliferative activity of Sertoli cells resulting in sertoli cell tumor.

Table 1: Complete Blood Count

Parameters	Observed Value	Reference Value
Hemoglobin (g/dl)	16	12-18
PCV %	60	37-55
RBC (m/cmm)	8	5.5-8.5
WBC (thousands/cmm)	35500	5500-16000
Platelets lakhs/micro L	2.3	1.75-5
Neutrophils %	93	60-70
Lymphocyes %	6	12-30
Blood picture	Neutrophilia with left shift	
BUN (mg/dl)	140	10-28
Creatinine(mg/dl)	1	0.5-1.5
Total proteins(g/dl)	6	5.4-7.1
Albumin(g/dl)	4.1	3.9-4.9
ALT(U/L)	213	21-102
Phosphorous(mg/dl)	**7**	2.6-6.2
Potassium(mmol/dl)	7.32	4.3-5.3

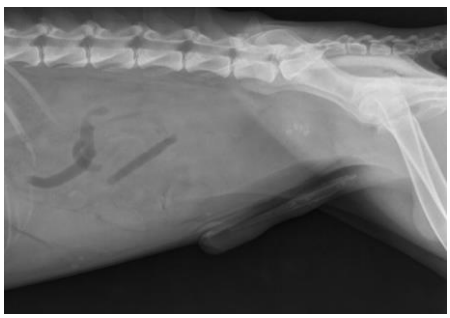

Fig 1: X ray - cystic and urethral calculi

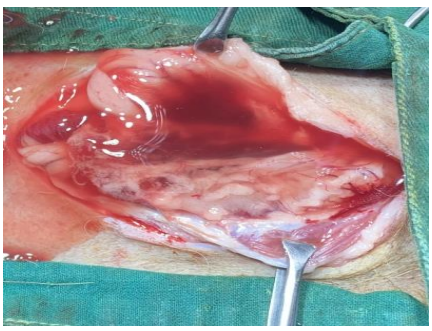

Fig 2: Uroabdomen

Fig 3: Calculi removed from the urinary bladder

Fig 4: Numerous calculi in the urethra

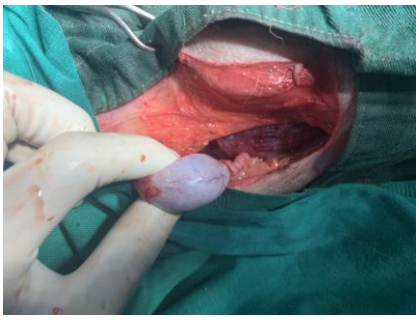

Fig 5: Retained testicle in the abdomen

Fig 6: Jack fruit shaped calculi

4. Conclusion

Surgical management of a chronic case of urolithiasis and unilateral cryptorchidism in a German Shepherd is reported.

5. Acknowledgement

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