

## **TUBE CYSTOSTOMY FOR MANAGEMENT OF STRUVITE UROLITHIASIS IN MALE GOATS: A REVIEW OF SIX CASES**

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**Abstract:** Six male goats suffering from urolithiasis were presented to University Veterinary Hospital Mannuthy, Kerala Veterinary and Animal Sciences University over a period of six months. All the animals had history of feeding pelleted cattle ration. Prior to presentation, they were initially managed by referring veterinarians by snipping the urethral process to cure the condition. One animal had ruptured bladder and five out of six cases were surgically managed by tube cystotomy using foley's catheter. Urinalysis and identification of calculi revealed struvite crystals in all cases. All the animals managed by surgery had uneventful recovery.

**Keywords:** Tube cystostomy, struvite urolithiasis, male goats.

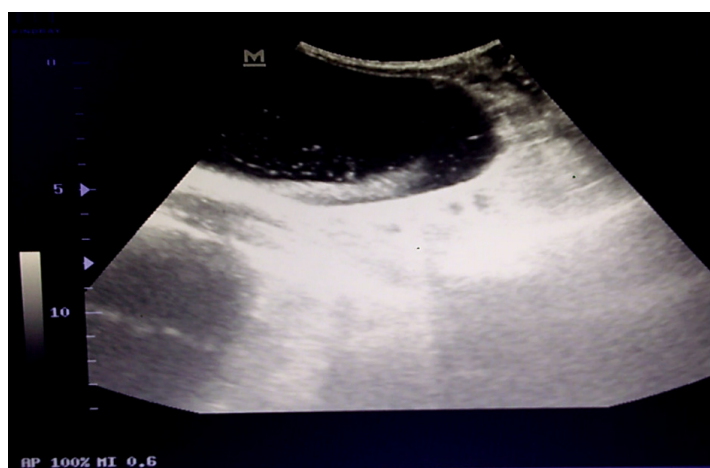
### **INTRODUCTION**

Obstructive urolithiasis is a complex condition affecting castrated and intact male goats. Partial or complete urinary obstructions are quite common among male kids and calves. The incidence is high in male kids compared to calves. Narrow urethral passage, presence of the sigmoid flexure and urethral process are some of the anatomical peculiarities that lead to higher incidence in male kids. Ruminants fed with rations high in phosphorus, such as cereal grains, commonly develop struvite (magnesium ammonium phosphate) calculi. High dietary phosphorus levels increases phosphate ion in the urine of lambs because calcium opposes phosphate absorption, and therefore the urinary phosphate is increased if the dietary calcium : phosphorus ratio is low that is less than 1.5:1 (Bushman *et al.*, 1965). Castration at an early age also has a role in the development of urolithiasis as it leads to hypoplasia of the penis and urethra (Tamilman *et al.*, 2014)

### **MATERIALS AND METHODS**

Six male goats suffering from urolithiasis were referred to University Veterinary Hospital Mannuthy of KVASU over a period of six months (Table-1). All the animals were presented with history of not passing urine 1-2 days prior to day of presentation and treatment was

attempted by the referring Veterinarians by snipping of urethral process. One animal was presented with ruptured bladder. Anamnesis revealed stall feeding in all the animals with pelleted cattle feed. All the animals had anorexia and lethargy and the one with ruptured bladder showed symptoms of uroperitoneum. Plain radiography of abdomen was not diagnostic in all cases to identify presence of calculi. On ultrasonography movement of hyperechoic calculi in the distended hypoechoic bladder could be observed in five cases on simultaneous succussion of abdomen (Fig.1). Evaluation of peritoneal fluid revealed elevated creatinine level of 6.7mg/dL in one case of bladder rupture. Hematological evaluation revealed low Hb concentration of 3 g % and reduction in RBC count of  $6 \times 10^6/\mu\text{L}$  in one case where as significant changes were not observed in other 5 animals. Urinalysis showed alkaline pH of 7-9 in all cases. Struvite crystals were identified by urine examination.



**Fig.1:** Ultrasonographic appearance of the bladder showing hyperechoic stones as white spots against hypoechoic bladder wall

### Surgical Technique

All the animals were sedated using Xylazine Hydrochloride @ 0.1 mg / kg body weight followed by inverted “L” block using 2 % Lignocaine Hydrochloride. Left lower flank region was prepared for aseptic surgery. An oblique lower flank laparotomy incision on the left side of the animal was done to enter the abdominal cavity. A 2cm incision was made on the craniodorsal aspect of the bladder for lavage and suction to remove urine and calculi which was having white colour and rice powder consistency. A stab incision was made in the abdominal wall 2 cm lateral to the oblique incision and a 12 french Foley catheter was passed through the stab incision and placed in the bladder lumen through a separate nick incision on the dorsal wall of the bladder away from the previous incision site which was closed in Cushings followed by Lemberts suture pattern with 2-0 chromic catgut. The balloon of the

catheter was inflated using normal saline, and drawn against the bladder wall. The stab incision in the bladder wall was reinforced with a purse-string suture with 2-0 chromic catgut (Fig.2). The laparotomy incision was closed in two layers, and the free ends of Foley catheter was fixed to the skin with sutures at multiple sites to protect it from being pulled out (Fig.3). In one animal with ruptured bladder, cystorrhaphy was performed and Foleys catheter was fixed, but the animal collapsed and succumbed to death on the day of surgery.

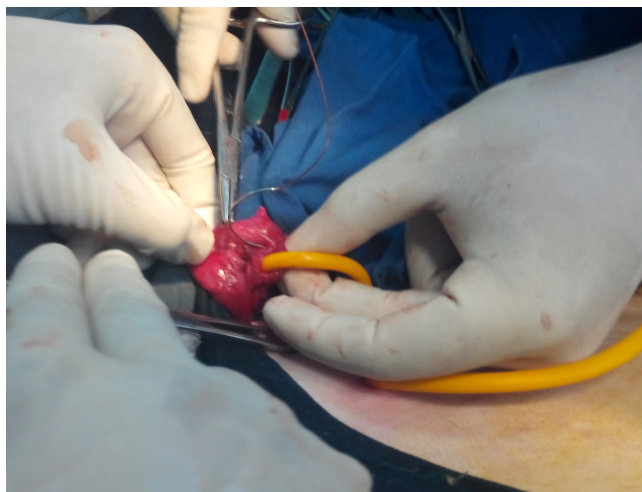


Fig.2: foleys catheter insitu



Fig.3: Animal with catheter.

Post operatively the animals were administered with tetanus toxoid, inj. Dicyclomine 10 mg and inj. Streptopenicillin @ 2500 IU/ kg bodyweight intramuscularly as antibiotic for 5 days. Oral administration of ammonium chloride @ 200mg/ kg bodyweight daily for a period of two weeks along with Vitamin C (ascorbic acid) @ 10 mg/ kg bodyweight were advised. Bladder was flushed with inj. Metronidazole and 1% boric acid solution for three days post operatively. Urine output and pH were monitored at weekly intervals.

## RESULTS AND DISCUSSION

**Table 1:** Details of the cases of urolithiasis presented and outcome after management

SL No	Age in months	Sex	Castrated / Uncastrated	Post operative	Urine pH
1	8	M	Un- Castrated	Uneventful recovery	8
2	12	M	Un-Castrated	Uneventful recovery	8
3	11	M	Castrated	Bladder ruptured with uroperitoneum, animal collapsed.	
4	15	M	Un- Castrated	Uneventful recovery	9
5	10	M	Un- Castrated	Uneventful recovery	9
6	8	M	Un-Castrated	Uneventful recovery	8

Urethral patency in all cases except the one with cystorrhhexis were observed as urine started dripping from the prepuce by 2<sup>nd</sup> post operative week. Folley's catheter was removed on the third post operative week. Cystitis occurred in 2 out of 5 animals which were managed by extended course of antibiotic for five more days. Struvite crystals were identified in all cases using Fourier Transform Infrared Spectroscopy. Administration of ammonium chloride @ 200mg/ kg bodyweight and Vit-C (ascorbic acid) @ 10 mg/ kg bodyweight orally could reduce the average urine pH from 9 to 6.5. All the presented animals were brought from dry areas with water scarcity and provision for ad libitum water was not practiced. Complete uneventful recovery was noticed in 4 out of six cases whereas the one with bladder rupture succumbed to death and one case showed recurrence of calculi after three months of surgery.

Feeding small ruminants with dairy cattle ration has been found to induce urolithiasis (Corbera *et al.*, 2007). Castration at an early age also has a role in the development of the condition as it leads to hypoplasia of the penis and urethra (Tamilman *et al.*, 2014). Tube cystostomy is a treatment option if breeding ability is to be maintained in a ruminant with urethral rupture, as urethral flushing is ineffective in such cases (Rakestraw *et al.*, 1995). Tube cystostomy can also be performed in animals with bladder rupture. Antibiotics and weak acid solutions, infused directly into the bladder via the Foley catheter, was found to be highly effective to control cystitis and facilitate calculus dissolution. Maintenance of a total ration calcium to phosphorus ratio of 2:1 limit phosphatic urolithiasis (Chigerwe *et al.*, 2016). In some cases, severe post-obstruction diuresis may occur, requiring aggressive intravenous fluid therapy to maintain hydration and electrolyte balance (Van Metre and Smith., 1991).

Urethral rupture and tube blockage are the two important post operative complications encountered in tube cystostomy (Gugjoo *et al.*, 2014) and such complications were not observed in the present study.

## CONCLUSION

Obstructive urolithiasis is a common surgical emergency encountered in young male goats. Feeding and management practises have an important role in the development of the condition. Tube cystostomy along with urinary acidifiers, antibiotics and antispasmodics were found to be effective for the surgical management of majority of cases reported in this study.

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