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## Management of obstructive urolithiasis in small ruminants

**Shivaraju E, Suresh L, BN Nagaraja, V Mahesh and A Sahadev**

### Abstract

The present study was planned to evaluate the efficacy of tube cystostomy with and without urinary acidifier for the management of obstructive urolithiasis in small ruminants. This clinical study was carried out on 12 clinical cases of small ruminants presented with the complaint of urinary retention. Based on the history and clinical examination, the cases were diagnosed and grouped to treat them with tube cystostomy followed by postoperative supplementation of ammonium chloride orally as a urinary acidifier in group A, and in group B tube cystostomy without any urinary acidifier. Preoperatively retrograde urethrography using urografin as contrast agent helped to know the site of obstruction and ultrasonography helped in confirmatory diagnosis of urolithiasis. All the cases showed uneventful recovery in both the groups. Postoperative supplementation of ammonium chloride helped in acidification of urine and augmented the dissolution of calculi with higher recovery rate and lesser postoperative complications in group A.

**Keywords:** Tube cystostomy, retrograde urethrography, ammonium chloride

### Introduction

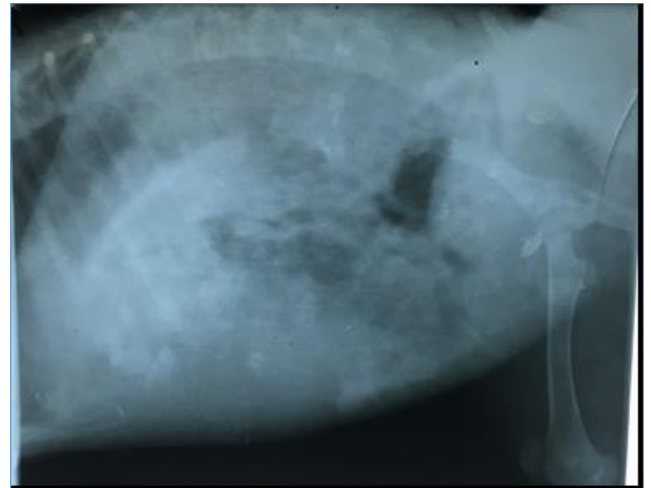
Small ruminants are largely reared by poor farmers, with only a few organised farms operating under government schemes. Urinary retention and obstruction is the second major cause of death of rams and bucks after respiratory diseases, resulting in significant financial losses for the farmer. In India, overall incidence of urolithiasis in animals was found to be 5.04 percent out of which highest incidence was recorded in goats 49.83 percent followed by cattle 32.87 percent, dogs 14.53 percent, horses 1.38 percent, sheep 1.04 percent and cats 0.34 percent (Amarpal *et al.*, 2004) [4]. Various workers have devised different treatment approaches to treat this condition and many preventative strategies have been tried. Despite all of these efforts, the survival rate of the affected animals has remained unacceptably low. Tube cystostomy has become more popular method of treatment for obstructive urolithiasis with subsequent dissolution of calculi in small ruminants (Streeter *et al.*, 2001; Ewoldt *et al.*, 2006 and Van Metre and Fubini, 2006) [2, 10, 13]. This technique is relatively less expensive, simple, quick and requires short duration of anaesthesia and results in restoration of complete urethral patency in successful cases (Van Metre and Fubini, 2006) [13]. Several urinary acidifiers like ammonium chloride and ammonium sulphate have been used to decrease the urinary pH and to control the struvite uroliths. Early researchers explored the prophylactic action of ammonium chloride in the prevention of uroliths since it is a popular, inexpensive, and conveniently available urine acidifier (Senthilkumar *et al.*, 2001) [7]. Dissolution of calculi has also been found effective by oral administration of ammonium chloride (Singh, 2005) [9]. Considering this scenario, particularly in urban areas where small ruminants are mainly raised for meat purpose management of urolithiasis is utmost necessary. In view of the above facts the study was carried out to compare the efficacy of tube cystostomy with and without urinary acidifier for the management of obstructive urolithiasis in small ruminants.

### Materials and Methods

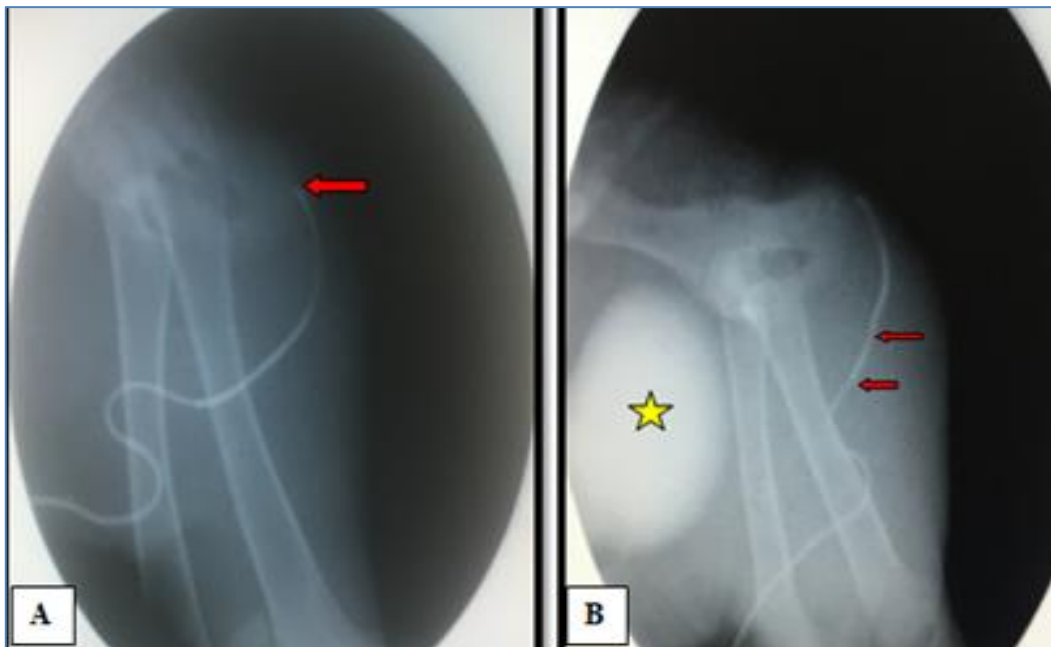
The present study was carried out on the twelve clinical cases of small ruminants suffering from obstructive urolithiasis presented to the Department of Veterinary Surgery and Radiology, Veterinary College, Hebbal, Bangalore, from December 2020 to December 2021. Based on the history and clinical examination, the cases were diagnosed and grouped to treat them with tube cystostomy followed by postoperative supplementation of ammonium chloride orally as a urinary acidifier in group A, and in group B tube cystostomy without any urinary acidifier. Survey radiographs (Fig.1) and contrast radiographs (Fig.2) using Urografin as a

contrast agent was performed to identify the site of obstruction and ultrasonography (Fig.3) was used to differentiate the intact bladder and the ruptured bladder. Haemato-biochemical analysis was done to investigate the fluid and electrolyte disturbances and the same were corrected by Intravenous fluid therapy. All the animals were prepared aseptically and urethral process amputation was performed. Anesthesia was achieved by linear infiltration of 2% lignocaine hydrochloride over the operative site just dorsal to the rudimentary teat (Fig.4). A 3–4 cm long skin incision was made about 2 cm lateral and parallel to the penile urethra in the left prepubic region. After opening the abdomen, urinary bladder was identified and Foley’s catheter was inserted via subcutaneous tunnel (Fig.5). In animals with rupture of urinary bladder, cystorrhaphy was performed and then catheter was inserted. Laparotomy incision was closed by standard procedure. Dribbling of urine noticed via Foley’s catheter (Fig.6). Postoperatively all the animals were treated with meloxicam at 0.2 mg/kg body weight as anti-inflammatory and ceftriaxone at 10 mg/kg as antibiotic for 3 and 5 days respectively. Animals of group A were treated with ammonium chloride at 200 mg/kg body weight orally for 30

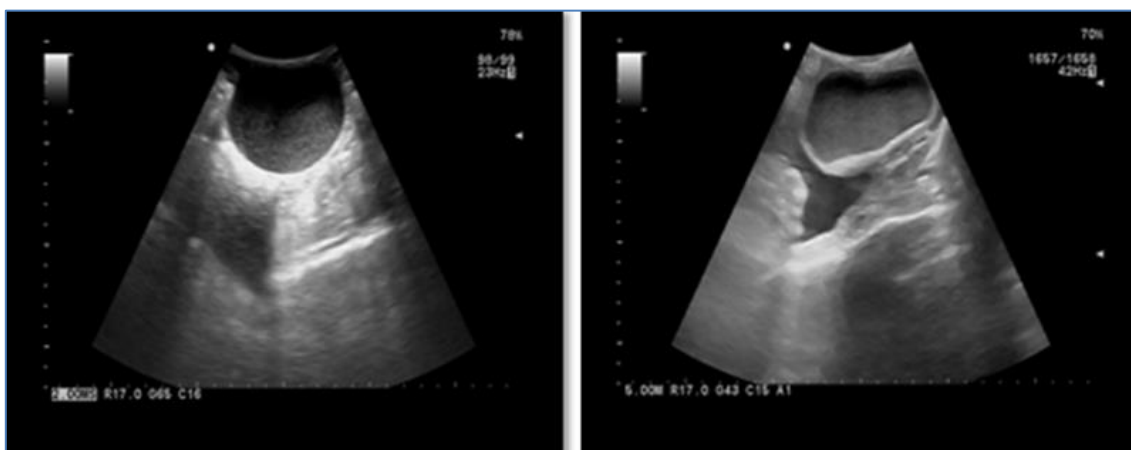
days as urinary acidifier.



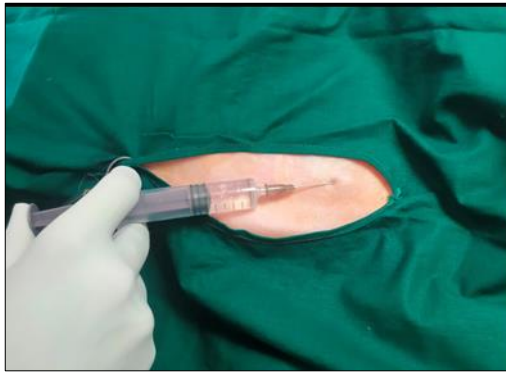
**Fig 1:** Plain radiograph showing distended urinary bladder



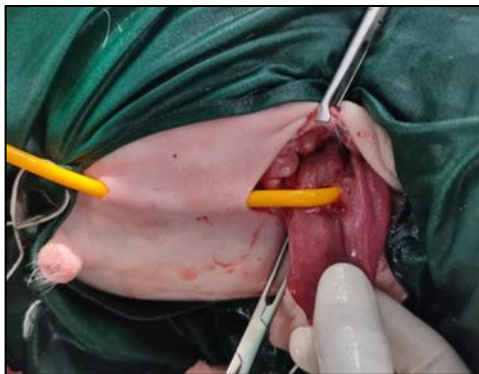
**Fig 2:** A. Retrograde urethrography in animal with complete obstruction B. Incomplete obstruction with seepage of contrast material into bladder



**Fig 3:** A. Intact urinary bladder B. Ruptured urinary bladder



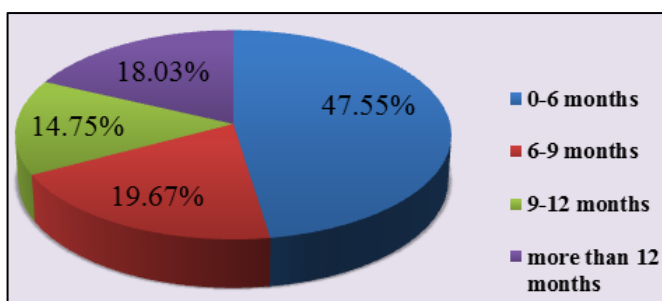
**Fig 4:** Linear infiltration anesthesia using 2% lignocaine hydrochloride for tube cystostomy



**Fig 5:** Foley's catheter inserted into the bladder



**Fig 6:** Postoperative image of Ram standing with dribbling urine via Foley's catheter



**Fig 7:** Age wise occurrence of urolithiasis in small ruminants

**Results and Discussion**

In the present study maximum number of obstructive urolithiasis cases were reported in the summer season followed by rainy season and winter season. The age-wise prevalence of urinary obstruction in the present study revealed

higher occurrence in the age group of less than 6 months (47.55%), followed by 6 to 9 months (19.67%), more than 12 months (18.03%) and least occurrence was recorded in age group of 9 to 12 months (14.75%) (Fig.7). Singh *et al.* (2014)<sup>[8]</sup> reported higher incidence of urolithiasis in the age group of 1 to 5 months (87.43%) and Sarker *et al.* (2020)<sup>[6]</sup> reported, in indigenous goats higher occurrence of obstructive urolithiasis was in age group of fewer than six months (63%). Similar findings were recorded by Kushawa *et al.* (2014)<sup>[4]</sup>, Tamilmahan *et al.* (2014)<sup>[12]</sup> and Sutradhar *et al.* (2018)<sup>[11]</sup>. 75.4 percent of the presented cases were uncastrated which might be due to animals were mainly reared for breeding purpose. 37.71 percent of the cases were reported within two days of illness which showed the symptoms like anuria, dysuria, stranguria, hematuria, frequent attempts to urinate, tail lifting, straining for urination and upon palpation distended bladder was observed and 62.29 percent of the cases were reported more than two days of illness which showed the signs like bilateral distension of abdomen, fluid thrill, sunken eye balls, pale mucous membranes, dehydration, Respiratory distress, discomfort and prolonged standing or short period of prolonged lateral recumbency. This may be because of failure to recognize the problem at an early stage, lack of awareness of treatment for urethral obstruction in owners, refusal of owners for surgical intervention in the early stages of urethral obstruction and preferring medical treatment. In contrast to the findings of present study Gugioo *et al.* (2013)<sup>[3]</sup> found the duration of retention was less than 3 days for about 93.90 % of goats. Urine flow was re-established in all the animals of both the groups A and B immediately after surgery through the Foley's catheter. In the groups A and B the dribbling of urine from the urethra was noticed on 6.17±1.30 and 7.67±1.28 days, respectively. The free flow of urine from the urethra in group A and B was observed on 11.5±3.53 and 16.33±3.72 days, respectively. The mean days of catheter removal in the groups A and B was 15.33±3.07 and 20.33±3.23 days, respectively. The free flow of urine through the external urethral orifice might be due to the reduction in inflammation, infection and urethral spasm by administration of antibiotics and anti-inflammatory drugs postoperatively in animals of group A and B. Administration of calculolytic agent like ammonium chloride per orally as urinary acidifier had helped in acidification of urine and augmented the dissolution of uroliths and controlled occlusion of the catheter helped in achieving patency of the normal urethra by flushing the urethra of debris and miliary sandy caliculus materials (Sutradhar *et al.*, 2018)<sup>[11]</sup>. The above findings were in accordance with the observations of Rakestraw *et al.* (1995)<sup>[5]</sup>, Ewoldt *et al.* (2006)<sup>[2]</sup>, Tamilmahan *et al.* (2014)<sup>[12]</sup> and Sarker *et al.* (2020)<sup>[6]</sup>.

**Conclusion**

In conclusion both the treatment regimen proved to be effective for the management of obstructive urolithiasis in small ruminants and the tube cystostomy followed with urinary acidifier (group A) was found to be superior with higher recovery rate and lesser postoperative complications as compared to tube cystostomy alone.

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