

Comparative evaluation of conventional and ultrasound assisted tube cystotomy for obstructive urolithiasis in cattle

P P SUDRIK¹, A H ULEMALE¹, R V SURYAWANSHI¹✉, V D AHER¹, S M AGIVALE¹ and V S DHAIGUDE¹

KNP College of Veterinary Science (MAFSU), Shirwal, district Satara, Maharashtra 412 801 India

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In cattle, obstructive urolithiasis continues to be a serious issue including both sexes equally; however, the occurrence is less common in females due to the short length and flexible lumen of the urethra (Radostits *et al.* 2000). Male ruminants are predisposed to obstructive urolithiasis due to a combination of morphological and dietary factors. Calculi in large animals close to the insertion of the retractor penis muscle in the distal sigmoid flexure causes reduction of urethral diameter (Ewoldt *et al.* 2008). The main contributors to stone formation are a diet high in phosphorus compared to calcium and a higher quantity of concentrate feeding (Amarpal *et al.* 2013). Common signs of urolithiasis include colic, repeatedly lying down and rising, straining, kicking at the belly. Long standing cases or cases of ruptured urinary bladder result in bilateral abdominal distension and perineal swelling in animals (Loretti *et al.* 2003). Ultrasonography technique is highly accurate and helps to diagnose the inflammatory condition of the urethra, the presence of calculi in the urinary tract and the condition of the bladder, whether it is ruptured or intact (Saharan *et al.* 2013).

Bovine urolithiasis is usually treated with post-scrotal urethrotomy and urethrostomy but these methods are associated with the formation of urethral strictures and a recurrence of the obstruction. The conventional method of tube cystotomy is an age-old technique in ruminants. However, tube cystotomy can be performed with the help of an ultrasonography by pierced bladder wall using a catheter-loaded metal rod, which is guided ultrasonographically unlike the conventional method (Niwas *et al.* 2021). Thus, the present study was undertaken to evaluate the efficacy of conventional vs ultrasound assisted tube cystotomy for management of obstructive urolithiasis in cattle. Twelve clinical cases of cattle with obstructive urolithiasis were randomly allotted two groups of six each, presented to Teaching Veterinary Hospital. The conventional tube cystotomy using a Foley's catheter was performed in group

I, while ultrasound assisted tube cystotomy in group II. These techniques were evaluated in terms of their clinical efficacy and post-operative complications.

All animals were subjected to a detailed anamnesis and signalment including age, sex, breed, duration of clinical illness, previous treatment if any, feed and water intake, and other relevant information. Animals from both groups were subjected to pre-medication with inj. Xylazine hydrochloride @0.05 mg/kg body weight intramuscularly and infiltration with 2% Lignocaine Hydrochloride at the surgical site. In group-I, animals were positioned in right lateral recumbency by making incision at the left paramedian site and making subcutaneous tunnel using a straight artery forcep towards the cranial side of the incision. A small nick was given over the skin at the tip of the artery forcep and then the jaws of the artery forcep were opened. The tip of Foley's catheter was grasped with artery forcep and passed through the subcutaneous tunnel with its pointed end towards the incision. After incising the fascia, muscles, and peritoneum, the bladder was identified. After checking the status and appearance of the bladder, a Foley's catheter was placed in bladder by inflating 25–30 ml of normal saline. In group-II animals, ultrasonography was performed by aiming to find a locus at which the urinary bladder lies very close to the body wall (Figs.1 and 2) without the interposition of internal tissue

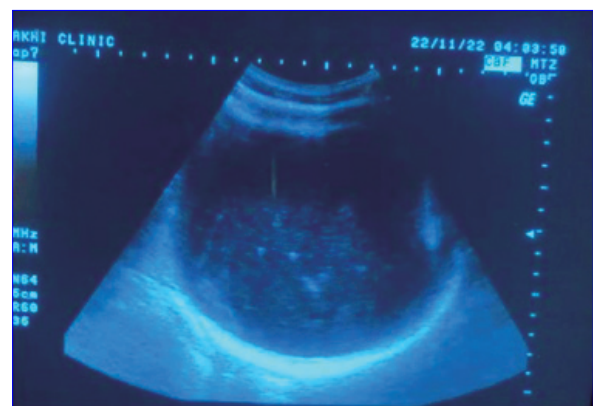


Fig. 1. Sonogram showing hyperechoic bladder wall containing anechoic urine in urolithiasis.

Present address: ¹KNP College of Veterinary Science, Shirwal, District Satara, Maharashtra. ✉Corresponding author email: drravi_7@yahoo.co.in

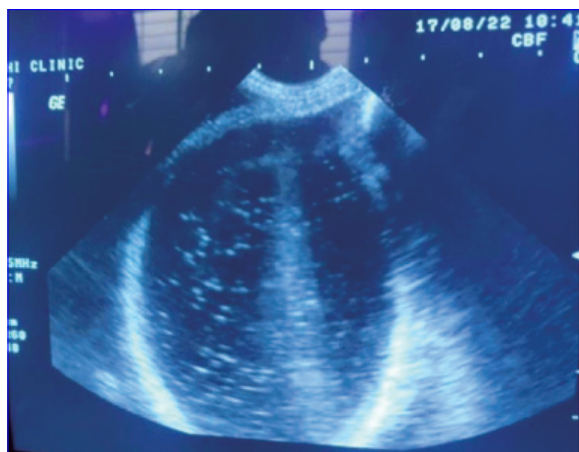


Fig. 2. Presence of hyperechoic material or sludge in urinary bladder without acoustic shadow.

between them. Animals were positioned in right lateral recumbency or standing position by taking stab incision at ischio-rectal fossa towards the left side of anal sphincter for penetration of Foley's catheter into the bladder (Fig. 3). The position of the catheter was ensured in the lumen of the urinary bladder guided by scan and observing urine outflow from the catheter, and the balloon was inflated using 25–30 ml of normal saline. Foley's catheters were evaluated for ease of catheterization technique, duration of technique, dislodgement or blockage of catheter, etc. parameters which were recorded during study.



Fig. 2. Position of Foley's catheter in place in group-II animal.

Maximum cases of urolithiasis were recorded in the age group of 2-4 months (41.66%, n=5) followed by 6 months of age (33.33%, n=4); 0-2 months age group (16.66%, n=2) and 4-6 months of age group (8.33%, n=1). Similar observations were reported by Saurabh *et al.* (2016) and Rafee *et al.* (2015) in their study. Mahajan *et al.* (2017)

and Sarkar *et al.* (2020) also found that majority of cases (81.82%) were under six months of age. In contrast, Amarpal *et al.* (2013) recorded maximum incidence of urolithiasis in adults. Out of 12, 11 were males (91.66%) and remaining was female (8.33%); owing to a shorter, wider and less tortuous urethra in females compared to the longer and more tortuous urethra in males, stones can easily pass through the urethra in females (Matthews 1999). Sandeep *et al.* (2020) documented maximum incidence of urolithiasis in males (84.61%). Studies by Amarpal *et al.* (2004), Kushwaha *et al.* (2014) and Mahajan *et al.* (2017) concluded that young uncastrated bovine males commonly suffered with obstructive urolithiasis. Amongst breeds, nine were khillar (75%) followed by Gir (2, 16.66%) and non-descript (1, 8.33%). Similarly, Taksande (2015) reported higher incidence of obstructive urolithiasis in non-descript male cattle. Whereas, Amarpal *et al.* (2013) revealed highest incidence of obstructive urolithiasis in non-descript and mixed breed of goats and buffaloes. In present study, most of the animals were maintained on concentrated diet.

Eight (66.66%) animals were reported with history of 1-2 days of obstruction followed by three (25%) with 2-4 days of duration and one (8.33%) with 4-6 days. Niwas *et al.* (2021) reported 2-3 days duration of illness in calves presented for ultrasound guided tube cystotomy. Kushwaha *et al.* (2014) observed duration of 1 to 6 days of urethral obstruction in calves with average of 4.20 days. Rafee *et al.* (2015) found that highest numbers of buffalo calves were reported on 3rd day of urine retention and after that, number of cases reduced. Similarly, Singh *et al.* (2008) documented that 39.66% calves were reported during first 3 days of urine retention, whereas, 43.10% calves were reported between 4-6 days of urine retention and remaining 17.24% calves were reported after 6 days of urine retention.

SUMMARY

The aim of this study was to evaluate the efficacy of conventional and ultrasound assisted tube cystotomy techniques for obstructive urolithiasis in 12 cattle by allowing two groups. Group-I, animals were subjected to conventional tube cystotomy, whereas in group-II, ultrasound assisted tube cystotomy was performed using Foley's catheter under deep sedation with xylazine hydrochloride and local infiltration anaesthesia. Clinically, all animals showed urethral pulsation, dribbling of urine, futile attempts, bellowing, congested mucous membrane, sunken eyes, dry muzzle and teeth grinding. Non-significant changes were observed in haematological and biochemical values, however neutrophilia and alkaline pH of urine was prominent. Ultrasound assisted tube cystotomy technique consumed less time (40.00±1.29 min) with small incision and minimal bleeding as compared to conventional tube cystotomy.

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