

## MANAGEMENT OF URINARY OBSTRUCTION IN BUFFALO CALVES BY TUBE CYSTOSTOMY

Rammehar Singh<sup>1</sup>, Satbir Sharma<sup>2</sup>, Deepak Kumar Tiwari<sup>1\*</sup>, R.N. Chaudhary<sup>1</sup>,  
Sandeep Saharan<sup>2</sup> and Anand Kumar Pandey<sup>2</sup>

### ABSTRACT

Urinary obstruction in calves is a fatal disease that predisposes to high mortality rate, due to subsequent uraemia, unless the animal is subjected to emergency treatment for correction of the obstruction. The present study was conducted to evaluate tube cystostomy procedure for management of urethral obstruction in 108 male buffalo calves of age 1 to 5 months presented to TVCC, LUVAS, Hisar (Haryana) from November, 2013 to February, 2014. Diagnosis of the disease was made with the history of anuria, distended abdomen, fluid thrill, abdominocentesis and ultrasonographic examinations. All the calves were treated surgically by tube cystostomy. Simultaneously ammonium chloride 500 mg/kg b. wt. was administered orally to dissolve the calculi. Out of 108 cases, 102 animals recovered uneventfully while six died within 24 to 48 h after the surgery.

**Keywords:** buffalo calves, buffaloes, *Bubalus bubalis*, tube cystostomy, urinary obstruction

### INTRODUCTION

Obstructive urolithiasis causes economic loss to the farmer due to loss of animals and cost of treatment. Factors such as diet, age, sex, breed, genetic makeup, season, soil, water, hormone, mineral, and urinary tract infections play an important role in the genesis of urolithiasis (Udall and Chow, 1969). Urolithiasis describes the concretion of urinary calculi or organic compound, which may lodge anywhere in the urinary system but most frequently at the distal end of sigmoid flexure in ruminants, and causes subsequent urine flow obstruction (Radostitis *et al.*, 2000; Kushwaha *et al.*, 2011). Occurrence of urolithiasis is significantly more common in male calves compared to females due to their anatomical conformation of the urethral tract (Smith and Sherman, 1994).

Urethral obstruction in calves is a fatal disease that predisposes to high mortality rate, due to subsequent uraemia, unless the animal is subjected to emergency treatment for correction of the obstruction. Treatment of obstructive urolithiasis is definitely surgical if the urethral obstruction is complete (Haven *et al.*, 1993; House *et al.*, 1996). Multiple surgical techniques have been described for treatment of such affection including

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<sup>1</sup>Department of Veterinary Surgery and Radiology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India, \*E-mail: dr.deepaktiwari@rediffmail.com

<sup>2</sup>Teaching Veterinary Clinical Complex, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

urethrotomy (Singh *et al.*, 2010), urethrostomy (Stone *et al.*, 1997), tube cystostomy (Williams and White, 1991), bladder marsupialization (May *et al.*, 1998) and penile transaction with urethral fistulation (Misk and Semieka, 2003) with little practical value in treating obstructive urolithiasis. Tube cystostomy together with medical dissolution of calculi is considered an effective technique for resolution of obstructive urolithiasis in small ruminants (Ewoldt *et al.*, 2008). Advantages of this technique include simple procedure, fewer recurrences, preservation of the reproductive function of the animal (May *et al.*, 1998), an opportunity for the removal of cystic calculi, attains a full urethral patency in short period of time and easy application in field conditions. The tube cystostomy gives passage for removal of urine and prevents its accumulation which might lead to the rupture of bladder or the urethra (Dubey *et al.*, 2006). Animals with prolonged obstruction have high morbidity due to subsequent uraemia. Tube cystostomy, though reportedly successful in small ruminants but it is not widely used in large ruminants. The present study describes the clinical signs, surgical management of obstructive urolithiasis and its outcome in 108 cases of male buffalo calves.

## MATERIALS AND METHODS

### Animals

A retrospective study was conducted on 108 male buffalo calves of age 1 to 5 month with obstructive urolithiasis presented to TVCC, LUVAS, Hisar (Haryana) from November, 2013 to February, 2014. Thorough clinical examination was conducted for vital parameters and the status of urethra and urinary bladder. Abdomenocentesis

was performed in the cases showing 'water belly' appearance to confirm cystorrhesis, if any. Dehydration status was evaluated by physical appearance and skin tent test.

Intraoperatively the bladder was observed for its integrity and appearance (smooth, rough, inflamed or necrosed). Animals which have severe dehydration and uraemia were stabilized preoperatively with fluid therapy, corticosteroids and drainage of urine from abdominal cavity by centesis. Animals were prepared for aseptic surgery and tube cystostomy was performed.

### Surgical procedure

All the animals were controlled in right lateral recumbency with left hind limb flexed and abducted from trunk under mild sedation with xylazine hydrochloride 0.05 mg/kg intravenously. Prepubic paramedian left abdominal area was prepared for aseptic surgery. Site of incision was infiltrated with 2% lignocaine hydrochloride. A linear skin incision was given (Figure 1). Fascia, muscles and the peritoneum were separated by blunt incision to open the abdominal cavity and the bladder was identified. The status of bladder was checked. If bladder was intact, a subcutaneous tunnel starting from anterior end of incision and parallel to the prepuce was made by passing straight artery forceps through the subcutaneous tissue opening near the prepuce orifice (Figure 2). Foley's catheter (#18G/ 20G) was passed through tunnel and stabbed at an acute angle into the bladder at an avascular healthy area (Figure 3 and Figure 4). Once the urine starts to dribble through drainage channel then catheter bulb was inflated with sterile normal saline (30 ml) to fix the catheter tip inside the bladder. Alternatively, in cases of ruptured urinary bladder, cystorrhaphy was done with chromic catgut (#1) followed by

catheter placement after necessary debridement (Figure 5 and Figure 6). Peritoneum, muscles and subcutaneous tissues was sutured with absorbable suture material using simple continuous or lock stitch pattern. Skin was sutured with non-absorbable suture in routine manner. The free excess hanging Foley's catheter was fixed at multiple sites on the ventral abdomen (Figure 7).

Postoperatively, ceftriaxone 20 mg/kg and amikacin 5 mg/kg combination along with analgesic meloxicam (0.5 mg/kg) were administered by intramuscular route for five days. Ammonium chloride 500 mg/kg per day orally was given for one month. Local antiseptic dressing with povidone iodine was done twice a day till healing. The catheter was allowed to drain freely for three days; thereafter the owner was instructed to clamp the urinary drainage outlet of catheter to block the urine flow for a brief period of 1 to 2 h in order to determine the urethral patency. After the normal urination through urethra resumed, the time of blockage of catheter was increased systematically in installments up to 24 h in 3 to 4 days. Then catheter was removed by deflating the bulb. The skin sutures were removed after 10 days.

## RESULTS AND DISCUSSION

The occurrence of urolithiasis in peak winter season i.e. during the period of study may be due to the decreased water intake and deficiency of vitamin- A, arising from lesser availability of green fodder (Radostits *et al.*, 2000). Desquamated epithelial cells may be due to deficiency of vitamin A and infections (Jones and Miesner, 2009). This may be related to water imbalance of animals, during winter animals will not take much water and produce concentrated urine (Kushwaha *et al.*,

2011).

Majority of affected buffalo calves were of the age of 2 to 4 months. Sharma *et al.* (2007) recorded about 60% urethral obstruction occurs at an early age in ruminants. Gugjoo *et al.* (2013) reported that 84.61% affected buffalo calves were of the age of 4 to 7 months. Duration of urine retention was less than three days in 80% of all cases while more than five days in the 12%. In eighteen buffalo calves, urinary bladder was ruptured which were subjected to cystorrhaphy followed by tube cystostomy. The prevalence of urolithiasis may occur due to imbalance of mineral intake in feed as the calves receive more cereals and concentrated feeds during growing period. These feeds contain more level of phosphorus and magnesium and relatively less level of calcium and potassium, as a result may lead to urolithiasis (Unmack *et al.*, 2011).

Clinical signs in calves with intact bladder were complete anorexia or inappetance, stranguria or anuria, reluctant to walk and frequent attempt for urination. In eight cases with a history of urine retention for more than seven days, rectum prolapse was accompanied due to constant straining. In case of ruptured urinary bladder, bilateral ventral distension of abdomen was noted and on abdomenocentesis urine was present in abdomen. Two calves with ruptured bladder were in recumbent position and had tachycardia with feeble heart sound. The dehydration was usually much more marked due to loss of water and electrolyte over a period of several days. This results in loss of skin elasticity, dryness of the skin and mucosa, and a reduction and retraction of the eyeball (enophthalmia) due to reduction in the volume of the postorbital fat deposits. Dehydration was more in cases of ruptured urinary bladder which might be due to the loss of fluid from the interstitial and



Figure 1. Skin incision.



Figure 4. Stabbing of Foley's catheter avascular area on bladder.



Figure 2. Subcutaneous tunnel.



Figure 5. Cystorraphy in ruptured bladder.



Figure 3. Passing of Foley's catheter at through the tunnel



Figure 6. Placement of Foley's catheter in bladder.



Figure 7. Fixing of Foley's catheter on ventral abdomen.

intracellular spaces into peritoneal cavity.

Late reporting of cases and indiscriminate use of diuretic (Frusemide) by local practitioners were the main cause of the rupture of the bladder. The increasing pressure and distended stretching of bladder wall results in inflammation, pressure ischaemia, devitalization, thinning, trabeculae formation and herniation of mucosa through the musculature of the urinary bladder leading to seepage of urine into the peritoneal cavity resulting in uroperitoneum (Makhdoomi and Ghazi, 2013). When the urinary bladder ruptures, it gives relief for 1 or 2 days then severe uremia and uroperitoneum develops. Cystorrhaphy followed by tube cystostomy was done for all cases of ruptured bladder.

Different post-operative complications were observed in 66 cases which include suppurative infection of subcutaneous tunnel around catheter (n=38) and blockage of catheter (n=24). Complication of urethral rupture was seen in 4 calves. Subcutaneous suppurative infection was managed by flushing the tunnel with diluted povidone iodine solution, while catheter blockage was removed by using clutch wire and flushing catheter with normal saline and povidone iodine

solution. Catheter was removed at an average period of 13 to 15 days after normal urination through the external urethral orifice. Out of 108 cases, 102 animals recovered uneventfully and six died within 24 to 48 h after the surgery. Complication of tube cystostomy might be due to blockade of tube with blood or tissue debris, urethral rupture, tube dislodgement, and suppurative infection of subcutaneous tunnel (Parrah *et al.*, 2010). The free flow of urine through the external urethral orifice could be due to many factors which include post-operative medication with anti-inflammatory drugs that relived the spasm and inflammation of urethra. Calculolytic agent like ammonium chloride along with water reduced the pH of urine which promotes the dissolution of calculi. Bypassing of urine through the Foley's catheter may reduce the calculi size and frequent occlusion of catheter with clamp could lead to flushing urethra of all debris and calculus material with urine.

## CONCLUSIONS

Tube cystostomy along with oral administration of ammonium chloride has a good success rate in management of cases of urinary obstruction in buffalo calves with intact as well as ruptured urinary bladder.

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