

Perineal versus prescrotal urethrostomy for treatment of obstructive urethrolithiasis in calves

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A clinical study was conducted on 40 cattle and buffalo calves suffered from urine retention with intact bladder as a result of urethroliths in the ventral curvature of sigmoid flexure. Animals were randomly categorized into two groups for performing perineal or prescrotal urethrostomy. Duration of surgery, severity of bleeding, post-surgical complications, and body gain were recorded for comparing between the techniques. The most common complications were urine scalding in 100% of perineal group, dehiscence of the surgical wound in 25% of perineal group, and stricture of the created fistula in both groups with higher incidence in perineal group. Although the operated calves by either technique cannot be used for breeding, it is concluded that prescrotal urethrostomy can be considered superior to perineal one as it required shorter duration of surgery, and associated with lesser bleeding, fewer complications, and higher body weight gain.

Key words: Buffalo calves, Perineal, Prescrotal, Urethrolithiasis, Urethrostomy.

Urine retention as a result of obstructive urethrolithiasis is a worldwide disease that was recorded in many countries, and caused great economic losses (Gasthuys *et al.*, 1993; Tiruneh, 2000; Alexandre *et al.*, 2003; Abdel-Fattah and Seddek, 2005; Seif *et al.*, 2007; Kushwaha *et al.*, 2009). However, the incidence of bovine urolithiasis has decreased worldwide due to improvement in the management system of cattle (Larson, 1996).

In a series of 319 cases of urine retention, the most common site for lodgement of the stone was sigmoid flexure (72.3%) followed by the perineal region (23%). According to clinical findings, the affection was classified into two main types, recent cases associated with intact bladder and old cases with ruptured bladder. Recent cases should be treated surgically as quick as possible to avoid rupture of either the bladder or the urethra (Seif *et al.*, 2007).

Multiple surgical techniques were used for treatment of urine retention. Although each technique has its advantages, disadvantages and success rate, urethrostomy can be considered as a

quick field technique to save animal life, when treatment cost is a limiting factor as it requires minimal hospital settings and equipments (Seddek and Bakr, 2009; Kalim *et al.*, 2011). Unfortunately it has many disadvantages as it may cause severe haemorrhage, urine scalding of the thighs, and cannot be considered durable technique as a result of stricture of the created fistula few months post-surgery (Haven *et al.*, 1993; Stone *et al.*, 1997; Seddek and Bakr, 2009).

The present study was aimed at evaluating a new pre-scrotal urethrostomy technique for treatment of obstructive urethrolithiasis in calves.

Materials and Methods

The subjects of the study were 40 calves suffered from urine retention as a result of urethrolith at the ventral curvature of sigmoid flexure. All animals had urine retention, intact bladder and clear signs of colic. The animals were randomly classified into two groups, group I consisted of 20 cattle and buffalo calves subjected to perineal urethrostomy proximal to the scrotum, and group II consisted of 20 cattle and buffalo calves subjected to the prescrotal urethrostomy technique.

Following preparation for aseptic surgery, calves were sedated with intramuscular (0.2 mg/kg) xylazine HCl. Epidural injection of 10-15 mL 2% lidocaine HCl, and local infiltration analgesia at the site of surgery were instituted and animal secured on the right lateral side, with the left hind limb advanced forward and abducted to expose the perineal and prescrotal region.

Perineal urethrostomy

The technique was performed through 5-7 cm skin incision, 5-10 cm proximal to the neck of the scrotum. The penis was exteriorized and the seat of the stone was detected at the ventral curvature of sigmoid flexure, then about 2 cm longitudinal

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urethrotomy was made proximal to the sigmoid flexure and lodged stone was removed. The patency of the urethra proximal to urethrotomy site was ascertained by passing flexible catheter towards the bladder. The urethral mucosa was then fixed to the skin by silk No. 2 in a simple interrupted manner, and the skin incision was sutured by silk in an interrupted manner proximal and distal to the seat of urethrostomy (Slatter, 2002).

Prescrotal urethrostomy

The technique was made by creating about 5 cm longitudinal para-median skin incision. The incision was 5 cm cranial to the neck of the scrotum and 2-4 cm lateral to the midline (Fig. 1). The penis was exteriorized, and the stone was detected at the ventral curvature of the sigmoid flexure, then the insertion of retractor penis muscle was advanced to be fixed to subcutaneous tissue of the created skin incision by chromic catgut. This procedure straightened or unbent the sigmoid flexure and prevented the glans penis from protrusion through the prepuce. Then about 2 cm longitudinal urethrotomy was made for removal of the stone (Fig. 2), and the urethral wound was then fixed to the skin in the same manner as mentioned for group I (Fig. 3). Finally the skin wound anterior and posterior to the urethrostomy was sutured with silk in an interrupted manner.

Aftercare included systemic injection of antibiotic (Terramycine LA 1 mL/20 kg), daily dressing of the wound with povidone iodine, daily oral administration of 5-10 g sodium chloride to operated calves, removal of silk 8-10 days post-surgery, and re-suturing of ruptured stitches.

Duration of surgery, weight of the lost blood during surgery, body weight gain over 6 months post-surgery, and complication of surgery were recorded for each animal. Weight of the lost blood was measured by weighing sterile cotton/gauze before and after use and the difference in weight was estimated as the weight of blood.

Six months post-surgery the patency of the urethra distal to the seat of urethrostomy and relaxation of the penis out of the prepuce was checked, under epidural analgesia and sedation by 0.2 mg/kg, i.m. xylazine HCl, by passing flexible catheter from the external urethral orifice upward toward bladder, and from the urethral orifice in both directions (Sedeek *et al.*, 2009).

Results and Discussion

Although urethrostomy is a salvage surgical procedure for temporary relief of urine retention, many disadvantages and complications such as urine scalding, urethral stricture and recurrent obstruction tend to occur within weeks to months after surgery (Haven *et al.*, 1993; Slatter, 2002; Abdel-Fattah and Saleh, 2005; Kalim *et al.*, 2011).

Prescrotal urethrostomy required shorter duration of surgery and associated with milder haemorrhage (Table). It might be due to the superficial subcutaneous location of the penis, and the lesser blood supply in the surgical field in contrast to perineal urethrostomy (Sedeek and Bakr, 2009). A similar phenomenon was recorded with scrotal urethrostomy when compared with perineal one in dogs (Slatter, 2002).

The most observed complications in this study were rupture of stitches or dehiscence of the surgical wound in five animals in perineal urethrostomy group, urine scalding in all calves of perineal urethrostomy group (Fig. 4), and stricture of the fistula that was four times higher in perineal (12/20) than prescrotal group (3/20). Rupture of the urethrostomy stitches, and urine scalding were common complications of perineal urethrostomy (Haven *et al.*, 1993; Slatter, 2002; Sedeek and Bakr, 2009), but none of the animals of prescrotal group showed such complication. Absence of ruptured stitches in case of prescrotal technique might be due to fixation of retractor penis muscle to subcutaneous tissue, and absence of tension in the

Table: Comparison between perineal and prescrotal urethrostomy techniques.

	Perineal	Prescrotal
Mean of surgery duration in min (Minimum – Maximum)	51.35 (39-65 min)	28.55 (20-36 min)
Total weight of the group in kg	2635	2360
Total weight of bleeding in kg	4.215	1.755
Mean weight of bleeding in g/kg b.wt	1.7	0.7
Ruptured stitches	5/20	0/20
Complications Urine scalding	20/20	0/20
Stricture of fistula	12/20	3/20
Increased weight of the group after 6 months	1695	1783
Mean of growth rate in kg/kg b.wt after 6 months	0.650	0.772

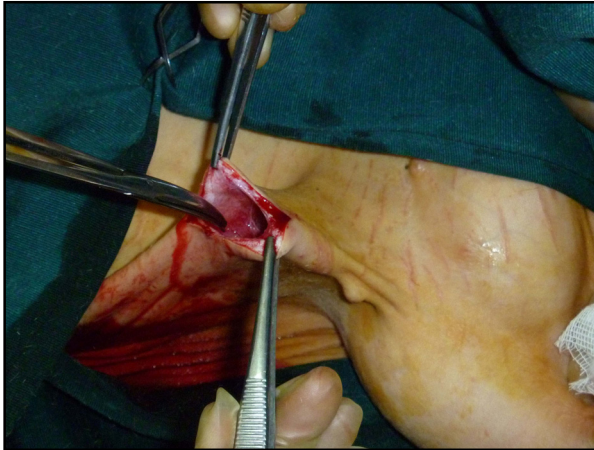


Fig. 1: Paramedian skin incision, 5 cm cranial to scrotal neck, of 5 cm length, and located 2-4 cm lateral to midline.



Fig. 2: Exposure of lower curvature of sigmoid flexure and removal of stone.

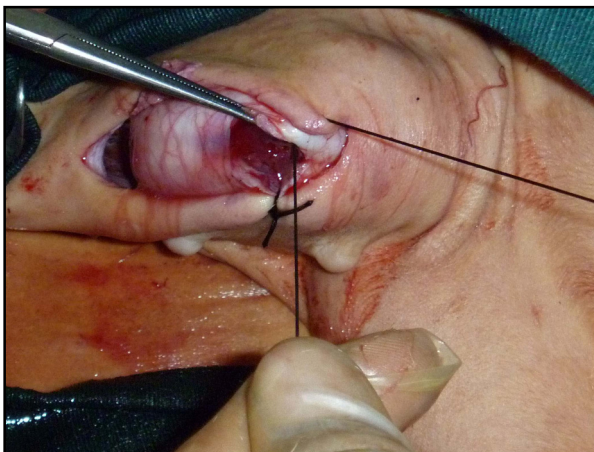


Fig. 3: Fixation of urethra to the skin.

seat of fistula in contrast to perineal urethrostomy that predisposed to higher straining on seat of surgery during abduction of hind limbs (Sedeek and Bakr, 2009). Complete absence of urine scalding in case of prescrotal urethrostomy might be due to



Fig. 4: Signs of urine scalding started with immediate voiding of urine over the perineal region down seat of urethrostomy.



Fig. 5: Ventrolateral voiding of urine away from the body and from both the urethrostomy site and external urethral orifice.

the position of the created fistula and the lateral rotation of the created fistula that resulted in ventrolateral voiding of urine away from the body of the calves (Fig. 5).

Urethral stricture is not only a common complication but also few surgical options are available once it has formed (Haven *et al.*, 1993; Stone *et al.*, 1997). Incarceration of the seat of urethrostomy between the two thighs, urine scalding and dermatitis might be the main causes of higher incidence of stricture in perineal urethrostomy group (Sedeek and Bakr, 2009). The mean of growth rate over six months was greater in prescrotal group (772 g/kg) than perineal group (650 g/kg). Urine scalding and its associating dermatitis and continuous irritation of the skin might be enough stress that induced anorexia, body weight loss and reduced growth rate in perineal group (Marti *et al.*, 1994; Harris *et al.*, 1998; Marai *et al.*, 2007).

It should be noted that the longer urethra in

case of prescrotal urethrostomy did not predispose to lodgement of urethroliths and this in fact might be due to two main factors, unbending and fixation of the sigmoid flexure which has higher incidence of obstruction than perineal urethra, and increased daily water consumption by administration of oral sodium chloride and regular cleaning of water containers to maintain water palatability (Seif *et al.*, 2007; Kalim *et al.*, 2011).

Six months post-surgery, the penis could be relaxed under the effect of epidural analgesia, and protruded through the prepuce in all calves of perineal urethrostomy group; unfortunately, the urethra was completely obliterated distal to the urethrostomy and the catheter could not be advanced from external urethral orifice upward toward urethrostomy site. On the contrary, all calves of prescrotal group showed signs of phimosis, none of them could exteriorize the penis out of the prepuce, and all of them voided urine via both the urethrostomy site and the external urethral orifice.

It was concluded that prescrotal urethrostomy technique can be considered as an alternative urethrostomy technique, superior to perineal one as it required shorter surgical duration, and associated with milder bleeding, lower incidence of complications and higher body weight gain.

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