



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(5): 2850-2853
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www.thepharmajournal.com

Received: 24-03-2023
Accepted: 26-04-2023

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Tube cystotomy for treatment of ruptured penile urethra attributable to faulty castration in a male calf

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Abstract

Uroperitoneum and subcutaneous deposition of urine in large ruminants are two different conditions which occur due to various reasons like obstructive urolithiasis, haematoma, congenital anomalies. In the present study, a non-descriptive castrated male calf presented to the Teaching Veterinary Clinical Complex, CVSc & AH was showing symptoms of ventral abdominal swelling, frequent attempt to pass urine but unable to micturate. A tube cystostomy was performed using an indwelling Foley catheter and a polythene pipe with multiple holes was inserted into the abdominal cavity for evacuation of subcutaneously deposited urine. Postoperatively, the calf remained in good health and was discharged with the cystostomy catheter in situ. Two weeks following surgery the incision site was healed up but sloughing off of the necrosed area was seen creating a large skin defect anterior to penile area. Six weeks following surgery, the calf was noted to pass urine through its urethra. Eighth weeks following surgery, the catheter became dislodged and the calf was observed to urinate normally. The skin wound takes at least four more weeks to heal up by second intention.

Keywords: Tube cystotomy, foley catheter, nasogastric tube, penile urethra, polythene pipe

Introduction

The urethra in male ruminants is a long tube extending from the bladder to the glans penis. It passes caudad on the floor of the pelvis, turns around the ischial arch, forming a sharp bend and passes anteriorly as a part of the penis, enclosed in the corpus cavernosum urethrae. Just posterior to the scrotum the penis, penile urethra form a s-shaped curve called the sigmoid flexure [1]. Many types of affections of the penile urethra were reported in the literature including congenital anomalies such as hypospadias in cattle, sheep, goat [2, 3], urethral dilatation in calves and goats [4, 5] and acquired affections such as urethral obstruction, anal gland obstruction and rupture in buffaloes, cattle, sheep, goat and dog [3, 6, 7, 8]. Trauma related to rupture of penile urethra and the reason pertaining to crushing and rupture by mishandling of Burdizzo castrator during closed method of castration is unusual. Urethral obstruction commonly occurs in castrated male calf or small ruminants due to calculi formation at various sites. Obstruction of the urethra can result in rupture of the urinary bladder or urethra and formation of strictures [9]. Failure to relieve the urethral obstruction can lead to distention and then rupture of the urethra or bladder. A large, fluctuant swelling on the ventrum of the abdomen that originates near the distal end of the sigmoid flexure is characteristic of a ruptured urethra [9, 10]. Gravity causes the swelling to progress along the sheath and results in swelling and partial prolapse of the prepuce. Palpation of the swollen area usually reveals it to be cold, discolored and non painful because urine accumulation in tissues causes rapid necrosis [9]. Selection of appropriate surgical therapy depends on the value and intended use of the animal, the location of the obstruction and the integrity of the urethra and bladder. Both urethrostomy and urethrotomy have been associated with stricture formation and subsequent recurrence of the urethral obstruction, leading to a poor long-term prognosis for ruminants kept as pets, fiber producers or breeding animal [11, 12]. The rationale for catheter placement is that the bladder wall often is edematous and does not retain sutures well in the area of the rupture. Decompression by placing catheter reduces tension on the suture line until the urinary bladder is healed [11]. In ruminants, fibrin deposition on the surface of the urinary bladder usually is sufficient to withstand filling of the bladder within 5 days of surgery [10]. This study describes an alternate method of surgical management i.e. the use of temporary tube cystostomy, for treatment of ruptured penile urethra along with placement of polythene pipe with multiple holes inside the peritoneal cavity and to report on complications and long-term results in a

castrated male calf.

Case History

A 6 month old castrated male calf was presented to the Teaching Veterinary Clinical Complex, CVSc & AH with a complaint of not passing urine and discomfort since last 72 hrs. Animal showed uneasiness and abdominal pain manifested by straining, kicking at the belly, twitching of the penis and frequent attempt for urination. As reported by owner calf was previously healthy, received routine vaccination and observed to urinate normally till the day castration was done for making animal sterile. Ventral subcutaneous edema had developed three days back. The subcutaneous tissues at the ventral abdominal wall, preputal, scrotal and perineal regions become infiltrated with urine resulting in frog-belly shaped abdominal contour and grayish discoloration of affected area. A transverse line at the lateral abdominal wall was evident representing the line of separation between non-infiltrated and infiltrated tissues (grayish discoloration) with urine (Fig. I). The bladder was felt empty on per rectal examination. The animal showed mild elevation of body temperature (102.5 °C), increased heart rate at 99 beats per minute and normal respiration rate. The results of hematological examination showed haemoconcentration with a haematocrit of 50% (normal 30 – 35%), leukocytosis with neutrophilia (total leukocyte count of 14,500 leukocytes/ μ l blood; normal 5,000 – 10,000 leukocytes/ μ l), hyperproteinaemia with a total plasma protein concentration of 108 g/l, normal 60 – 80 g/l). The serum concentration of urea (38 mmol/l, normal 2.4 – 6.5 mmol/l) and creatinine (453 μ mol/l, normal 80 – 120 μ mol/l) were increased. On clinical examination, animal was found to be dehydrated, uremic condition with abdominal distension. Abdominocentesis with an 18 gauge needle yielded clear yellow fluid that smelled of urine. There was marked pitting edema of the ventral abdomen. We were unable to catheterize the urethra and the penis could not be extruded due to marked subcutaneous edema. A presumptive diagnosis of urethral rupture was made and surgery was elected in order to perform an urinary diversion technique. Sodium penicillin (15 mg/kg, q6h, IV) and ketoprofen (3 mg/kg, q24h, IV) were administered preoperatively. The case was tentatively diagnosed to be of urethral rupture and it was decided to perform temporary tube cystostomy.

Anesthetic regimen consisted of (a) sedation by intramuscular 0.2 mg/Kg xylazine HCl and intravenous 0.2 mg/Kg diazepam, (b) epidural analgesia by 5 ml 2% lidocaine HCl and (c) local infiltration analgesia by 2% lidocaine HCl. An 18 gauge catheter was inserted into the left jugular vein and intravenous fluid therapy was commenced using 0.9% sodium chloride at 4 mL/kg/h. Following anesthesia and aseptic preparation, the calf was restrained in right lateral recumbency with the left hind limb flexed and abducted. An exploratory celiotomy was performed via a left lateral incision. The urinary bladder was intact and the kidneys were normal upon palpation. Stay sutures were placed in the bladder with monofilament suture material and urine was aspirated from the bladder with a needle suction system. A cystostomy was performed by making a 5 cm sagittal incision in the ventral aspect of the bladder between the stay sutures. The bladder did not contain any sediment. The bladder was lavaged with warm, sterile, isotonic saline solution. A 10.0 French by 50 cm Nasogastric tube was fed from the bladder

down the urethra. The catheter was obstructed approximately 30 to 35 cm from the trigone of the bladder, but there was minimal resistance to gentle flushing with saline. Based on these findings it was assumed that the urethra was ruptured in the penile area. A stab incision was made on the contra lateral side of the caudal ventral abdomen and an 18 French Foley catheter was introduced through the paramedian skin incision and then tunneled for a short distance subcutaneously before entry into the abdominal cavity. The catheter was then placed through the stab incision made into the ventral paramedian aspect of the bladder and the cuff was inflated with 10 mL of saline. A purse string suture was placed through the wall of the bladder using 2-0 glycomer 631 (Biosyn) to fix the catheter in place. The cystostomy incision was closed routinely in two layers and traction applied to the Foley catheter to appose the bladder and the abdominal wall. The Foley catheter was fixed to the body wall using 1-0 Vicryl and the celiotomy incision was closed. Polythene pipe with multiple holes was inserted into the peritoneal cavity in the ventral abdominal wall at two points and fixed with 1-0 nylon suture to the skin (Fig.II). Postoperatively, regular flushing of the abdomen was done with Betadine, Normal Saline and Metrogyl solution for at least one week to clear the uremic condition. The calf was maintained on procaine penicillin-G (20,000IU/kg every twelve hour Intramuscularly (IM) until after the Foley catheter was removed from the bladder. To reduce urethral inflammation, flunixin meglumine (1.1 mg/kg every 12 hours, IV) was administered postoperatively and continued until the urethral obstruction was resolved. Nursing care included maintenance of an abdominal bandage to protect the incision sites and the Foley catheter, as well as placement of ice-packs and an emollient cream on the perineum. The calf remained bright and alert with a good appetite. Urine dribbled intermittently from the Foley catheter. Owner was advised to restrict exercise and maintain the catheter under an abdominal bandage and to obstruct the cystostomy catheter for several hours every 7 to 10 days to test for urethral patency. Follow-up telephone conversations determined that urine started dribbling from the urethra approximately 6 weeks following surgery and the cystostomy catheter became dislodged from the calf 8 weeks following surgery. The antibiotics were continued till suture removal. Instead of a good post operative follow up and regular patient contact a large skin defect appeared in the necrosed area which subsequently sloughed off on 8th weeks. Though the animal was feeding normally and appetite was good, the skin defect was large enough (40cmx 30cm) creating danger for survivability of the calf (Fig. III). Local dressing was done with prepared lotion of (glycerin 100gms+chloramphenicol 500mg cap x 5 caps + Camphor 2 balls + Haldi 5gm) for at least one month and at last the wound was healed up by second intention. Antibiotic therapy was continued seven more days to reduce super infection of the site. Three months after surgery, the animal was visited upon and found to be urinating properly, healthy and the skin defect has closed.

Result and Discussions

Cystostomy and flushing is considered preferable to perineal urethrostomy due to the lower risk of postoperative complications and urethral stricture [13]. Tube cystostomy has been considered useful in the treatment of obstructive urolithiasis. Its success rate in cases with concurrent urethral rupture has been reported [14], although the extent of rupture

appeared minor and the time following rupture was short compared with the present case. In the study by Rakestraw *et al.*, 1995 [14] the tube cystostomy was maintained for 6 to 38 days and the catheter was manually removed in all cases. In this case, the calf was discharged within 5 days, was managed at home and the tube cystostomy along with polythene pipe inserted to abdomen, was maintained for long enough for the ruptured urethra to heal and for urethral patency to re-establish. Positive contrast urethrogram for diagnosis of ruptured urethra and grafting of skin wound was not attempted only because of financial constraint and owner's disinclination.

We propose that tube cystostomy, using a long-term indwelling Foley catheter, along with placement of polythene pipe in abdomen, may be a useful therapeutic option in the management of ruminants with ruptured urethra especially for cases in which site of rupture is inaccessible and treatment cost is a limiting factor.



Fig 1: Frog bellied conditions in bull calf



Fig 2: Tube cystotomy along with polythene pipe



Fig 3: Skin defect of 40cmx 30cm size in the mid-ventral Region



Fig 4: Calf after 3 months of surgery

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