



Case report

SURGICAL INTERVENTION OF PENILE URETHRAL DIVERTICULUM IN CROSSBRED MALE GOAT KID: A CASE REPORT

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Summary

Mekková, S., M. Kadaši, P. Gomulec, M. Dolník, V. Glembová, O. Nagy & M. Figurová, 2026. Surgical intervention of penile urethral diverticulum in crossbred male goat kid: A case report. *Bulg. J. Vet. Med.*, **29**, No 1, 164–170.

A condition in which a "pouch" of varying sizes forms next to the urethra is called a urethral diverticulum, which can be either congenital or acquired. Urethral diverticulum is observed at both the pre- and post-scrotal areas in animals and typically emerges as a result of transient urethral obstruction, or, less frequently, due to bacterial urethritis of the lower urinary tract. Urethral diverticulum in kids is reported infrequently. In this case report, a penile urethral diverticulum was treated by diverticulectomy following the amputation of the narrowed urethral process. Both the penile urethra and urethral orifice appeared to have healed without any complications, and the clinical issues observed preoperatively were resolved. Although these surgical approaches are not routinely applied in farm animals, they appear to be successful in pet small ruminants. To the best of our knowledge, this is the first case of penile urethral diverticulum referred to the Clinic of Ruminants, University of Veterinary Medicine and Pharmacy in Košice, Slovakia (UVMP) in recent years.

Key words: diverticulectomy, dysuria, goat kid, urethral orifice

There are several reports on congenital anomalies of the genital tract in male goat kids. The penile urethral diverticulum seems to be the more frequent anomaly, which can be associated with other anatomical defects such as hypospadias, ectopic testicles, and paraphimosis (Sylla *et al.*, 2019). Other congenital abnormalities that can occur in correlation with hypospadias include urethral diverticula, ure-

thral stenosis, and testicular and penile hypoplasia (Alam *et al.*, 2005). Urethral diverticulum in kids is reported infrequently (Temizsoylu, 2005). Treatment can be conservative if the animal has an orifice that allows the elimination of urine (Rajashri *et al.*, 2016), or surgical when there is retention leading to dysuria, stranguria, and vocalisation due to pain (Sylla

et al., 2019; Qayyum *et al.*, 2020; Belge *et al.*, 2022).

Urethral diverticulum is either a congenital or acquired condition in which a variably sized "pocket" or outpouching forms next to the urethra (Anderson *et al.*, 1993). In male animals, single or multiple urethral diverticula may be present (Ali *et al.*, 2013; Bokhari, 2013). While urethral diverticulum is the abnormal dilatation of the urethra, hypospadias is the imperfect closure of the external urethra in males, resulting from the incomplete fusion of the urogenital folds and abnormal openings of the penile urethra, primarily affecting goats, followed by sheep, cattle, and bubalines (Misk *et al.*, 2013). The penile urethra terminates ventrally at any level from the perineum to the tip of the penis (Radostitis *et al.*, 2007). Urethral diverticulum is observed at the pre- and post-scrotal spots in animals and emerges as a result of transient urethral obstruction or, much less frequently, due to bacterial urethritis of the lower urinary tract section (Anderson *et al.*, 1993; Gasthuys *et al.*, 1993). The aim of the present study was to report a urethral diverticulum and its surgical correction in a male goat kid, a procedure that is not routinely applied in farm animals.

Case description

A three-month-old Lamancha crossbred buck was referred to the Clinic of Ruminants, University of Veterinary Medicine and Pharmacy in Košice, Slovakia (UVMP) with urination complications. The animal was referred by a field veterinarian with a suspected diagnosis of obstructive urolithiasis. General clinical examination, ultrasound and X-ray were performed. Blood samples were taken for haematological and biochemical examinations. Based on the findings, surgical intervention was indicated.

Clinical findings. Physical examination revealed no fever, increased heart rate and respiratory rate. The colour of the mucous membranes, capillary refill time, appetite, and hydration status were all normal. Clinical examination of the patient revealed stranguria and a thin-walled, fluid-filled structure localised in the ventral region of the penis, measuring 5×3 cm (Fig. 1). The urethral process and glans penis were slightly adhered to the foreskin; after gentle traction, they were released, revealing a narrowing of the urethral opening. Both testicles were normally located in the scrotal sac. After applying gentle pressure to the thin-walled structure, urine was excreted through the



Fig. 1. Macroscopic aspect of the ventral penile urethral diverticulum (clinical finding).

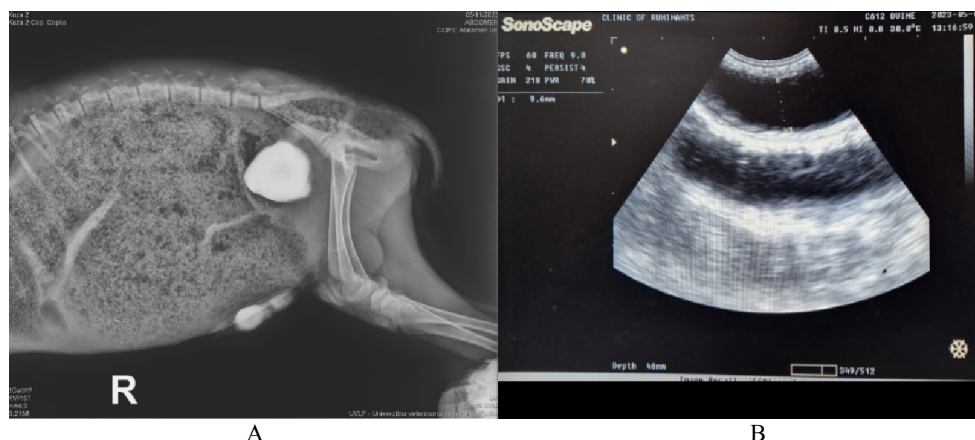


Fig. 2. The contrast radiography, showing the dilated urethral diverticulum in the goat kid (laterolateral view, ascending urographic exam) (A); Longitudinal ultrasound view of prescrotal urethra after urine evacuated measured 9.6 mm (B).

urethral opening, which was then examined with a diagnostic strip. The strip showed an alkaline urine with pH 9 and presence of proteins, although this was not confirmed by a rapid diagnostic test with sulfosalicylic acid. No crystals were observed in the urine sediment. Haematological and biochemical tests are performed routinely as this is an invasive procedure, that may result in haemorrhage from the sectioning of the corpus cavernosum, as well as a prolonged period of anaesthesia, therefore they are crucial for pre-surgical evaluation (Belge *et al.*, 2022). Haematological and biochemical analysis results, particularly the protein profile, were within the normal reference range.

Diagnostic imaging. A real-time ultrasound scanner (Sonoscape A6, Sono Scape Medical Corp, Shenzhen, China) with a frequency range of 7.5–9 MHz and a sector convex probe was used. The ultrasound examination revealed normal kidneys and urinary bladder. The mass showed a thin wall with hypoechoic content (presence of fluid), and the internal diameter of the urethra, after the evacua-

tion of urine, measured 9.6 mm (Fig. 2). The narrowed urethral process was amputated with scissors, and a lubricated sterile catheter (1.3×50 cm) was placed in the urethra one day before surgery. Despite the physiological limitation of the sigmoid flexure, we were able to introduce the flexible catheter into the bladder. Contrast radiography, positive urography and cystography were performed using 15 mL iodinated non-ionic contrast agent as injected into the urinary bladder (ascending urography) under sedation with 0.2 mg/kg xylazine hydrochloride IM (Romotar 20 mg/mL; Bioveta a.s., Nitra, Slovakia), which confirmed the diagnosis.

Surgical treatment. Before the surgical intervention, the kid was given broad-spectrum antibiotics (1.0 mA/kg, q12h for 48 hours) – Betamox LA (a.u.v., inj. 100 mL, Norbrook, Newry, Northern Ireland) – and the non-steroidal anti-inflammatory drug flunixin meglumine (2.2 mg/kg, Vetaflumex 50 mg/mL, Vet-Agro, Lublin, Poland). The urine in the swelling of the diverticulum was evacuated through a catheter by manipulation. Sedation and analgesia were provided with xylazine

hydrochloride at 0.22 mg/kg, IM (Rometar 20 mg/mL, Bioveta a.s., Nitra, Slovakia), and anaesthesia was induced with ketamine hydrochloride at 9 mg/kg, IM (Ketamidol 100 mg/mL, Richter Pharma AG, Wels, Austria).

The kid was prepared for aseptic surgery and placed in right lateral recumbency (Fig. 3). Penile urethral diverticulectomy was performed under the guidance of the urethral catheter. An elliptical skin incision was made on the dorsal bor-

der of the diverticulum and resected with a scalpel blade. The urethral diverticulum was excised, and the urethral mucosa was sutured together to close the opening (urethroplasty) in two layers. The first layer was closed with a Cushing continuous suture, and the second with a simple continuous suture using absorbable surgical suture (Vicryl No. 3-0 USP, Ethicon, Ohio, US). Subcutaneous tissues were sutured with a simple continuous suture using absorbable surgical suture (P.G.A



Fig. 3. Preoperative view showing large saccular anterior urethral diverticulum (A); Postoperative view – urethral catheter stayed in place (B).

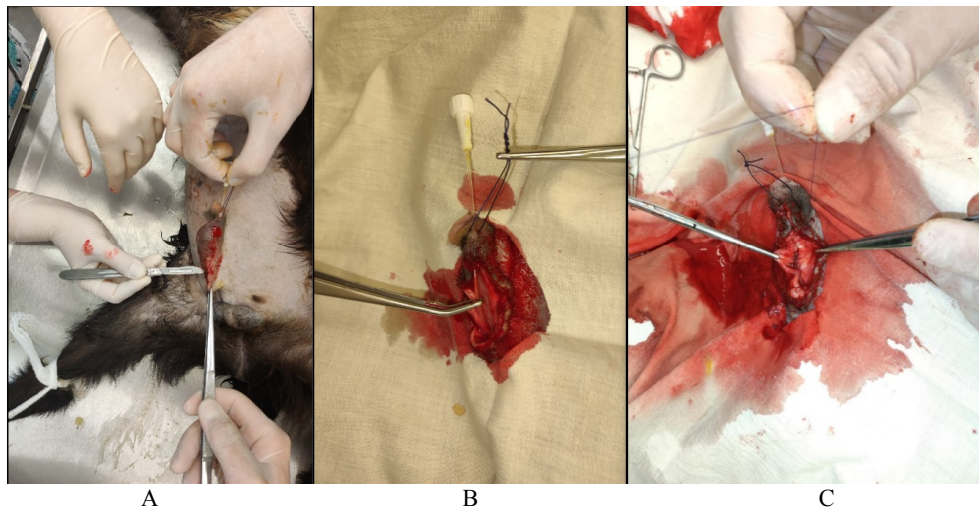


Fig. 4. Intraoperative separation of the diverticulum (A), urethroplasty (B) and suture of layers (C).

No. 3/0 USP, Kruuse, Langeskov, Denmark), (Fig. 4). Finally, the skin was sutured using simple interrupted sutures (Tervalon 0 USP, Chirmax, Stará Turá, Slovakia).

Post-operatively, the urethral catheter remained in place for 8 days. During the first three days, the wound and catheter were cleaned with a 0.9% sodium chloride solution and 1% betadine solution, followed by the topical application of betadine ointment to prevent the formation of blood clots or clogging from tissue debris. Ten days after surgery, the skin sutures were removed. Post-operative attempts at urination resulted in free-flowing streams.

Results. Two weeks after the operation, no complications were seen such as wound infection, wound dehiscence, and dysuria in the fully recovered kid. Penile urethra and urethral orifice both appeared to be healed without complications, and the clinical problems observed preoperatively were resolved. Two months after the diverticulectomy, the kid was castrated.

Clinical diseases of the urinary system are uncommon in goats, with the exception of obstructive urolithiasis (Smith & Sherman, 2009). These anomalies are usually present in multiple forms and are often associated with abnormalities in other systems (King *et al.*, 2002; Almubarak *et al.*, 2016). Research on urethral diverticulum in goat kids is limited (Temizsoylu, 2005). Urethral dilatation may develop primarily due to congenital and genetic factors, bacterial urethritis, or surgical interventions (Genccelep & Alkan, 2000). Urethral dilatation in goats can also be associated with defects such as hermaphroditism, cryptorchidism, and urinary bladder dilatation (King *et al.*, 2002). If the animal is able to urinate,

treatment can be conservative. However, if stranguria, urine retention, and pain are present, many authors prefer surgical intervention over conservative treatment, as this condition can lead to urethritis and/or cystitis, potentially progressing to bladder rupture (Misk *et al.*, 2013). Other complications include urethral stricture, urethrocele, or urethrocuteaneous fistula (Nuin- inga *et al.*, 2005).

To prevent stenosis of the urethra and/or its orifice, a urethral catheter is inserted, and its placement can extend up to ten days, after which it is removed along with the sutures (Belge *et al.*, 2022), as in our case. Depending on complications, such as the presence of adhesions between the penis and prepuce, amputation of the urethral process may complicate the insertion of the catheter into the urethra. The operated animal may be at high risk for developing ascending infections in the urogenital tract; therefore, post-operative antibiotic therapy is crucial for the success of the treatment (Qayyum *et al.*, 2020). Genccelep & Alkan (2000) have suggested excision and perineal uret- rostomy for treating urethral dilatation. However, in the present clinical report, the urethral defect was successfully re- paired through diverticulectomy, as re- ported by Sylla *et al.* (2019) and Hristov & Stoimenov (2020). Urethral diverticu- lum is rare but can be easily identified; however, its correction is sometimes chal- lenging (Karras *et al.*, 1992). Several studies have reported that the local swell- ing in urethral dilatation has a fluctuating character (Ali & Youssef, 2007). Urina- tion is facilitated by applying pressure to the swelling caused by urinary stasis, which can be painful due to the pressure on surrounding tissues. In our clinical case, the symptoms were consistent with those described above. Due to the high

possibility of a genetic basis of this condition, to reduce libido and encourage penile exposure, castration was performed two months after diverticulectomy. With the increasing popularity of goats as pets, particularly in metropolitan regions, the demand for veterinary care is expanding to maintain the health of the animal, irrespective of its productive and reproductive potential. It is essential to prevent such conditions by advising owners not to crossbreed with polled goats, as this can result in offspring with urethral malformations that may be incompatible with life (Rizzo *et al.*, 2023).

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