

Urethrostomy in an Alpine kid secondary to congenital penile urethral diverticulum



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SUMMARY

Ruminant's urogenital tract is seldom affected by congenital anomalies; cases of hypospadias, penile urethral diverticulum, urethral stenosis, testicular and penile hypoplasia are reported in bovine and ovine species. This case report describes the clinical findings and surgical treatment of the penile urethral diverticulum in an Alpine goat kid from a commercial goat farm. A 2-month-old, 10 kg bodyweight, intact male Alpine goat was referred to the University Veterinary Teaching Hospital (OVUD) at the Department of Veterinary Medicine University of Perugia - Italy, with a history of dysuria and ventral penile urine filled cyst. At genital tract examination, transparent cystic diverticulum in the ventral aspect of the prepuce and stenotic urethral appendix were identified.

After sedation, anaesthesia induction and surgical preparation of the animal, cyst centesis and pre-scrotal urethral catheterization were performed. Then, penile amputation, cyst asportation, orchiectomy and oschiectomy were completed. Finally, permanent urethrostomy was realized. The surgical wound was medicated twice daily in order to remove blood clots or tissue debris. The urinary bladder catheter was maintained for 3 days. On day 2, the kid's appetite and attitude improved and urination was normal. Eight days after surgery, skin sutures were removed: both penile urethra and urethral orifice appeared to be healed without complications. At 3 months following surgery, the kid continued urinating normally and no adverse clinical or behavioural signs were reported.

In the present case report, the penile urethral diverticulum was treated by diverticulectomy and permanent urethrostomy in the perineal area. The kid clinical status improved within 5 days and showed any further complication related to its preoperative condition. In the Author's personal caseload, animals subjected to urethrostomy experienced urine soiling in the inguino-abdominal region; in case of pet goat, this could be a cause of owner complaint. However, the surgical approach gave the patient a second chance of life.

In conclusion, hypospadias with associated urethral diverticulum may be successfully treated by diverticulectomy and permanent urethrostomy; even if these surgical approaches could not be applied routinely in farm animals, they appeared to be successful in pet small ruminants.

KEY WORDS

Urinary tract anomalies; urethral diverticulum; goat.

CASE HISTORY

Ruminant's urogenital tract is seldom affected by congenital anomalies; however some cases of hypospadias, penile urethral diverticulum, urethral stenosis, testicular and penile hypoplasia, cryptorchidism, patent urachus and renal agenesis are reported in bovine and ovine species. These defects are usually combined and are often seen together with anomalies of other systems. For instances, hypospadias is an imperfect closure or complete lack of fusion of the urethral grooves during phallus elongation and can be classified on the basis of anatomic localization such as glandular, penile, scrotal, perineal, or anal¹⁻⁴. Furthermore, it is accompanied by hypoplasia of the corpus cavernosum urethra, inducing the opening of the urethra anywhere along its length at one or more locations⁵. The aetiology of hypospadias is not well

understood; it seems to be multifactorial and may be related to genetic, endocrine, and environmental factors^{6,7}.

This case report describes the clinical findings and surgical treatment of the penile urethral diverticulum in an Alpine goat kid from a commercial goat farm.

A 2-month-old, 10 kg bodyweight, intact male Alpine goat was referred to the University Veterinary Teaching Hospital (OVUD) at the Department of Veterinary Medicine University of Perugia - Italy, with a history of dysuria with associated ventral penile urine filled cyst (Figure 1).

Immediately upon the kidding, the farmer noticed the malformation and referred it to his practitioner; but was decided to not proceed with further medical investigations or surgical correction. The kid continued to grow up normally even if he presented some degree of dysuria and preputial diverticulum increased in volume alongside. At the moment of weaning, for didactic purposes, we purchased the kid in order to perform diagnostic and therapeutic procedures. On presentation at the OVUD, the patient showed good clinical condition, with no sign of depression nor pain, good body

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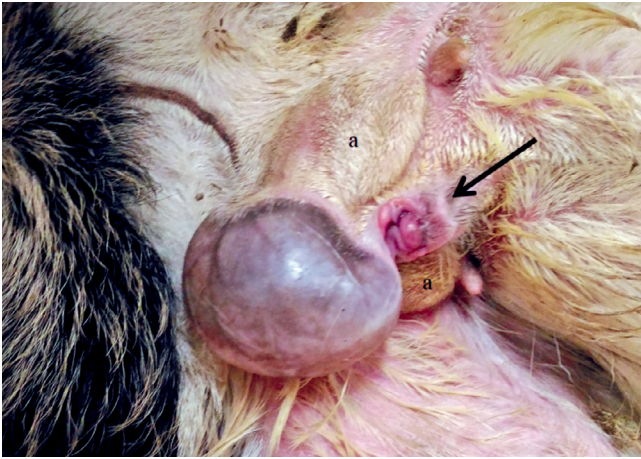
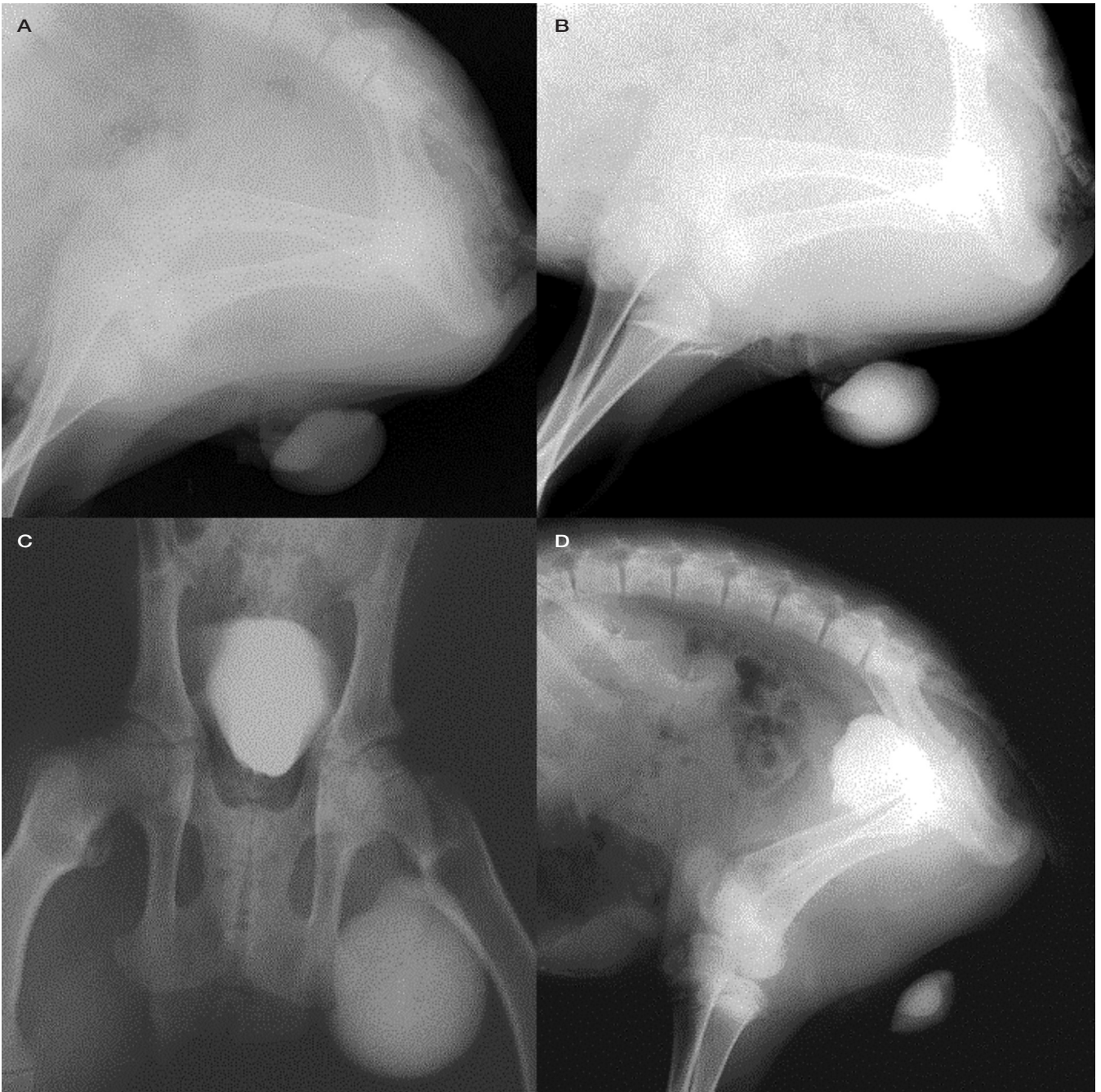


Figure 1 - Macroscopic aspect of the ventral penile urine filled cyst in the goat kid at the moment of presentation at the veterinary teaching hospital (OVUD). Arrow: prepuce with stenotic penile urethra; a: scrotal sacs with descended testes.

condition score of 4/5, pinkish oral and conjunctive mucous membranes and normal lymph nodes volume. At the genital tract examination, the animal presented a transparent cystic diverticulum in the ventral aspect of the prepuce and stenotic urethral appendix that allowed some urine dribbling. First signs of necrotic progression were identified on the ventral aspect of the urethral diverticulum, probably due to excessive distension of the tissues. Manual compression of the preputial diverticulum allowed urine emission through stenotic urethra. Both the testicles were normally located in the scrotal sac.

Figure 2 - **A:** X-ray plain-film showing the dilated urethral diverticulum in the goat kid. **B:** X-ray ascending urographic exam, latero-lateral view. **C:** X-ray ascending urographic exam, ventro-dorsal view. **D:** descending urographic X-ray exam, latero-lateral view.



Abdominal ultrasonography was performed with ultrasound machine using 3-8 MHz linear transducer (MyLab 30 Gold, Esaote, Genova, Italy) in order to check out other urogenital malformation, namely kidneys, penis or bladder. The urinary bladder was normal and fluid-filled, both kidneys were normal and no other abnormalities were seen in abdominal cavity. On ultrasound, the peri-preputial mass showed a thick wall with a hypoechoic/mildly heterogenic content. Internal diameter of the peri-preputial mass measured 6x3 cm.

Furthermore, both an X-ray plain-film and urographic exams were carried out in order to show the urine outflow pathway (Figures 2A and 2B). Briefly, the urethral process was cut and the urethra was catheterized and 10 ml of a solution of 350 MgI/ml iobitridol (Xenetix® 350, Guerbet) mixed in equal part with saline solution was injected in the lumen. For the descending urinary contrastography, an intravenous access was applied through an 18G catheter into the right cephalic vein; then, 15 ml of 350 MgI/ml iobitridol (Xenetix® 350, Guerbet) was administered and successive radiograms were performed with a 5 min interval. Plain film showed the silhouette of the cyst that was better evidenced after ascending urography but the proximal part of the urethra was not visible anyway. A descending ventro-dorsal and latero-lateral urography (Figures 2C and 2D) were attempted in order to evidence the pathway of the urethra cranially the cyst, but there was no relevant founding.

Premedication was obtained with Xylazine (0.05 mg/kg BW, IV) while anaesthesia was induced with Ketamine (4 mg/kg BW, IM) and maintained with Isoflurane and oxygen through a tracheal intubation. Surgical preparation of the ventro-caudal region was achieved and local anaesthesia was performed through subcutaneous injection of a total of 10 ml Lidocaine chlorhydrate 2%. A centesis of the diverticulum was carried out to empty the urine and an elliptical incision of the skin around the preputial diverticulum was performed; then the cystic wall was cut allowing exposure of the urethral mucosa that was successively catheterized at this level. The urinary bladder was emptied and we proceeded with distal penile amputation, both bilateral orchietomy, complete oschiectomy and post-scrotal urethrostomy (Figure 3).

In order to perform orchietomy and oschiectomy, elliptical skin incisions were made around each scrotal sac, castration

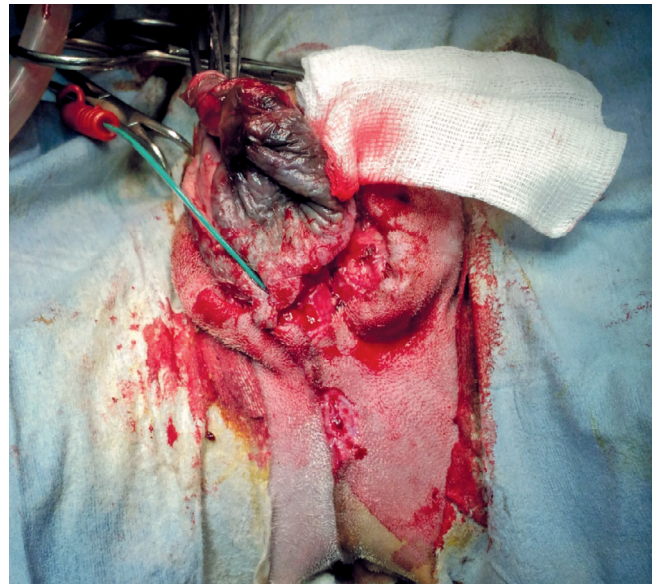


Figure 3 - Intraoperative view of oschiectomy and orchietomy in the goat kid with urethral stenosis and urethral diverticulum. Pre-scrotal urethra was catheterized to allow subsequent perineal urethrostomy.

of the intrascrotal testis was performed using a standard open orchietomy technique and scrotal ablation was performed by undermining the incised skin. Penile diverticulectomy was performed through an elliptical ventral incision over the swollen preputial sheath, and extension of the incision through the subcutaneous tissue, till identification of hypospadiac opening in the postscrotal penile urethra; then its patency and communication with the urethra were noticed. The incision was extended over the urethral mucosa in the perineal area; therefore, the mucosa layer was sutured with the skin, creating a permanent urethrostomy. Simple interrupted sutures using 2-0 Mersilk® were applied (Figure 4A).

Specimen concerning the entire urethral diverticulum was subjected to routine anatomohistopathology examinations. Specimens were fixed in buffered 10% formaline and kept at room temperature for 24h. Then, sections were included, cut and stained. Unfortunately, as also found during in situ examination, extensive necrosis and inflammatory cell infiltration made the identification of the tissue impossible.



Figure 4 - **A:** Postoperative aspect of the permanent urethrostomy. **B:** Kid jumping in the field several weeks post urethrostomy.

Warmed saline solution supplemented with Superton® - a vitamin B complex - (50 mL, IV) was perfused during the surgery and for the following three days. Systemic antibiotic and anti-inflammatory therapies were started with Clamoxyl® RTU (7 mg/kg, IM) and Rimadyl® (4 mg/kg, SC) and were continued on the following 7 and 3 days, respectively. The surgical wound was medicated twice daily with diluted iodine solution in order to remove blood clots or tissue debris. The urinary bladder catheter was maintained in situ for 3 days. On day 2, the kid's appetite and attitude had improved markedly and urination was normal. Since slight lateral deviation of the urine flow, caused by irregular urethrostomy margins, mineral oil was applied to the skin of the internal surface of the legs, in order to avoid dermatitis due to the urine flow. Eight days after surgery, skin sutures were removed; both penile urethra and urethral orifice appeared to be healed without complications. Urethrostomy urine flow became straight after removal of the sutures. At 3 months following surgery, the kid continued urinating normally and no adverse clinical or behavioural signs were reported (Figure 4B).

In the present case report, the penile urethral diverticulum was treated by diverticulectomy, distal penile amputation, orchiectomy, oschiectomy and permanent urethrostomy in the perineal area. The kid clinical status improved within 5 days after surgery and showed any further complication related to its preoperative condition. There are several reports on congenital anomalies of the genital goat kids; the more frequent one seems to be penile urethral diverticulum which can be associated to other anatomical defects such as hypospadias, ectopic testicles and paraphimosis. Usually, many researchers suggest the excision of the urethral diverticulum with subsequent urethrostomy, preserving both the distal penis and the scrotum⁸⁻¹¹. Generally, the kids are subjected to mild sedation with Xylazine combined with local anaesthesia. Herein, we performed both an X-ray plain-film and urographic exams in order to show the urine outflow pathway. In the Author's personal caseload, animals subjected to urethrostomy experienced urine soiling in the inguino-abdominal region; in case of pet goat, this could be a cause of owner complaint. However, the surgical approach gave the patient a second chance of life.

In conclusion, hypospadias with associated urethral diverticulum may be successfully treated by diverticulectomy and permanent urethrostomy; even if these surgical approaches are not routinely applied in farm animals, they appeared to be successful in pet small ruminants.

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CONFLICT OF INTEREST

The authors declare that there were no conflicts of interest.

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