Hypospadias in three calves: a case report

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ABSTRACT: Two to three weeks old 3 male indigenous Korean calves weighing 35–40 kg were referred to the Animal Medical Centre, Chonbuk National University with signs of urine scalding on the ventral perineum. Physical examination in all 3 cases revealed aplasia of the penis along with an undescended testis, bifid scrotum and ventrally incomplete sheath. In case 1, the urethra opened cranially to the bifid scrotum, whereas in case 2 and 3, the urethra opened at the ventral perineum. The diagnosis was made as hypospadias, along with penile aplasia and unilateral cryptorchidism. With an exploratory laparotomy, the abdominal testis was removed. The scrotal testis was also castrated and scrotal ablation was performed. In case 1, prescrotal urethrostomy and in case 2 and 3, perineal urethrostomy was performed. Two weeks after surgical correction, the caves appeared to be urinating normally.

Keywords: hypospadias; cryptorchidism; penile aplasia; urethrostomy; calf

Hypospadias is a rare congenital malformation of the urethra reported in dogs, sheep, goats, cattle, rats, nonhuman primates and humans (Ader and Hobson, 1978; Hayes and Wilson, 1986; Kluth et al., 1988). It is reported to be one of the most common congenital anomalies, occurring in approximately 1:250 to 1:300 live births in humans (Baskin, 2000; Uda et al., 2004). Affected animals may have other congenital or developmental anomalies such as cryptorchidism, which is reported to be the most common congenital anomaly associated with hypospadias (Shima et al., 1979; Hayes and Wilson, 1986; Rohatgi et al., 1987). Hypospadias is often accompanied by hypoplasia of the corpus cavernosum urethra. The urethra opens anywhere along its length at one or more locations. Hypospadias is classified based on the location of the urethral opening as glandular, penile, scrotal, perineal, or anal (Ader and Hobson, 1978). In some cases the penis may be under developed and abnormal, while the scrotum may be divided. In the majority of cases the etiology remains elusive, but generally it is considered as a congenital deformity that may be caused by extra- or intrauterine factors resulting defects in androgen metabolism and/or androgen receptors (Stamper et al., 1999; Kurzrock et al., 2000; Uda et al., 2004). However, to our knowledge, clinical reports on hypospadias in bovine calves are scanty in literature. The purpose of this report is to present three cases of hypospadias in calves and their surgical management.

CASE PRESENTATION

Three two to three weeks old male indigenous Korean calves weighing 35–40 kg were presented (case 1 on 21 May 2003, case 2 on 14 April 2004 and case 3 on 24 May 2005) to the Animal Medical Centre, Chonbuk National University with signs of urine scalding on ventral perineum. Physical examination of the calves revealed aplasia of the penis along with an undescended testis, bifid scrotum and ventrally incomplete sheath. In case 1, the urethra opened just cranial to the bifid scrotum (Figure 1), whereas in case 2 and 3, the urethra opened at the ventral perineum (Figures 2 and 3). Physical examination of the calves revealed that they were males with hypospadias, not hermaprodites or pseudohermaphrodites as there were presence of testes and an absence of female genitalia. The condition was diagnosed as hypospadias along with penile aplasia and unilateral cryptorchidism.

Figure 1. Bifid scrotum and prescrotal opening of the urethra in case 1

The calves were anesthetized administering atropine sulphate (Atropine Sulfate®, Huons Co. Ltd., Korea) 0.04 mg/kg, SC and xylazine hydrochloride (Rompun®, Bayer Korea Ltd.) 0.05 mg/kg, *i.v.* The calves were then placed on dorsal recumbency and the caudal abdominal and perineal regions were surgically prepared with 7.5% povidone-iodine surgical scrub. The urethra caudal to the scrotum was catheterized with 8 Fr rubber catheter (JMS Co Ltd., Korea). Through a pre-scrotal paramedian laparotomy incision the intraabdominal testis was exteriorized, the spermatic cord was double ligated and transected, and the testis was removed. Elliptical skin incisions were made around each scrotal sac, castration of the intrascrotal testis was performed using a standard open orchidectomy technique and scrotal ablation was performed by undermining the incised skin. In case 1, prescrotal urethrostomy and in case 2 and 3, perineal urethrostomy was performed by suturing the urethral epithelium to the skin with 3–0 nylon sutures in a simple interrupted pattern. Debridement of the ventrally incomplete sheath was performed and the skin edges were closed with simple interrupted sutures (Figure 4). Postoperatively amoxicillin (Augmex®, United Pharmaceutical Ltd., Korea) 10 mg/kg *i.m.* was administered every 8 hrs for 1 week. Two weeks after surgical correction, the calves appeared to be urinating normally through the urethrostomy.

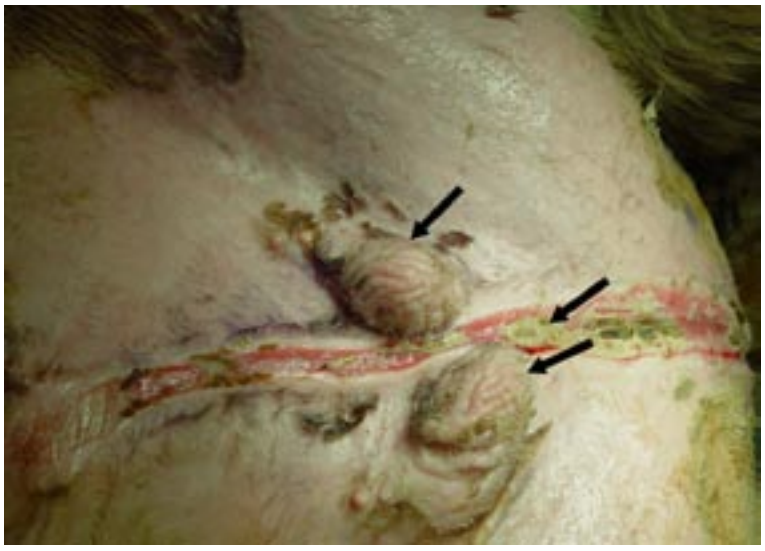

Figure 2. Ventrally incomplete sheath and bifid scrotum in case 2

Figure 3. Ventral perineal opening of the urethra in case 3

Figure 4. Scrotal ablation and closure of the sheath

DISCUSSION

Hypospadias occurs most often in dogs, goats and sheep and only infrequently (0.3%) in cattle (Saunders and Ladds, 1978; Hayes and Wilson, 1986). It is believed that the urethra arises by the fusion of the paired urethral folds after rupture of the urogenital membrane. A disturbance in this process is thought to result in the various forms of hypospadias (Kluth et al., 1988). Hypospadias is thought to be related to abnormalities of androgen production and timing of receptor function during male sexual differentiation at the early period of gestation (Uda et al., 2004). The male urethra is formed when androgen acts during the urethral formation stage and the female urethra is formed in the absence of its action (Kurzrock et al., 2000; Uda et al., 2004). Transinguinal descent of the testes also depends on androgens (Hutson et al., 1997). Disruption of the fusion of the urogenital folds at different sites along the urogenital tract is thought to occur because of variations in the timing of hormone disruptions. Studies in rats, rabbits and humans have revealed that dihydrotestosterone, a product of testosterone, is critical in the differentiation of the male penis (genital tubercle) and the disorders of production of dihydrotestosterone are associated with severe intersex anomalies (Wilson and Lasnitzki, 1971; Baskin, 2000). Hypospadias may be a phenotype caused by an inherited genetic defect in families (Ader and Hobson, 1978).

Other congenital anomalies reported to be associated with canine and human hypospadias included pseudohermaphroditism and hermaphroditism (Rajfer and Walsh, 1976; Howard and Bjorling, 1989). Initially these calves were also thought to be pseudohermaphrodites. A pseudohermaphrodite is distinctly of one gender but has the somatic characteristics of both genders (Stamper et al., 1999). Close inspection of these calves' external genitalia revealed that the calves had hypospadias and were not hermaphrodites or pseudohermaphrodites.

Cryptorchidism is the most common congenital anomaly associated with human and canine hypospadias (Shima et al., 1979; Hayes and Wilson, 1986; Rohatgi et al., 1987). In our case, each calf had an undescended, hypertrophied cryptorchid tesis (case 1 and 3, left and case 2, right). These findings cannot be compared because of the lack of available literature on the same bovine cases. However, the calves urinated normally postoperatively. Postoperative complications included partial wound dehiscence in one calf (case 2), resulting in second intension healing of the incision.

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