

## Radiographic Diagnosis of Hypospadias in Three Korean Native Calves

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**Abstract :** Three calves which were born in a village with similar symptoms that urine ran down along the inner femoral region were referred to Veterinary Medical Teaching Hospital, Kyungpook National University. On physical examination, there were aplasia of the penis, ventrally incomplete sheath and bifid scrotum in common. Blood cell count test and blood biochemistry test were performed and then diagnostic radiography was carried out in a case. Retrograde positive cystograph showed normal urinary bladder and no other urogenital abnormalities. The shape and size of the testes were normal on ultrasonographs, yet intact urethral wall was not detected. These cases were diagnosed as hypospadias.

**Key words :** hypospadias, retrograde positive cystography, urethral ultrasonography, Korean native cattle

### Introduction

Hypospadias is the result of arrested development of the urethra, foreskin, and ventral surface of the penis where the urethral opening may be anywhere along the shaft, within the scrotum, or in the perineum (3,16). In a postmortem study of 4417 lambs, only ten (0.2 %) had hypospadias (6) and in dogs, the incidence of hypospadias has been reported to be 0.003 % (9,10). The genital tracts of 968 slaughtered bulls were examined for defects of a congenital or developmental nature and three heads of them is hypospadias (0.3 %) (13). The majority of hypospadias are believed to have a multifactorial etiology, implicating some combination of genes and environment in the development of the anomaly although a small percentage do result from single gene mutations (3,7). Hypospadias is often accompanied by hypoplasia of the corpus cavernosum urethra. 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 (11,14,15). In some cases the penis may be under developed and abnormal, while the scrotum may be divided. Here we present three cases of hypospadias in Korean native calves and their diagnostic methods.

### Cases

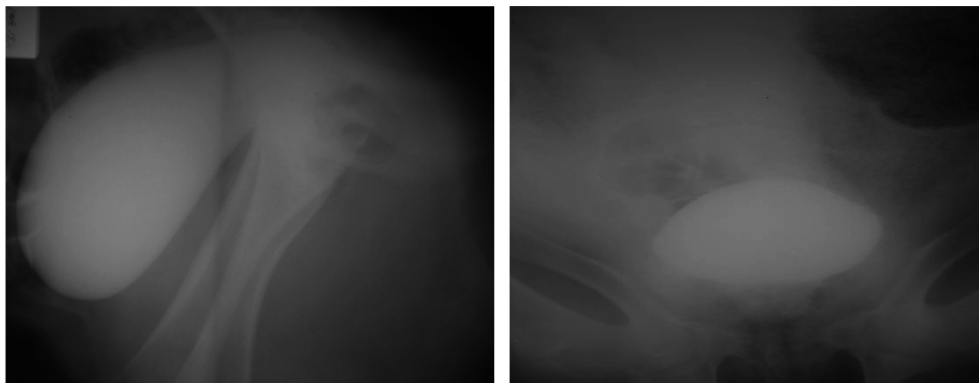
Three cattle that were born in same village had similar symptom that urine ran down along the inner femoral region. On physical examination, there were aplasia of the penis

which was seen as a pink groove (Fig 1), ventrally incomplete sheath and bifid scrotum, urine staining of the inguinal region below in common. In case 1 (a 26 month old male), there were decreasing of appetite, lifelessness and low body weight gain comparing with normal ones. In case 2 (a 15 month old male), there were normal appetite, normal activity and body weight gain. Case 2 is younger brother of case 1. In case 3 (a 6 month old male), there were normal appetite, activity, and body weight gain. With the farmer's permission, blood cell count test and blood biochemistry test were performed and then diagnostic radiography was carried out in case 3. Food was withheld for 24 hours prior to the examination and an enema was given before a cystographic examination had been begun. All catheters and equipments were sterilized, and the genitalia were cleaned before the bladder is catheterized. The calf was sedated by administering atropine sulfate (Atropine<sup>®</sup>, Dai Han Pharm. Co. Ltd., Korea,

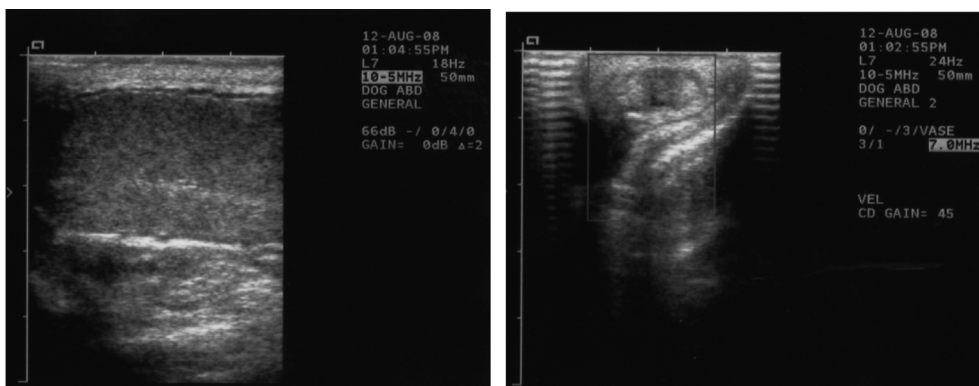


**Fig 1.** Perineal opening of the urethra.

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**Fig 2.** Lateral caudal view (left) and ventrodorsal view (right) on positive-contrast cystographs.



**Fig 3.** Normal testes parenchyma (left) and non-intact urethral wall(right) on urethral ultrasonographs.

0.04 mg/kg, SC) and xylazine hydrochloride (Rompun<sup>®</sup>, Bayer Korea Ltd. 0.1 mg /kg IM). A retrograde positive cystography was performed by injecting Iohexol (Omnipaque<sup>®</sup>, Amersham Health Cork, Ireland) into the evacuated bladder via a urethral catheter. The volume of retrograde positive dilute contrast medium used for cystography was 920 ml (approximately 10 ml/kg) until back pressure was felt on the syringe plunger. Ultrasonography was performed to recognize morphologic forms of the testes and penile urethra.

In CBC exam, the values of RBC, PCV, WBC, and lymphocyte were normal, but those of monocyte and thrombocyte slightly increased. In blood chemistry test, the concentrations of ALP, glucose and phosphorus significantly increased. In the positive-contrast cystographs, normal shape and location of the urinary bladder were monitored. Bladder rupture, ectopic urethra opening and communications with structures adjacent to the bladder were not found (Fig 2). In ultrasonographs, the shape and size of the testes were normal and intact urethra wall was not detected (Fig 3). Integrating all facts, these cases were diagnosed as hypospadias.

### Discussion

Hypospadias is considered to be the result of inadequate fusion of urethral folds and, possibly, of canalization of a

glandar epithelial cord during the formation of the spongy urethra (19). It is a genetic disease that is especially in familial and syndromic forms due to abnormal genital development (phallus or testicular dysgenesis) or defect of the androgens pathway (20 % of the cases) (4,8). The genes of penile development (HOX, FGF, Shh) and testicular determination (WT1, SRY) and those regulating the synthesis (luteinizing hormone receptor) and action of androgen (5 $\alpha$  reductase, androgen receptor) can cause hypospadias if altered (1,2,17). It is also an environmental disease. Environmental endocrine disruptors such as oestrogenic and antiandrogenic chemicals have been suggested to be responsible for the increasing incidence of hypospadias in some countries (5,12,18). A definitive demonstration, however, remains to be made. In our cases, symptoms might be suspected as hypospadias were observed in common; aplasia of the penis which was seen as a pink groove, ventrally incomplete sheath and bifid scrotum, and urine staining of the inguinal region below. But the underweight condition which was representative symptom of hypospadias was showed only in case 1. So additional tests were performed for differential diagnosis in case 3. Though several items of blood test were abnormal, they did not suggest significant meaning in relation to the hypospadias. Positive contrast cystography might reveal the states of the bladder and urethra in the pelvic cavity which

could not be seen grossly. Ultrasonography was performed to find development of testes and structure of urethral wall. The testicle had an echogenic capsule and uniform parenchymal echotexture similar that of the spleen. In penile urethra, intact wall was not detected.

### Conclusion

In bovine hypospadias, a positive contrast radiography and ultrasonography were very effective in diagnosis of urogenital abnormalities which could not be detected on gross finding.

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