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A case of hypospadias in a dog

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This clinical case report described a three-month-old mongrel dog that had the urethral orifice opening 3cm from the tip of the penis and lacked a completely formed preputial sheath. It was presented to the clinic with an exposed penile shaft that was dry. The dog had urinary incontinence that was not of neurological origin. It also had unilateral agenesis of the right testicle. The preputial sheath was successfully reconstructed. Urinary incontinence stopped soon after surgery, suggesting that it had been probably due to an ascending urethritis. A large preputial opening was left because of the location of the urethral opening.

Key words
Dog,
Hypospadias,
Urinary incontinence,
Preputial deficit,
Preputial reconstruction.

Introduction

Hypospadias is a congenital developmental anomaly of the external genitalia in male animals (Smith, 1981) and man (Snell, 1975), in which the external urethral orifice is on the ventral surface of the penis rather than at the tip of the glans. To a variable extent in individual cases, there is failure of fusion of the urogenital folds and incomplete development of the penile urethra (Hobson, 1998; Hedlund, 1997). The urethra may open at any level on the ventral surface of the penis somewhere between the normal location and the ischiatic arch or on the surface of the perineum (Hobson, 1998; Meyers-Wallen and Patterson, 1986). In severe cases, lesions such as failure of the two halves of the scrotum to fuse, underdevelopment or absence of the penis, and failure of the urethra to close in the perineal area may be seen (Hobson, 1983; Smith, 1981; Adder and Hobson, 1978; Snell, 1975). The urethral meatus may be located along the scrotal raphe (McFarland and Deniz, 1961). In one report (McFarland and Deniz, 1961) hypospadias was seen in association with unilateral renal agenesis, whilst in another report there was underdevelopment of the penis, fusion failure of the urethra, prepuce and scrotum. Other abnormalities associated with hypospadias are retained testicles, bone or anorectal defects, umbilical hernia, hydrocephalus, and urinary incontinence (Hayes and Wilson, 1986; McFarland and Deniz, 1961).

There are relatively few reports of this condition in the veterinary literature but this may not reflect the true prevalence of the condition (Meyers-Wallen and Patterson, 1986). Its aetiology is unclear (Hayes and Wilson, 1986); it may be due to inadequate production of androgens by the foetal testes or to inadequate numbers of androgen receptors on the urethral folds.

This case report describes a three-month-old mongrel dog that had hypospadias, unilateral retained testicle, urinary incontinence, and absence of a fully formed preputial sheath which has not been described before.

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Case report

A three-month-old mongrel dog, weighing 12kg, was admitted to the veterinary hospital with urinary incontinence and an exposed and dry penis that appeared unsightly (**Figure 1**). The referring veterinarian had informed the owner that the dog had severe paraphimosis and that the penis could not be readily replaced into the preputial

Figure 1: The dog presented with urinary incontinence and an exposed, dry penis.

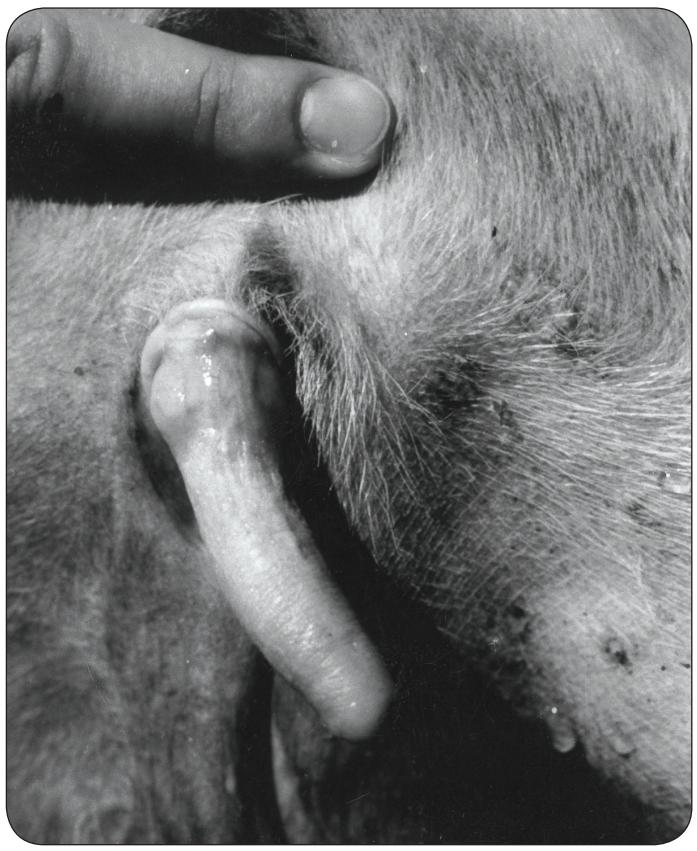

Figure 2: The prepuce was missing from the bulbus glandis cranially.

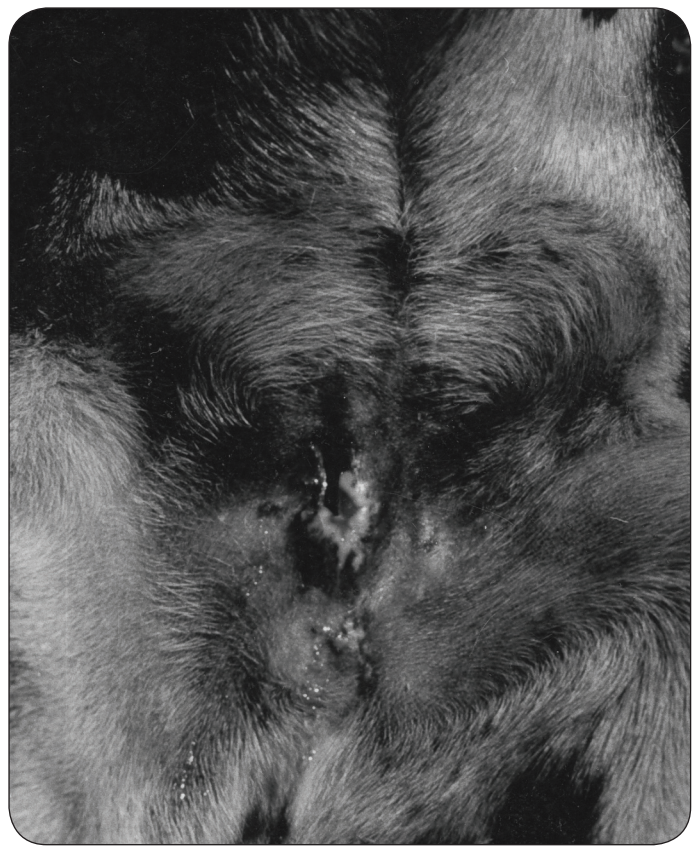

Figure 3: The prepuce has been reconstructed, leaving a wide preputial orifice.

sheath. On physical examination, there was urine scald of the skin on the ventral abdomen and urinary incontinence. The exposed penis was dry. The preputial sheath was absent from the *bulbus glandis* to the tip of the penis (**Figure 2**) but the dorsal mucosa of the incompletely formed sheath was present on the ventral abdominal wall. The penile urethra was opening 3cm from the tip of the penis. On catheterisation, the urethra was patent up to the urinary bladder. The dog had a retained testicle. There was no evidence of neurological deficits. Retrograde cystourethrography did not reveal any other abnormalities.

Corrective surgery was undertaken to reconstruct the preputial sheath. The dog was anaesthetised using intravenous thiopentone (10mg/kg) and intubated; anaesthesia was maintained with halothane and oxygen. A lateral incision was made in the mucocutaneous junction on either side of the midline up to the *bulbus glandis*. The mucosa was then undermined along the ventral abdominal wall. The undermined parietal preputial mucosa was then sutured over the exposed penis. The ventral abdominal skin was also undermined and sutured separately over the mucosa. The dorsocranial aspect of the area for the preputial orifice was left intact. After reconstruction of the preputial sheath, a paramedian celiotomy was performed to locate and to remove the intraabdominal testicle. A small, nodular, vestigial testicle, 0.5cm in diameter, was found and removed. The descended testicle was also removed by routine castration. Postoperatively the dog was treated with procaine penicillin for three days. The animal was kept for observation and it was noticed that urinary incontinence had resolved after 14 days. The surgical wounds had healed and the cosmetic appearance was satisfactory (**Figure 3**).

Discussion

This report describes a case of hypospadias in a three-month-old dog with an incompletely formed preputial sheath. The cause of hypospadias is not known; it is thought that the affected foetus may secrete inadequate quantities of testosterone or that there may be inadequate conversion of testosterone to dihydrotestosterone in the target tissues of the urogenital sinus and external genitalia (Meyers-Wallen and Patterson, 1986; Moore, 1982). The severity of defects present depends on the degree of androgen insufficiency. A spectrum occurs from mild hypospadias, in which the urinary orifice is located in the glans penis to severe hypospadias where the orifice is at the penoscrotal junction, scrotum, or the perineum (Hobson, 1998; Meyers-Wallen and Patterson, 1986; Adder and Hobson, 1978). In the dog, exposure of the male foetus to progesterone or anti-androgens during gestation, especially between day 30 and day 44 of pregnancy, may be responsible (Boothe, 2003). Severe genetic defects including cryptorchidism (McFarland and Deniz, 1961), absence of the scrotum, bifid scrotum (Finco *et al*., 1979), and persistent müllerian structures have been observed in dogs. In many cases in animals and man, chromosome analysis can be used to differentiate hypospadias from true hermaphroditism (Adder and Hobson, 1978).

Surgical correction is usually not attempted because the urethra cranial to the abnormal orifice is deficient. In the present case although the uretheral opening was 3 cm from the tip of the penis, it was patent up to the urinary bladder. One author (Larrosa, 1974) unsuccessfully attempted to reconstruct the urethra and, subsequently carried out amputation of the penis whilst others (Smith, 1981; Croshaw and Brodey, 1960) recommended the removal of the

open prepuce, partial penile amputation and prescrotal or perineal urethrostomy and castration as the treatment for hypospadias. When there are severe urethral defects, excision of the external genitalia and urethrostomy is the treatment of choice (Hobson, 1983). In the present case the preputial sheath was easily reconstructed to cover the exposed penis. It was not necessary to modify the preputial orifice since, after surgery, the preputial opening created was sufficiently large and long enough to allow outflow of urine without scalding the ventral abdominal skin.

It is thought that initially the penis appeared dry because of exposure to the air and it was soiled whenever the dog lay down. This must have caused irritation and probable ascending urethritis from bacteria entering through the abnormally located urethral opening. Urinary incontinence without neurological deficits is a frequent observation in dogs with hypospadias. In the present case it is presumed that the constant penile irritation and ascending urethritis could have been responsible for the urinary incontinence. In some animals penile and preputial disorders may be associated with pain, incontinence or reluctance to breed. In the present case, the owner was not interested in breeding the dog, and was satisfied with the outcome of surgery. It is concluded that in the less severe cases of hypospadias an attempt should be made to surgically reconstruct the affected parts. Although the cause of hypospadias is not known, affected dogs should not be used for breeding purposes.

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