



SPONTANEOUSLY ARISING DISEASE

Incomplete Urethral Duplication Associated with a Dermoid Cyst in a Dog with Urinary Obstruction

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Summary

A 20-month-old male miniature dachshund was evaluated for a 10-week history of intermittent stranguria, pollakiuria, haematuria and obstructive urolithiasis. Retrograde urethrocytography revealed a subcutaneous saccular structure in the perineal area connected to the intrapelvic urethra associated with urolithiasis. After excision of the perineal saccular structure, microscopical examination confirmed the presence of transitional epithelium lining the diverticulum, with isolated submucosal smooth muscle bundles. This structure was attached to another saccular structure lined by stratified squamous keratinizing epithelium with hair follicles, sebaceous glands and apocrine glands. An incomplete urethral duplication with dermoid cyst was diagnosed. The dog recovered uneventfully from surgery and was still urinary continent and free from clinical signs 5 months after surgery. To the authors' knowledge this is the first report of an incomplete urethral duplication with a dermoid cyst and concurrent obstructive urolithiasis in a dog.

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Urethral duplication is a rare congenital disorder characterized by the presence of an accessory urethra originating from the bladder neck or arising from the primary urethra (Levin *et al.*, 2007; Bello, 2014). Several anatomical variations exist depending on the location and opening of the duplicated urethra. Urethral duplication can be described as complete if the diverticulum has an external opening (Bello, 2014) or incomplete if the diverticulum is blind ended (Anderson *et al.*, 1980; Lawrence *et al.*, 1983). Only four cases of urinary duplication have been described in the veterinary literature (Tobias and Barbee, 1995; Duffey *et al.*, 1998; Stedile *et al.*, 2008; Palm *et al.*, 2015). To the authors' knowledge, neither urolithiasis nor dermoid cyst has ever been reported in association with urethral duplication.

A 20-month-old male miniature dachshund was referred to the Hospital for Small Animals, Royal (Dick) School of Veterinary Studies, with a 10-week history of intermittent stranguria, pollakiuria, haematuria and obstructive urolithiasis. The dog had been treated prior to the current presentation by the referring veterinary surgeon with retrograde hydro-pulsion and two cystotomies, resulting in removal of struvite urethroliths. Further treatment of concurrent urinary tract infection by *Staphylococcus* spp., *Proteus mirabilis* and coliform bacteria with antimicrobial therapy (potentiated amoxicillin) based on an antibiogram failed to resolve the clinical signs 3 weeks after the initial presentation. On presentation to the referral hospital 10 weeks after the initial clinical signs, physical examination revealed marked pain on abdominal palpation, a distended and turgid bladder and a fluid-filled swelling in the perineal region. The rest of the physical examination was

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unremarkable. Haematological analysis demonstrated neutrophilia ($22.1 \times 10^9/l$, reference interval [RI]: $3.6-12 \times 10^9/l$) suspected to be secondary to chronic urinary tract infection. Serum biochemistry revealed increased creatinine ($257 \mu\text{mol/l}$, RI: $40-132 \mu\text{mol/l}$) and urea (32.6 mmol/l , RI: $1.7-7.4 \text{ mmol/l}$) due to obstructive urolithiasis. Alkaline phosphatase (393 U/l , RI: $20-60 \text{ U/l}$) and bile acids ($9.2 \mu\text{mol/l}$, RI: $0-7 \mu\text{mol/l}$) were also elevated. These findings could have been secondary to chronic stress and functional cholestasis induced by sepsis. The urinary obstruction was relieved by urinary catheterization and further urinalysis documented marked haematuria, moderate proteinuria and low urine specific gravity (1.017). A cystocentesis was performed and urine culture isolated *Staphylococcus pseudintermedius*, which was sensitive to potentiated amoxicillin.

Plain abdominal radiographs revealed several cystoliths, urethroliths and a tubular mineralized structure within the perineal soft tissues. Retrograde urethrocyctofluorography and retrograde hydropulsion were performed, highlighting a subcutaneous saccular structure in the perineal area connected to the intrapelvic urethra and containing a small number of uroliths (Fig. 1). Careful examination of the perineal area did not reveal any opening or wound. A caudoventral midline coeliotomy was performed and multiple uroliths were retrieved via cystotomy. The perineal saccular structure was then dissected, ligated as cranial as possible and excised via a perineal approach (Fig. 2). The dog was still urinary continent and free from clinical signs 5 months after surgery.

Grossly, the excised saccular structure measured $25 \times 20 \times 12 \text{ mm}$, was mottled tan brown to pale pink and oval shaped with an irregular and slightly nodular surface. It was attached to a $20 \times 4 \text{ mm}$ pale pink, tubular structure. Following fixation in 10% neutral buffered formalin, samples were pro-



Fig. 1. Retrograde urethrocyctofluorography: note the contrast filling of a saccular structure (arrow), which connects to the intrapelvic urethra; it contains small urethroliths.



Fig. 2. Urinary catheter inserted in the urinary bladder and urethral saccular structure (arrow).

cessed routinely and embedded in paraffin wax. Sections ($5 \mu\text{m}$) were stained with haematoxylin and eosin. Microscopically, the tubular structure (Fig. 3A) was lined by transitional epithelium with mild, multifocal, transepithelial trafficking of lymphocytes and neutrophils. Diffusely, the superficial

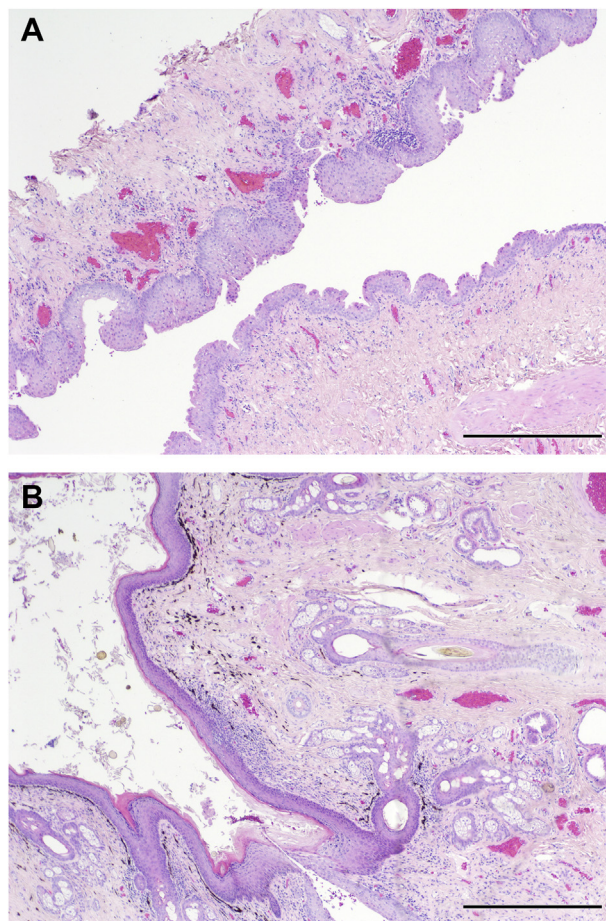


Fig. 3. (A) Duplicated urethra: a tubular structure is lined by transitional epithelium with isolated bundles of smooth muscle within the submucosa (lower right of the image). HE. Bar, $500 \mu\text{m}$. (B) Dermoid cyst: transitional epithelium abruptly changes to stratified squamous keratinizing epithelium lining a cystic cavity containing cell debris, fragments of keratin and hair shafts. The connective tissue wall contains numerous adnexal structures. HE. Bar, $500 \mu\text{m}$.

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