

Diseases of the lower urinary tract

**University of Georgia College of Veterinary Medicine
Department of Pathology
Veterinary Pathology Course: vpat5215**

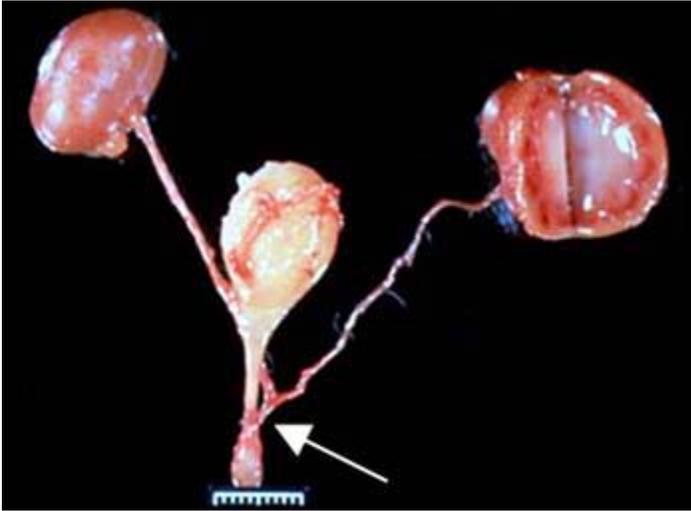
Some general things to remember before we start this unit:

- 1. The lower urinary tract consists of ureter, urinary bladder, and urethra**
- 2. The renal pelvis, ureters, and urinary bladder are lined by transitional epithelium. The horse bladder has islands of stratified squamous epithelium scattered among the transitional epithelium. The distal urethra is lined by stratified squamous epithelium. The lamina propria has small lymphoid follicles that may be large enough to be seen grossly (2-4 mm discrete, white foci).**
- 3. The vesicoureteral valve (formed by the oblique passage of the ureter through the bladder wall) normally prevents reflux of bladder urine into the ureter and renal pelvis.**
- 4. The urinary bladder often constricts at death and may appear very thick walled.**
- 5. The urine is normally clear except in a few species such as the horse where it is cloudy due to mucus and fine crystals.**

Developmental anomalies

Ureteral aplasia is rare but may be seen with renal aplasia

Ectopic ureters. Normally the ureters enter the trigone of the bladder. When they enter elsewhere they are termed ectopic. Ectopic ureters are mostly found in dogs and then certain breeds are at higher risk (e.g. Siberian husky dogs). They are a common cause of urinary incontinence in young female dogs.



Look at the ureters in this cat. It appears as if the two ureters had joined (or one split into two) during development and then enter the urethra as one.

The ureter should not enter the urethra so it is ectopic.

Ectopic ureters are often associated with other urinary tract anomalies which might explain the unusual joining of the two ureters in this case. They predispose animals to pyelitis and pyelonephritis because they are more prone to obstruction and infection.

Patent urachus is probably the most common bladder malformation. This develops when the urachus fails to close thus forming a direct channel between the bladder's apex and the umbilicus. Foals seem to be affected most frequently and will be seen dribbling urine at the umbilicus.

Failure of urachal involution and sometimes patency may be seen in association with neonatal omphalitis.



The patent urachus is prone to infection and abscessation and its rupture can lead to uroperitoneum. Affected animals are more susceptible to bacterial cystitis due to ascending infection.

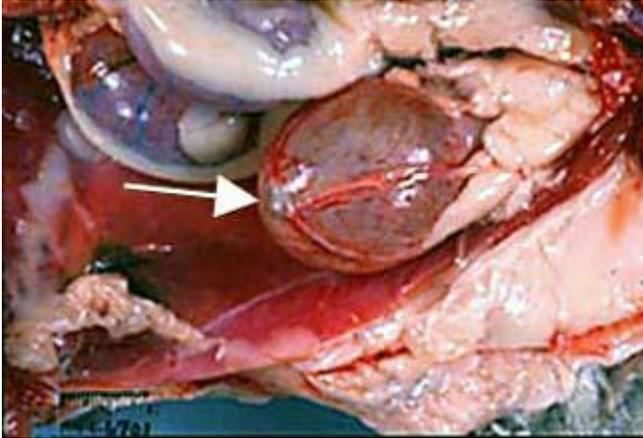
Note the patent urachus joining the apex of the bladder (B) and the skin in a calf.

Bladder diverticula are outpocketings of the bladder wall that may be acquired or congenital.



The apical location of the diverticulum in this cat is probably due to incomplete muscle closure during urachal closure.

Such anomalies predispose to cystitis and calculi due to urine stasis.



The diverticulum in this cat was acquired and was associated with lower urinary tract disease and obstruction of urine flow (note how red and distended the bladder is). These disappear when the obstruction is removed.

Diverticula are seen in about a quarter of cats with this condition and are twice as common in males as in females.