

What Is Your Diagnosis?

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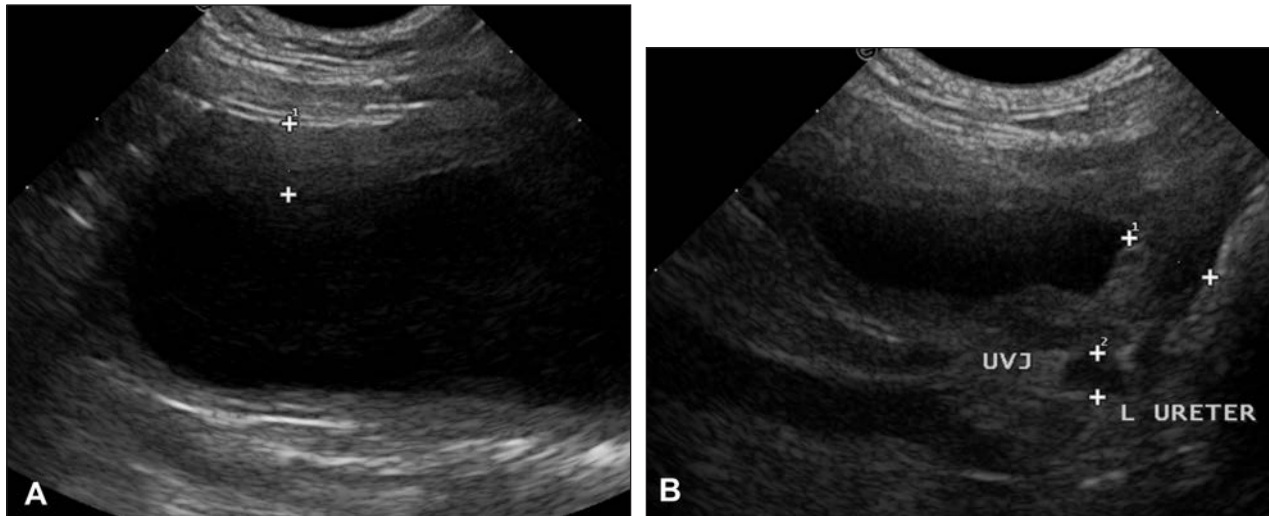


Figure 1—Longitudinal (A) and transverse (B) ultrasonographic images of the urinary bladder of a 13-year-old castrated male Dalmatian evaluated because of blood dripping from its prepuce after urination. Images were obtained transabdominally with an 8-MHz convex transducer at a depth of 5 cm. L = Left. UVJ = Ureterovesicular junction.

History

A 13-year-old castrated male Dalmatian was evaluated at The Ohio State University Veterinary Medical Center because of a 4-day history of blood dripping from its prepuce. The dog was urinating in the house and straining to urinate. Fifteen months earlier, urinary incontinence, hypothyroidism, and hyperadrenocorticism had been diagnosed, and the dog was being treated medically for the latter 2 conditions. Nine months earlier, abdominal ultrasonography revealed echogenic sand-like material within the dog's urinary bladder. At that time, the dog had a urinary tract infection caused by a highly antimicrobial-resistant strain of *Escherichia coli*. The dog was treated with ciprofloxacin for 4 weeks; results of bacteriologic culture of urine samples were negative at 1 and 3 months after antimicrobial treatment.

On initial physical examination, a grade IV of VI apical systolic heart murmur was auscultated. No other abnormalities were found on physical examination. Mild nonregenerative anemia (Hct, 31%; reference range, 36% to 60%) and eosinophilia (1,600 eosinophils/ μ L; reference range, 0 to 1,200 eosinophils/ μ L) were found on CBC. A high serum alkaline phosphatase activity, attributed to hyperadrenocorticism, was the only abnormality found on serum biochemical analysis. An ACTH stimulation test indicated acceptable control of the hyperadrenocorticism in response to trilostane administration.

Urine was obtained by cystocentesis and had a specific gravity of 1.012 and a pH of 9.0. Urinalysis performed with a reagent strip revealed that the dog has proteinuria (3+; scale, negative to 3+) and hematuria (3+; scale, negative to 3+). Microscopic examination of urine sediment revealed 0 casts, 20 to 30 WBCs/hpf, 40 to 50 RBCs/hpf, 0 crystals, and occasional bacteria. On bacteriologic culture of urine, > 30,000 colony-forming units/mL were isolated; the bacteria were identified as *E coli* and were highly susceptible to the antimicrobials commonly used to treat urinary infections. Abdominal ultrasonography was performed to evaluate the urinary bladder (Figure 1).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

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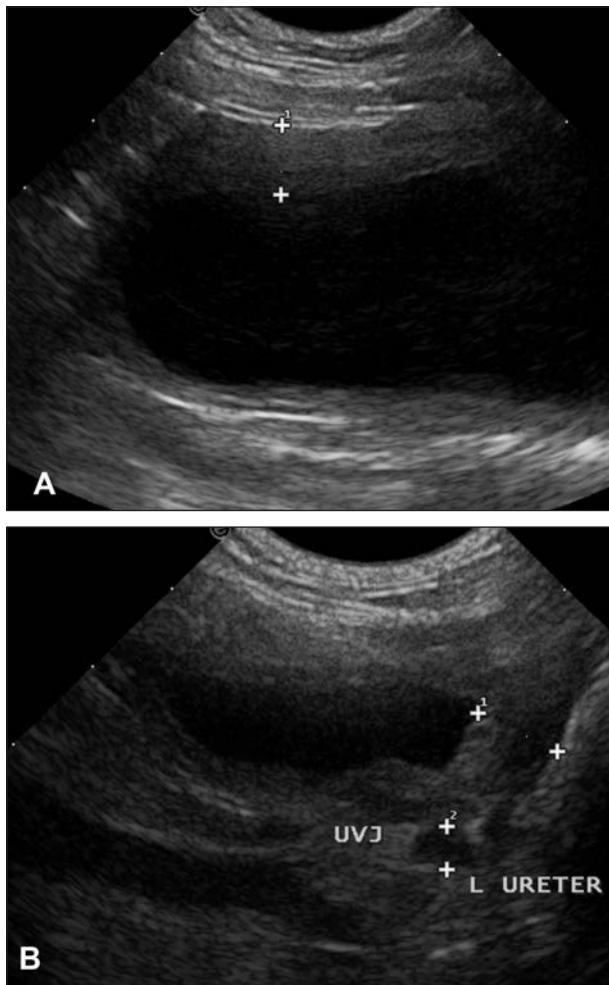


Figure 2—Same ultrasonographic images as in Figure 1. A—The cranioventral aspect of the urinary bladder wall is thickened (7.3 mm between cursors) on the longitudinal image. B—On the transverse image of the urinary bladder, notice that there is trigonal thickening (7.9 mm between first set of cursors) and a dilated left (L) ureter (3.9 mm between second set of cursors) at the ureterovesical junction (UVJ).

Diagnostic Imaging Findings and Interpretation

A moderately distended urinary bladder is evident with a circumferentially thickened (7.3 mm; reference limits, 1.4 to 2.3 mm)¹ and irregularly margined urinary bladder wall (Figure 2). A mass lesion measuring 7.9 mm in diameter can be seen in the trigone at the junction of the distal aspect of the left ureter and urinary bladder.

On further evaluation of the urinary tract, the left ureter is dilated (diameter, 8.8 mm) with a thickened ureteral wall (1.5 mm) and the renal pelvis of the left kidney is dilated (8.5 mm; Figure 3). A 5-mm-diameter nephrolith was noted in the renal pelvis of the right kidney (image not shown). The ultrasonographic diagnoses were urinary bladder wall thickening with obstructive left-sided hydronephrosis and hydroureter and right-sided nephrolithiasis. The urinary bladder mass lesion was considered likely to be neoplastic, with an inflammatory lesion less likely.

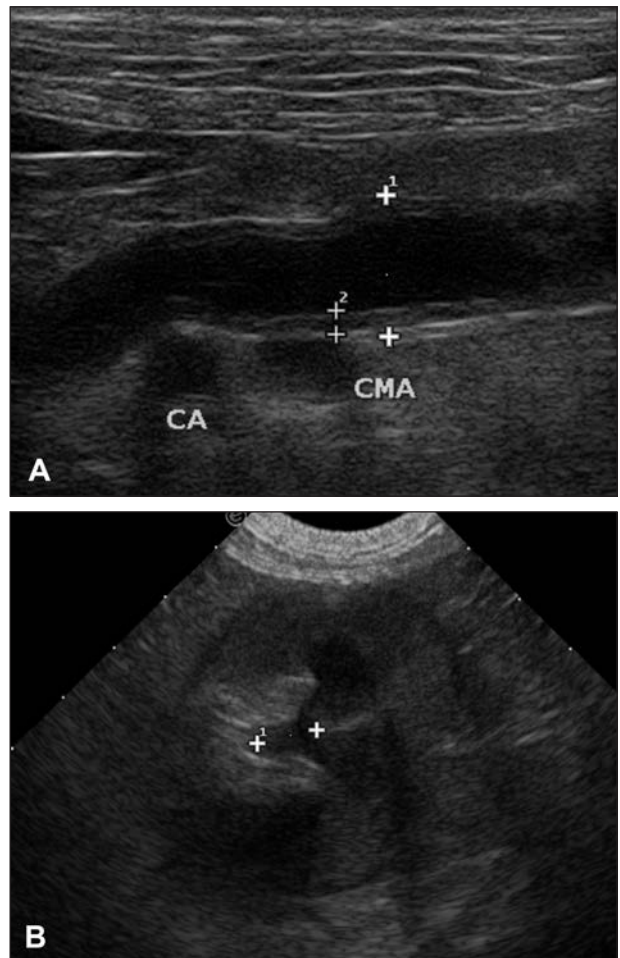


Figure 3—Ultrasonographic longitudinal image of the left ureter (A) and transverse image of the left kidney (B) of the same dog as in Figure 1. A—On the longitudinal image, the mid portion of the left ureter is dilated (8.8 mm between first set of cursors; typical measurement is 1.3 to 2.7 mm) and the ureteral wall is subjectively thickened at 1.5 mm (distance between second set of cursors). B—On the transverse image of the left kidney, notice that the renal pelvis is dilated (8.5 mm between cursors). Images were obtained transabdominally with an 18-MHz linear array transducer (A) and 8-MHz convex transducer at a depth of 7 cm (B). CA = Celiac artery. CMA = Cranial mesenteric artery.

Treatment and Outcome

Findings on cystoscopy and histologic examination of pinch biopsy specimens of the urinary bladder wall and mass ruled out transitional cell carcinoma. The histopathologic diagnosis was lymphocytic and neutrophilic cystitis consistent with a chronic bacterial infection. The transitional epithelium was mildly hyperplastic but without cellular atypia or invasion of the epithelium into the lamina propria; reactive fibrosis was absent.

Given the chronic tissue changes in the urinary bladder and presumptive pyelonephritis, the dog was treated with enrofloxacin (12 mg/kg [5.5 mg/lb], PO, q 24 h) for 8 weeks. Results of bacteriologic culture of urine after 6 weeks of treatment with enrofloxacin were negative. Ultrasonography of the urinary tract at 6 weeks revealed normal appearance of the urinary

bladder, less dilation of the renal pelvis of the left kidney, and resolution of the left-sided hydroureter. Bacteriologic culture of urine was repeated 1 week and 1 month after enrofloxacin administration had been discontinued—no bacterial growth was found. At last follow-up, the dog continued to do well. Preemptive urinalysis and culture to detect bacterial urinary tract infections early was recommended. Hyperadrenocorticism may have increased the dog's risk for urinary tract infections.

Comments

Findings on ultrasonography of the urinary tract in the dog of the present report were confounding. The circumferentially thickened urinary bladder wall was consistent with cystitis. However, the trigonal thickening and profound unilateral hydroureter were consistent with an obstructive neoplastic process, such as transitional cell carcinoma. The advanced age of the dog also increased the likelihood of urinary bladder neoplasia. The presence of the nephrolith in the right kidney increased the possibility for obstructive ureterolithiasis causing left-sided hydroureter.

Cystoscopy allowed targeted collection of pinch biopsy specimens for histologic evaluation. The presence of urinary tract infection and ascending pyelonephritis in an older animal is always of concern for underlying conditions, especially that of neoplasia, considering that a high percentage of dogs with transitional cell carcinoma have concurrent urinary tract infections. Initially, we theorized that the trigonal thickening caused a mechanical obstruction of the left ureter leading to

hydroureter. However, cystoscopy failed to show an obstructive process and urine flow was observed. The trigonal thickening bordering the ureterovesicular junction as seen on ultrasonography was in fact adjacent to the ureteral opening and thus not causing an obstructive process. Therefore, hydroureter was thought to be caused by ureteral functional obstruction secondary to the bacterial infection.

Pyelonephritis has been associated with mild renal pelvis dilation. In a report¹ of 9 dogs with pyelonephritis, the median renal pelvis diameter was 3.6 mm (range, 1.9 to 12.0 mm), and unlike the dog of the present report, all dogs described in that report had bilateral dilation. In the dog of the present report, unilateral pyelectasia and hydroureter with dilation measurements greater than typically expected for pyelonephritis further supported the presence of mechanical obstruction. However, as was true for the dog of the present report, chronic urinary tract infection can at times create tissue changes that look similar to those associated with neoplasia, so obtaining biopsy specimens for histologic evaluation in these instances is essential.²⁻⁴

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2. Lane Z, Epstein JI. Polypoid/papillary cystitis: a series of 41 cases misdiagnosed as papillary urothelial neoplasia. *Am J Surg Pathol* 2008;32:758-764.
3. Wallace LL, Bouchard G, Nicholson W, et al. Polypoid cystitis, pyelonephritis, and obstructive uropathy in a cow. *J Am Vet Med Assoc* 1990;197:1181-1183.
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