What Is Your Diagnosis?

In collaboration with the American College of Veterinary Radiology

Figure 1—Sagittal plane ultrasonographic image of the urinary bladder (A) and prostatic region of the urethra (B) of a 5-year-old sexually intact male hunting dog with dysuria. Ventral is toward the top of the image, and cranial is toward the left. The scale along the images is in centimeters.

History

A 5-year-old sexually intact male hunting dog was presented with dysuria and a 3-day history of reduced food and water intake. The owner reported that the dog had been frequently straining to urinate without success. The dog was known to swim in open water. No abnormalities were detected on clinical examination. Urethral obstruction was suspected; however, a urinary catheter was passed with little resistance. Abdominal ultrasonography with a 10-MHz linear-array transducer was performed (**Figure 1**).

Formulate differential diagnoses, then continue reading.

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Diagnostic Imaging Findings and Interpretation

Abdominal ultrasonography showed substantial distention of the urinary bladder. A tubular hypoechoic structure with sharp, hyperechoic margins was visible within the bladder lumen (**Figure 2**). The structure was 0.6 cm wide by almost 20 cm long and extended the entire length of the bladder and into the prostatic region of the urethra (prostatic urethra), dilating the prostatic urethra. There was mild vascularization of the extremities of the structure on color-flow Doppler ultrasonography. A large amount of sediment was present within the bladder. The prostate was within normal limits of size and had irregular margins and heterogenous parenchyma, consistent with benign prostatic hyperplasia or prostatitis.

Abdominal ultrasonography also revealed that the left kidney was enlarged, approximately 7.1 cm long, with normal architecture (**Figure 3**). The right kidney was small (3.4 cm long), had abnormal architecture and substantial loss of corticomedullary differentiation. Splenomegaly and enlargement of the medial iliac lymph nodes were also noted.

On the basis of the history and ultrasonographic findings, the primary differential diagnosis was

Figure 2—Same ultrasonographic images as in Figure 1. A—There is a tubular hypoechoic structure with hyperechoic walls (arrows) protruding approximately 5 cm into the urinary bladder. Note the large amount of urinary sediment (asterisk). B—There is a tubular, hypoechoic structure with hyperechoic and well-defined walls (arrows) in the urethra at the level of the prostate (dotted outlines). The prostatic region of the urethra is distended by this structure and a urinary catheter (asterisk). The prostate is within normal limits of size and has irregular margins and heterogenous parenchyma, consistent with benign prostatic hyperplasia or prostatitis.

Figure 3—Longitudinal ultrasonographic image of the left kidney (A) and right kidney (B) of the dog described in Figure 1. A—The left kidney is enlarged but has normal architecture; the image was obtained with a 10-MHz linear-array transducer. B—The right kidney is small, has abnormal architecture and substantial loss of corticomedullary differentiation; the image was obtained with a 5-MHz microconvex array transducer.

partial mechanical obstruction of the lower urinary tract by an unidentified structure. We suspected that a nematode worm (*Diectophyma renale*) had migrated from the right kidney to the urinary bladder, causing urethral obstruction and subsequent dysuria. The enlargement of the left kidney was thought to be due to compensatory hypertrophy. The splenomegaly and medial iliac lymphadenomegaly were probably due to inflammatory or infectious processes, possibly associated with the urinary and reproductive tract pathology.

Treatment and Outcome

The dog was hospitalized for surgical cystostomy. An indwelling catheter was placed to maintain bladder decompression. Just prior to surgery, after catheter removal, the dog was seen posturing to urinate with a structure protruding from the external urethral meatus. A 31-cm *D renale* worm was passed. Ultrasonography was repeated, and the tubular structure was no longer visible within the urinary bladder; however, changes compatible with cystitis were present. The dog was discharged with a prescription

of amoxicillin-clavulanic acid (500 mg, PO, q 8 h for 14 days).

Comments

Diectophyma renale is the largest nematode in domestic animals and is usually found in the kidney of the definitive host (canids) from where it releases eggs that are voided with urine. The eggs are ingested by the first intermediated host, the annelids.¹ The second intermediate host is a fish, and the definitive host becomes infected when it eats a fish containing infective parasite larvae.² For the dog of the present report, this route of infection was compatible with its habit of swimming, by which ingestion of infected fishes was possible. The infective parasite larvae penetrate the wall of the intestine of the final host and migrate from the intestine to the kidney (usually the right kidney due to its proximity to the duodenum).¹ Although the predilection site for *D renale* in dogs is the right kidney, this parasite has also been found free within the abdominal cavity and, more rarely, in other sites, including the uterus, inguinal area, mammary gland, and urinary bladder (such as in the dog of the present report).³

Diagnosis is usually based on necropsy findings,³ but there have been reports of diagnosis following imaging, including ultrasonography, in living veterinary patients.⁴ Although most cases are subclinical, dysuria¹ and other clinical signs such as hematuria, hyporexia, pollakiuria, anemia, emaciation, urinary tract infection, and peritonitis have been reported. In animals affected subclinically, no treatment is required but nephrectomy can be performed in cases with severe clinical signs.³

Typically, infections occur in temperate and subarctic regions of South and North America and Asia, with northern part of North America, particularly Canada, as a main endemic area.¹ The dog of the present report lived in the southern region of Brazil.

Ultrasonographic findings in the right kidney of affected dogs include multiple ring-like structures with echogenic walls and anechoic central areas in the transverse plane and bands with a similar appearance in the longitudinal plane.⁴ In the dog of the present report, the primary ultrasonographic finding was the tubular area within the urinary bladder, with a similar appearance to the longitudinal plane images of a nematode in the kidney. The changes in the right kidney suggested parenchymal damage by the parasite.⁴ In the few previous reports of urethral obstruction by *D renale*, abdominal ultrasonography was not performed,⁵ and to our knowledge, this was the first case in which ultrasonographic findings were reported.

Although rare, dioctophymiasis should be considered as a differential diagnosis for dogs with dysuria and signs of lower urinary tract obstruction. Ultrasonographic evaluation is an excellent tool to scan for dioctophymiasis, even in unusual locations.

References

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