



What Is Your Diagnosis?

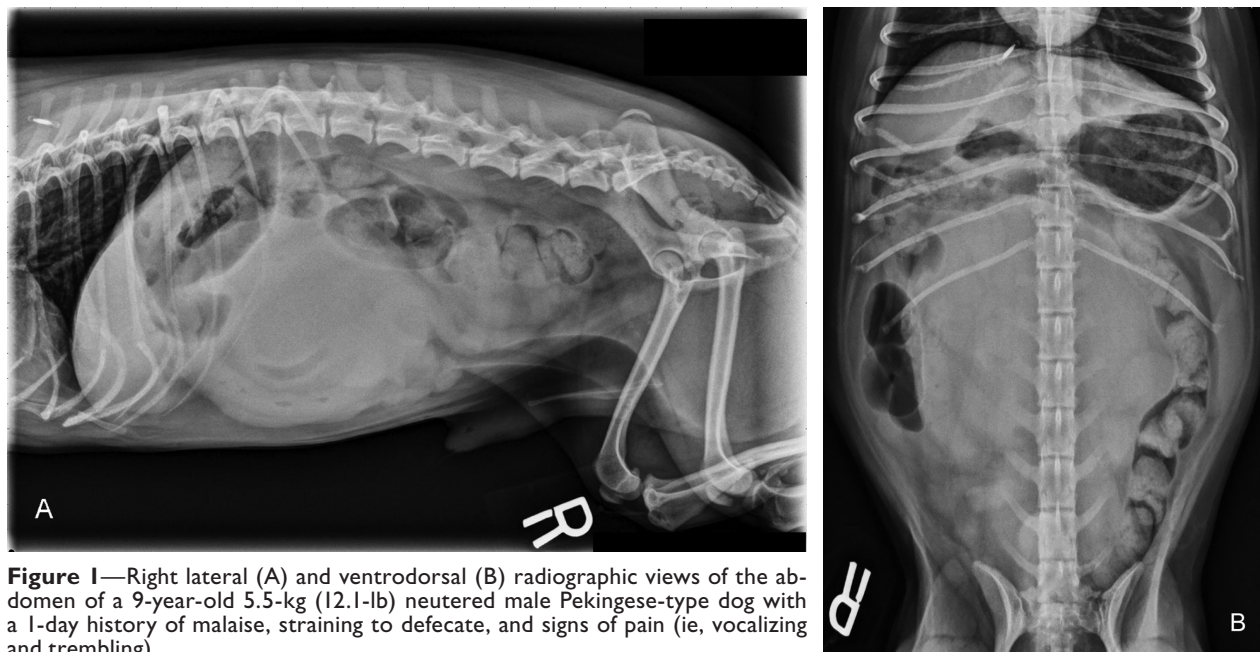


Figure 1—Right lateral (A) and ventrodorsal (B) radiographic views of the abdomen of a 9-year-old 5.5-kg (12.1-lb) neutered male Pekingese-type dog with a 1-day history of malaise, straining to defecate, and signs of pain (ie, vocalizing and trembling).

History

A 9-year-old 5.5-kg (12.1-lb) neutered male Pekingese-type dog was evaluated because of a 1-day history of malaise. Initially, the dog was straining to defecate, and vocalizing and trembling as if in pain. Clinical signs progressed throughout the day to include vomiting, anorexia, hypersalivation, and lethargy. The dog was reportedly healthy prior to the day of hospital admission. On physical examination, the dog had signs of moderate abdominal pain in response to palpation; a large mass was palpated in the cranial to middle portion of the abdomen. The dog had a slightly high heart rate (138 beats/min) and was hypothermic (36.8°C [98.3°F]). The respiratory rate was within reference range, and the respiratory effort appeared normal.

Hematologic abnormalities included mild leukocytosis characterized by neutrophilia and monocytosis, mild hyperglycemia (179 mg/dL; reference range, 70 to 143 mg/dL), and mildly high BUN concentration (28 mg/dL; reference range, 7 to 27 mg/dL). Serum amylase activity was low (426 U/L; reference range, 500 to 1,500 U/L). Abdominal radiography was performed (**Figure 1**).

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

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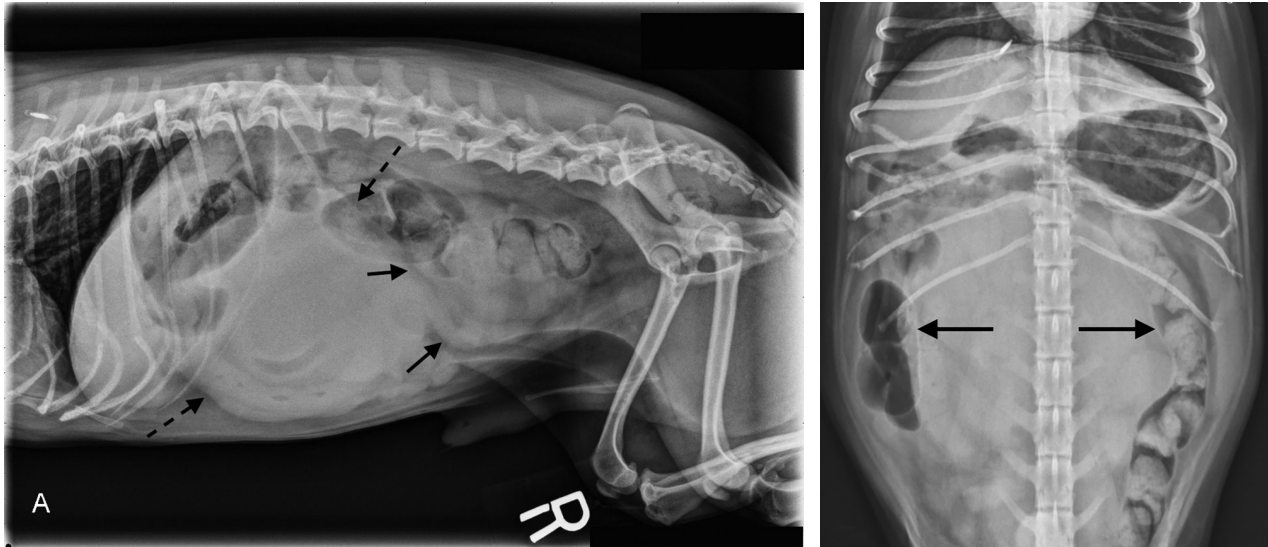


Figure 2—Same radiographic images as in Figure 1. A—There is a large, round mass of soft-tissue opacity in the cranial to middle portion of the abdomen (dashed arrows) causing craniodorsal displacement of the stomach. Notice the apparently normal margins of the urinary bladder (arrows). B—The soft tissue mass effect seen in the cranial to middle portion of the abdomen causes lateral displacement of the small intestines and colon (arrows).

Diagnostic Imaging Findings and Interpretation

On the lateral and ventrodorsal views, the cranial to middle portion of the abdomen contains a large, round soft-tissue opacity mass with well-defined margins (**Figure 2**). The stomach is moderately displaced cranially, with the pyloric antrum mildly displaced dorsally. The small intestine and colon are moderately displaced laterally by the abdominal mass. The potential organs of origin of the mass include the following: spleen, pancreas, mesenteric lymph node, and less likely small intestine. The differential diagnosis for the mass includes splenic malignant neoplasia (eg, hemangiosarcoma), splenic hematoma, benign masses (eg, myelolipoma, extramedullary hemopoiesis, lymphoid hyperplasia), or granuloma. Neoplasia, cyst, hematoma, or granuloma arising from the pancreas, mesentery, or small intestine could also be considered.

Abdominal ultrasonography was performed to further characterize the mass (**Figure 3**). It had smooth margins that were abutted by both the tail of the spleen and the urinary bladder. The mass was relatively homogenous in echotexture and measured about 9.8 X 6.7 cm, with no fluid cavities. No shared vasculature between the mass and surrounding abdominal viscera (including the spleen) could be identified. No other ultrasonographic abnormality was found. The ultrasonographic findings were inconclusive in identifying the organ of origin for the mass; however, as the margins abutted the spleen, it was suspected to be of splenic origin.

Treatment and Outcome

An exploratory laparotomy was performed. A large mass was found originating from the apex of



Figure 3—Sagittal ultrasonographic image of the mass in the cranial to middle portion of the abdomen of the dog in Figure 1. The mass is homogenous in echotexture and measures approximately 9.8 X 6.7 cm, with no fluid cavities. No shared vasculature between the mass and surrounding abdominal viscera (including the spleen) is seen.

the urinary bladder. On the ventral aspect of the urinary bladder, a linear thickening was also identified spanning from the apex to the bladder neck. The entire mass was excised with 5-mm margins, and the thickened area was also excised. Surgical recovery was uneventful. The patient had a good appetite following surgery and was urinating normal-colored urine, without straining. The dog was discharged from the hospital 2 days following surgery and was doing well 1 year later, with no recurrence of clinical signs. A histopathologic diagnosis of a leiomyoma was made.

Comments

Neoplasia originating from the urinary bladder is common in dogs. Tumors of smooth muscle origin, however, are much less common than carcinomas. Transitional cell carcinoma is most prevalent, followed by squamous cell carcinoma, adenocarcinoma, and undifferentiated carcinoma.¹ Mesenchymal tumors account for approximately 10% of urinary bladder neoplasms in dogs. The most common tumors seen within this subtype are leiomyomas, leiomyosarcomas, hemangiomas, and hemangiosarcomas.²

Tumors of smooth muscle origin are classically separated into the categories of benign (leiomyomas) and malignant (leiomyosarcomas). Together they make up about 5% of primary urinary bladder tumors in dogs (4% leiomyomas and 1% leiomyosarcomas).² These tumors can occur anywhere in the body, are composed of smooth muscle, and have been reported arising from many different organs including the trachea, esophagus, stomach, rectum, bladder, kidney, urethra, uterus, vagina, and blood vessels.^{2,3}

Within the urinary system, the bladder wall is the most common origin of smooth muscle tumors. Leiomyomas are typically described as single, nodular, discrete, nonencapsulated, and noninvasive masses protruding into the lumen of the urinary bladder or expanding the muscular wall. Surgical excision is often curative.² Leiomyomas are differentiated from their malignant counterparts (leiomyosarcomas) on the basis of their gross and histologic appearance.⁴ It can sometimes be difficult to distinguish leiomyomas from well-differentiated leiomyosarcomas. Of particular importance is the mitotic index, evidence of invasion, and areas of tumor necrosis. Overall metastases are rare, but local infiltration and recurrence are common.²

Older dogs are most commonly affected (mean age, 12.5 years for leiomyomas and 7 years for leiomyosarcomas) with no clear breed or sex predilection. Other veterinary species are in general much less commonly affected by these tumors.⁴ Clinical signs can include dysuria, pollakiuria, urinary incontinence, weight loss, lethargy, signs of abdominal pain, and occasionally a palpable abdominal mass.^{2,5,6} Most dogs with mesenchymal tumors of the urinary bladder have 1 or more abnormalities detected on urinalysis, including hematuria, pyuria, proteinuria, and bacteriuria.² Hematologic findings are often nonspe-

cific, but hypoglycemia has previously been reported for dogs with intra-abdominal leiomyomas.³ In the case described in the present report, urinary tract signs were not observed but the owners did report straining to defecate, which could have possibly been a sign of dysuria. Unfortunately, urinalysis results were not available, and contrary to what was found in a previous study,³ the patient had mild hyperglycemia rather than hypoglycemia.

Survey radiography is generally not expected to be useful in the diagnosis of tumors of the urinary bladder. Contrast radiography may prove more helpful but was not performed for the dog of the present report, as a urinary tract lesion was not suspected and ultrasonography was available. A report⁵ of the ultrasonographic findings in dogs with smooth muscle tumors of the urinary bladder described the masses as single, round, smoothly marginated masses of hypoechogenicity to mixed echogenicity. The tumors were intraluminal and not pedunculated but rather were broadly attached to the bladder wall.⁵ In the dog of the present report, the mass was entirely extraluminal. The radiographic appearance was highly unusual for a mass that originates from the urinary bladder, considering the cranial location and the normal ventral contour of the bladder with fat opacity partially separating the cranial bladder margin from the caudal margin of the mass. The case described in the present report demonstrates the importance of keeping a broad differential diagnosis list to include atypical organs of origin for midabdominal masses.

References

1. Knapp DW, McMillan SK. Tumors of the urinary system. In: Withrow SJ, Vail DM, Page RL, eds. *Small animal clinical oncology*. 5th ed. St Louis: Saunders, 2012;572-582.
2. Koestner A, Higgins RJ. Tumors of the urinary system. In: Meuten DJ, ed. *Tumors in domestic animals*. 4th ed. Ames, Iowa: Iowa State Press, 2002;509-546.
3. Koestner A, Higgins RJ. Tumors of muscle. In: Meuten DJ, ed. *Tumors in domestic animals*. 4th ed. Ames, Iowa: Iowa State Press, 2002;319-363.
4. Katamoto H, Kumagai D, Kouzai N, et al. Space-occupying leiomyoma in the pelvic canal of a dog. *J Small Anim Pract* 2003;44:277-279.
5. Heng HG, Lowry JE, Boston S, et al. Smooth muscle neoplasia of the urinary bladder wall in three dogs. *Vet Radiol Ultrasound* 2006;47:83-86.
6. Norris AM, Laing EJ, Valli VE, et al. Canine bladder and urethral tumors: a retrospective study of 115 cases (1980-1985). *J Vet Intern Med* 1992;6:145-153.