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What Is Your Diagnosis?

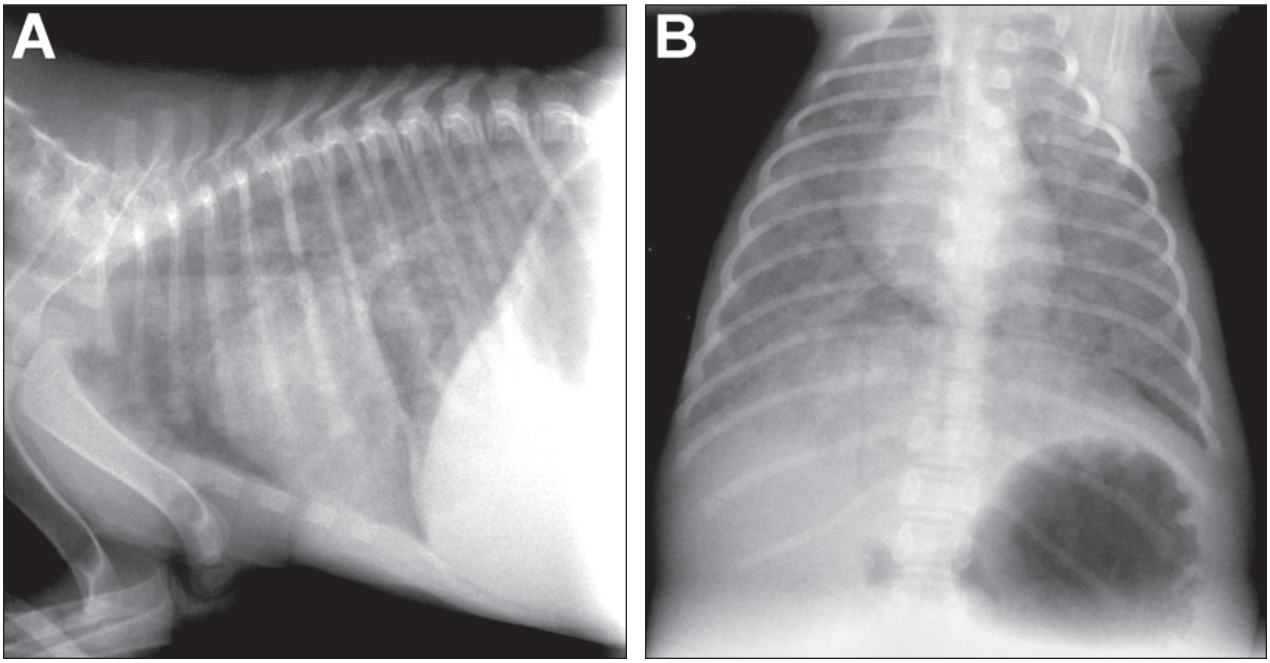

Figure 1—Right lateral (A) and ventrodorsal (B) radiographic views of the thorax of an 8-week-old sexually intact male puppy evaluated for acute onset of dyspnea and abdominal distention of 1 day's duration.

History

An 8-week-old sexually intact male Miniature Schnauzer was referred for dyspnea and abdominal distention of 1 day's duration. The dog was 1 of 6 puppies in a litter from an apparently healthy bitch. All puppies received pyrantel pamoate and were vaccinated against canine parvovirus and *Bordetella bronchiseptica* when they were 4 weeks old. All puppies were vaccinated against canine distemper virus, canine adenovirus-1 and -2, canine parainfluenza virus, and canine parvovirus when they were 6 weeks old. Six days after purchase, the puppy had been evaluated by the referring veterinarian for acute onset of anorexia, signs of depression, and labored respiration. The puppy's clinical signs worsened despite treatment with dexamethasone, gentamycin, and penicillin, and the owners were referred the following day.

On physical examination, the puppy was thin, hypothermic, and tachypneic and had pale mucous membranes, and respiration was markedly labored. Pulmonary crackles were detected in all lung fields during auscultation, and the abdomen was distended but pliable; signs of pain were not elicited during palpation of the abdomen. Results of an ELISA for canine parvovirus were negative. The puppy's PCV was 36% (reference range, 26% to 40%), and the concentration of serum total protein was 5.5 mg/dL (reference range, 4 to 5 mg/dL). Cytologic evaluation of a blood smear revealed leukocytosis composed predominantly of neutrophils and many reactive lymphocytes. Abnormalities detected on serum biochemical analyses included mild azotemia, and activities of alanine aminotransferase and alkaline phosphatase were slightly high. Radiographs of the thorax were obtained (**Figure 1**).

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

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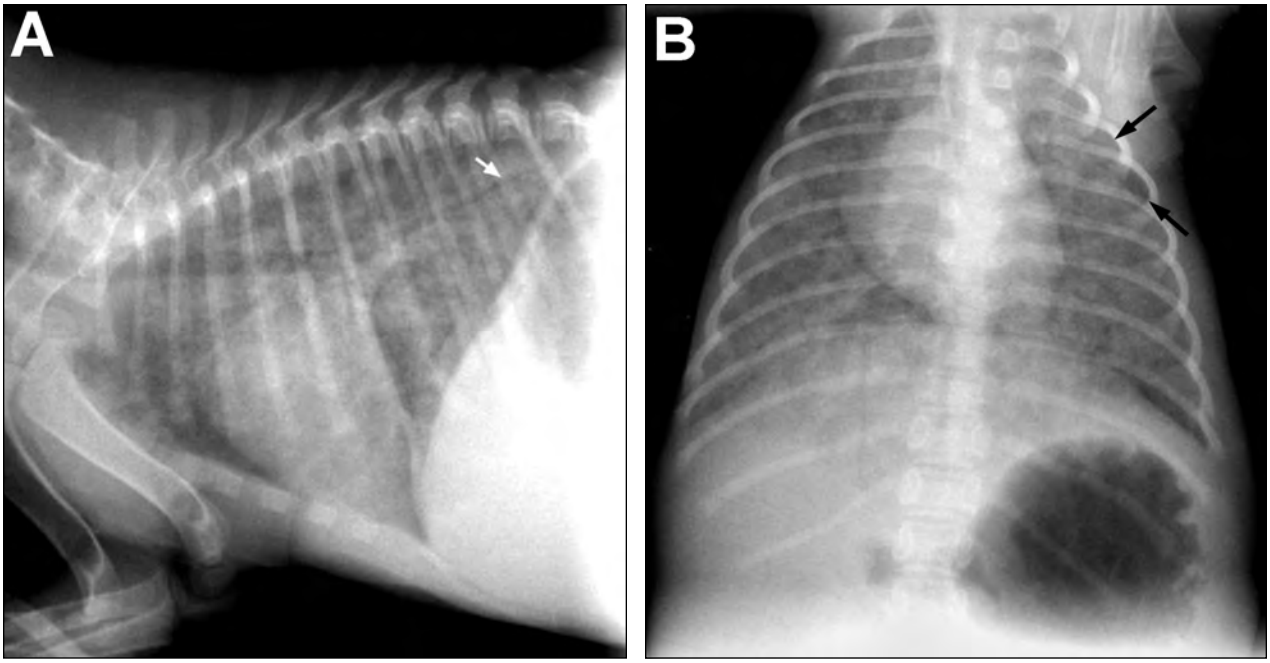

Figure 2—Same radiographic views as in Figure 1. Notice a severe diffuse increase in soft tissue opacity throughout the pulmonary parenchyma almost completely obscuring the pulmonary vasculature. Air bronchograms (white arrow) are evident in the caudodorsal lung field. The peripheral aspect of the cranial segment of the left cranial lung lobe (black arrows) is not as severely affected as the remainder of the lung.

Radiographic Findings and Interpretation

There is a severe diffuse increase in soft tissue opacity throughout the pulmonary parenchyma almost completely obscuring the pulmonary vasculature (**Figure 2**). Air bronchograms can be seen in the caudodorsal lung field. The peripheral aspect of the cranial segment of the left cranial lung lobe is not as severely affected as the remainder of the lung. These radiographic findings are compatible with a severe, diffuse unstructured interstitial pattern progressing to an alveolar pattern. Differential diagnoses included severe interstitial pneumonia secondary to viral causes or noncardiogenic pulmonary edema secondary to toxin exposure, electric cord shock, neurologic trauma, or vasculitis. Gastric air distention is attributed to aerophagia.

Comments

Diseases that are commonly characterized by a diffuse unstructured interstitial pattern include interstitial pulmonary edema, pulmonary fibrosis, early heartworm disease, and viral pneumonia.[1] The interstitial pattern in early viral pneumonia has a generalized distribution, with the radiographic changes most prominent in the caudodorsal lung and perihilar area.[1] Bronchopneumonia due to a bacterial cause is more commonly associated with a cranioventral distribution and was therefore an unlikely diagnosis in the dog of this report. Oxygen supplementation and furosemide (2.5 mg/kg [1.14 mg/lb], IV, repeated 2 and 6 hours after initial administration) were administered to the puppy for treatment of noncardiogenic pulmonary edema. The puppy's clinical condition continued to deteriorate, and respiratory arrest occurred approximately 12 hours after admission. Although the dog was successfully resuscitated, the puppy died after a second episode of respiratory arrest 4 hours later.

Necropsy findings supported a diagnosis of canine herpesvirus infection. Viral isolation performed on specimens from the lung, kidney, and gastrointestinal tract identified herpesvirus infection. Nucleotide sequencing of polymerase chain reaction assay products extracted from the kidney and spleen indicated that the sequence was 100% identical to canine herpesvirus. Canine herpesvirus is acquired through direct contact with infected bodily fluids.[2] Infection of adult dogs is most often subclinical but may be associated with genital or respiratory disease.[2] Clinical disease is most common in puppies born to females infected during pregnancy or in puppies infected during the neonatal period. Abortion, stillbirth, and fading puppy syndrome attributable to multifocal hemorrhagic necrosis may result from canine herpesvirus infection.[2] Puppies infected after 2 weeks of age or puppies nursing bitches with adequate antibodies against canine herpesvirus are generally resistant to clinical disease, although they remain latent carriers capable of shedding the virus at a later date.[2] Except for the age, clinical signs and pathologic findings in the puppy of this report were typical for canine herpesvirus infection.

1. Myer W. Radiography review: the interstitial pattern of pulmonary disease. *Vet Radiol* 1980;21:18–23.

2. Cohn LA, Langdon P. Viral infections. In: Morgan RV, ed. *Handbook of small animal practice*. 4th ed. Philadelphia: WB Saunders Co, 2003;1093–1094.