What Is Your Diagnosis?

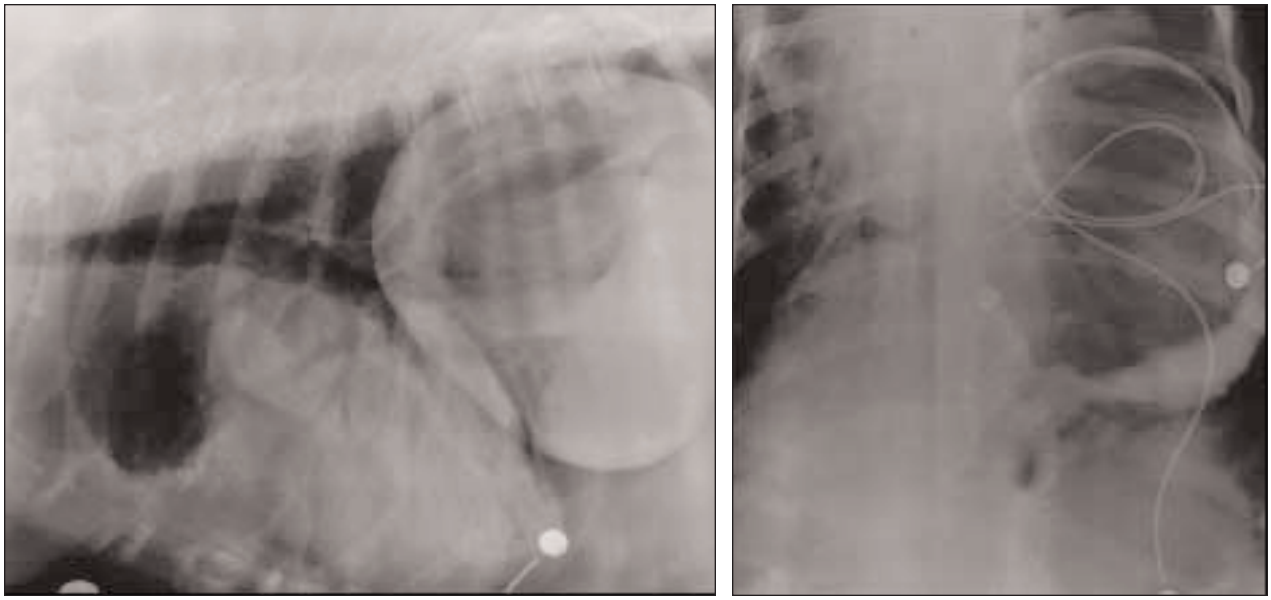

Figure 1—Right lateral (left) and dorsoventral (right) radiographic views of the thorax of a 9-year-old Great Dane with increased respiratory effort and lethargy that developed 24 hours after surgical treatment of gastric dilatation-volvulus.

History

A 9-year-old spayed female Great Dane was evaluated because of restlessness, progressive discomfort, and several bouts of nonproductive vomiting during the previous 4 hours. Findings on the initial examination were characteristic of **gastric dilatation-volvulus (GDV)** and mild shock. Results of CBC and serum biochemical analyses were within reference ranges. Abdominal radiography confirmed the diagnosis of GDV, and surgery was performed. During surgery, the stomach was rotated counterclockwise 270°, and an incisional gastropexy was performed. The dog recovered without complications. However, on the following day the dog developed increased respiratory effort and prolonged capillary refill time (2 sec) and became progressively more lethargic. An ECG revealed ventricular tachycardia (260 beats/min). Lateral and ventrodorsal radiographic views of the thorax were obtained (**Fig 1**).

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

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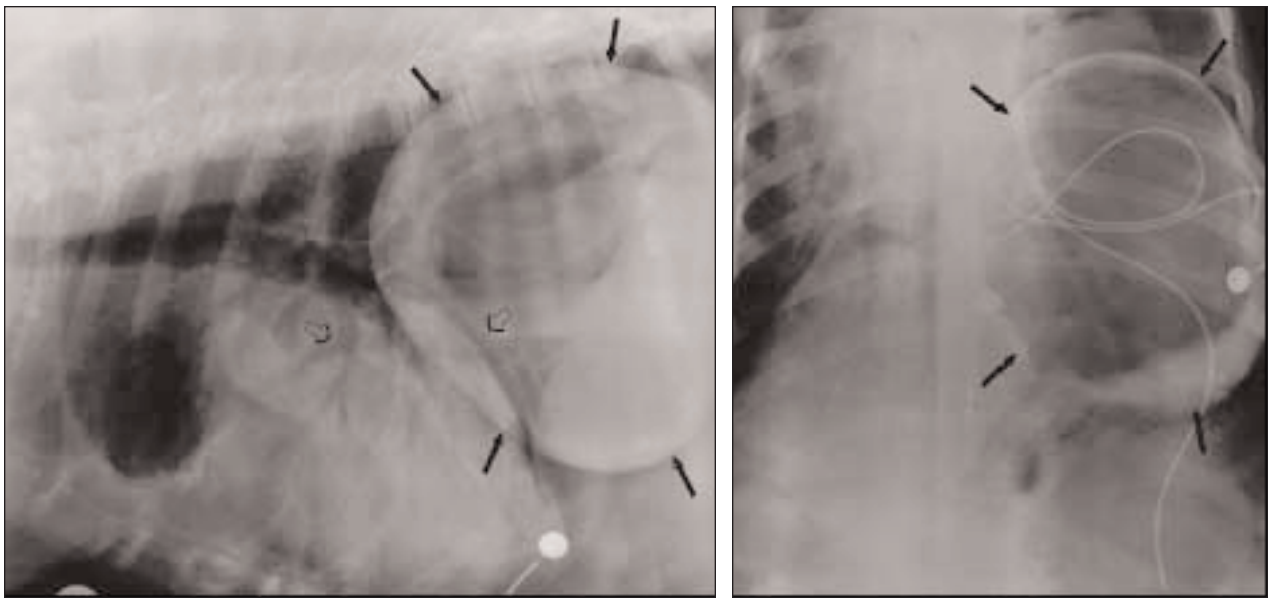

Figure 2—Same radiographic views as in Figure 1. Most of the stomach is within the caudal portion of the thorax and distended with gas (solid arrows). An alveolar infiltrate within the left cranial and caudal lung lobes is also apparent (open arrows).

Diagnosis

Radiographic diagnosis—Gastric dilatation and herniation of the stomach into the caudal region of the thorax (**Fig 2**).

Comments

Mild pneumothorax and pneumoperitoneum were evident, which raised concern about a possible communication between the abdominal and thoracic cavities. An alveolar infiltrate was apparent in the left cranial and caudal lung lobes together with a heavy interstitial pattern in the right cranial, middle, and caudal lobes. These radiographic findings were consistent with a diaphragmatic or hiatal hernia. The stomach appeared to be the only abdominal organ in the thoracic cavity. We briefly considered gastroesophageal intussusception as a differential diagnosis, but radiographic evidence supporting a communication between body cavities and the lack of soft-tissue opacity in the herniated structure made this diagnosis unlikely. An orogastric tube was positioned to decompress the stomach before surgery. Celiotomy revealed that the incisional gastropexy was intact; however, the stomach protruded through a 4-in tear in the diaphragm at the level of the esophageal hiatus. The tear extended dorsolaterally toward the left and appeared to be acute (< 72 hours). The stomach was gently retracted from the thoracic cavity, the diaphragmatic tear was closed, and the esophagus was sutured to the diaphragm with nonabsorbable suture. Because the tear appeared acute, we presumed trauma was the likely cause of the hernia. However, there was no history of trauma, and the dog was confined to a cage in the intensive care unit after gastropexy. The diaphragmatic tear was likely present during the gastropexy, but the esophageal hiatus was not specifically inspected during that surgery.

Diaphragmatic hernias can be congenital or acquired.[1] Acquired hernias often occur secondary to trauma, and affected animals may develop signs of shock, dyspnea, exercise intolerance, anorexia, depression, vomiting, diarrhea, weight loss, or pain after eating.[1-3] Diagnosis of diaphragmatic hernia can usually be made from survey radiographs. Common findings include interruption or loss of the diaphragmatic outline, abdominal contents within the thoracic cavity, cranial displacement of abdominal contents, and cranial or lateral displacement of lungs.[2,3] In cases where survey radiographic findings are equivocal, additional imaging procedures may be performed. These include horizontal-beam or erect ventrodorsal abdominal radiography, to gastrography or upper gastrointestinal tract contrast radiography, and positive-contrast celiography.[3]

Pulmonary abnormalities evident on the thoracic radiographs were consistent with aspiration or bacterial pneumonia. Predisposing factors for these disorders include esophageal disease, anatomic defects, pharyngeal dysfunction, vomiting, and a depressed state of consciousness.[4] In the dog of this report, a dilated esophagus, GDV, orogastric tube placement, displacement of the stomach into the thoracic cavity, regurgitation around the orogastric tube prior to gastropexy, and general anesthesia were all likely inciting factors for the pulmonary abnormalities. Despite treatment efforts, this dog developed sepsis and disseminated intravascular coagulation and died 60 hours after the second surgery.

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2. Garson HL, Dodman NH, Baker GJ. Diaphragmatic hernia: analysis of fifty-six cases in dogs and cats. *J Small Anim Pract* 1980;21:469–481.

3. Williams J, Leveille R, Myer CW. Imaging modalities used to confirm diaphragmatic hernia in small animals. *Compend Contin Educ Small Anim Pract* 1998;20:1199–1210.

4. Hawkins EC. Aspiration pneumonia. In: Bonagura JD, ed. *Kirk's current veterinary therapy XII*. Philadelphia: WB Saunders Co, 2000;915–919.