

What Is Your Diagnosis?

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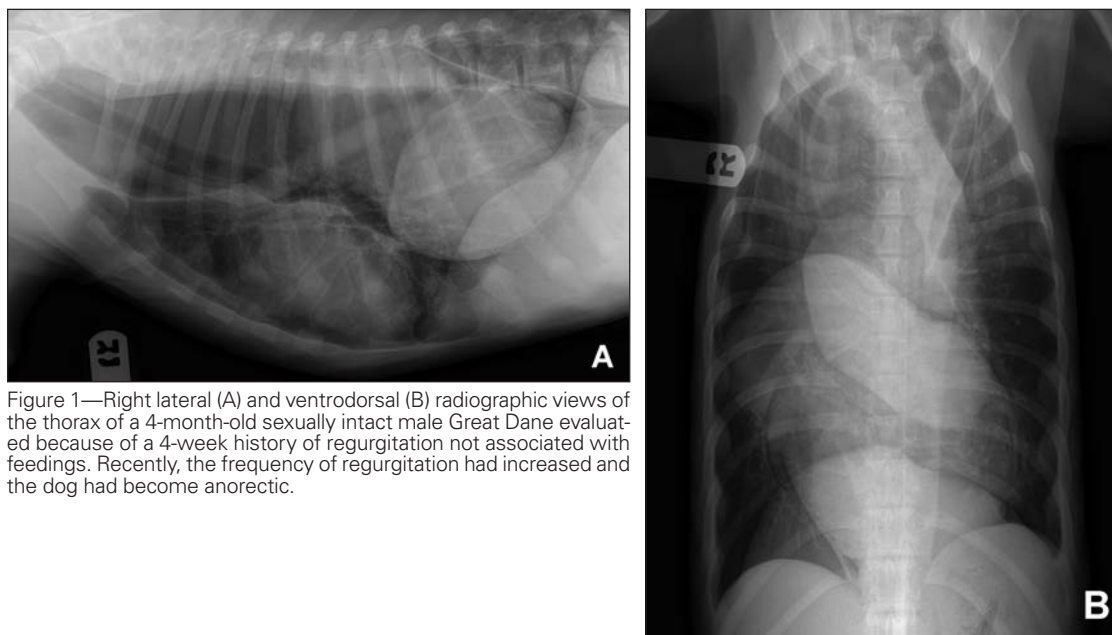


Figure 1—Right lateral (A) and ventrodorsal (B) radiographic views of the thorax of a 4-month-old sexually intact male Great Dane evaluated because of a 4-week history of regurgitation not associated with feedings. Recently, the frequency of regurgitation had increased and the dog had become anorectic.

History

A 4-month-old sexually intact male Great Dane was referred because of regurgitation since being acquired at 3 months of age. The frequency of regurgitation had historically been approximately 3 to 4 episodes/d but had increased dramatically over the 24 hours prior to referral, with 20 to 30 episodes of regurgitation and 1 episode of vomiting being reported. The regurgitated material was described as containing food, liquid, and foam, and episodes were not related to feedings. The dog's appetite had always been good; however, the owners reported that the dog had been anorectic the morning of initial evaluation. Vaccination and deworming status were complete and current.

Physical examination revealed a quiet but responsive puppy with a body condition score of 1 of 5. The dog was approximately 8% dehydrated with marked diffuse muscle wasting. Thoracic auscultation revealed tachycardia with a heart rate of 160 beats/min, but no murmur or arrhythmia was appreciated. Increased bronchovesicular lung sounds were present on auscultation of the right side of the thorax. Findings on abdominal palpation were unremarkable. The dog had 1 retained testis and was normothermic. Complete blood count and serum biochemistry analysis performed the day of initial evaluation revealed only moderate leukocytosis characterized by a neutrophilia with a left shift. Thoracic 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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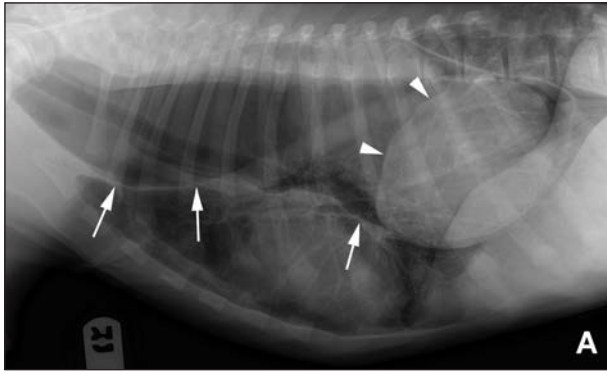
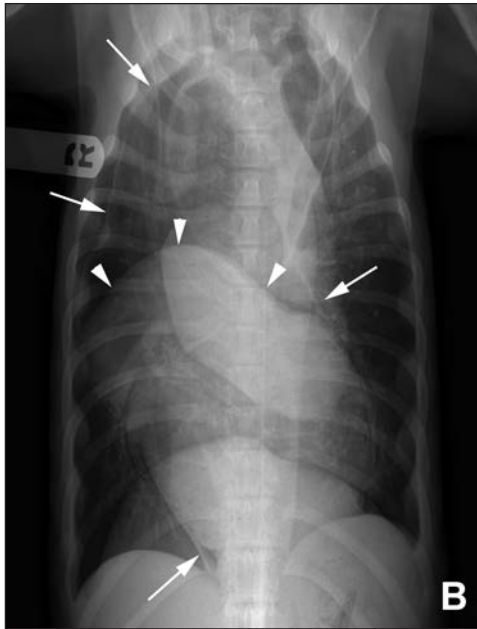


Figure 2—Same radiographic images as in Figure 1. Notice the large soft tissue opacity overlying the caudal portion of the thorax (arrowheads) and the severely distended esophagus (arrows).



Diagnostic Imaging Findings and Interpretation

The esophagus is severely distended with gas (Figure 2). In the caudal portion of the esophagus, there is a large, well-defined soft tissue structure. There is gas contrasting the cranial edge of this structure. This structure has a mass effect, displacing the heart ventrally and slightly to the left. The stomach is not evident in the abdomen. These findings are consistent with gastroesophageal intussusception.

An esophagram was obtained by use of iohexol (Figure 3). Contrast medium was evident passing ventral to the soft tissue structure, but no contrast medium was seen to accumulate in the stomach. This finding was also consistent with gastroesophageal intussusception.

Treatment and Outcome

The dog underwent exploratory laparotomy. The gastroesophageal intussusception was accompanied by paraesophageal herniation of a portion of the stomach and the entire spleen. The paraesophageal herniation had not been detected on the survey or contrast radiographic studies; radiographic signs had been considered consistent with an intraluminal esophageal structure such as a gastroesophageal intussusception. It is

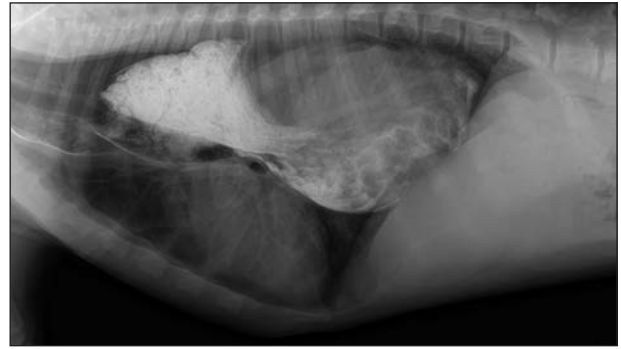


Figure 3—Lateral positive-contrast esophagram of the dog in Figure 1. The contrast agent highlights the esophageal margins and the intraluminal esophageal structure. Notice that the contrast agent has not moved into the stomach. These findings are consistent with gastroesophageal intussusception.

possible, but unlikely, that displacement of a portion of the stomach and the spleen through the paraesophageal hernia was induced by positioning the dog in dorsal recumbency for surgery or by muscle relaxation induced by anesthesia. In this dog, megaesophagus was present at the 2-week recheck examination after surgery. The dog was subsequently lost to additional follow-up.

Comments

Gastroesophageal intussusception is a rare condition that usually affects dogs < 1 year of age.¹ Most reported cases are in animals < 3 months old. Males and German Shepherd Dogs are overrepresented in the literature.² Gastroesophageal intussusception occurs when the stomach, with or without the spleen, duodenum, pancreas, and omentum, invaginates through the esophageal hiatus into the caudal portion of the esophagus.² This usually results in an esophageal obstruction that is responsible for the rapid deterioration and ultimately a high mortality rate, and as such, early detection of gastroesophageal intussusception is vital if therapeutic intervention is to be considered.

In cases of gastroesophageal intussusception, survey thoracic radiography will reveal a soft tissue opacity in the caudodorsal aspect of the mediastinum adjacent to the diaphragm. A dilated esophagus is often present, and gas contrasting the cranial margin of the soft tissue structure may be observed. The entire silhouette of the stomach will not be present in the cranial portion of the abdomen. Contrast radiography usually produces a large intraluminal filling defect in the caudal portion of the esophagus. Gastric rugal folds may be outlined, and contrast medium does not usually enter the stomach. If it does, part of the stomach may be visualized in the caudal portion of the thorax. Endoscopy may reveal rugal folds of the stomach in the caudal portion of the esophagus and associated esophageal pathological changes, such as esophagitis.

The use of contrast radiography for the diagnosis of gastroesophageal intussusception is not usually required. If an esophagram is deemed necessary, the risks associated with the use of a contrast agent in the face of esophageal disease and the properties of available contrast media need to be considered.³ Risks include aspiration of the contrast agent and leakage of the contrast

agent from a perforation in the gastrointestinal tract. Types of gastrointestinal contrast agents include barium sulfate and iodine-based media; the iodine-based agents can be further classified by their osmolality as low-osmolality contrast media, such as iohexol, and high-osmolality contrast media, such as diatrizoate. The iodine-based media are the best choice if there is a risk of perforation because they are absorbed into the vasculature and excreted via the kidneys, whereas barium is not absorbed. If there is a risk of aspiration, low-osmolality contrast media are the best choice because they are much less likely to induce pulmonary edema than are high-osmolality contrast media.³

Gastroesophageal intussusception and paraesophageal hernia both cause esophageal obstruction. Gastroesophageal intussusception results in esophageal obstruction via internal esophageal obstruction and paraesophageal hernia results in esophageal obstruction via external caudal esophageal compression.⁴ Clinical signs of esophageal obstruction include regurgitation, vomiting, drooling, dysphagia, and signs of abdominal discomfort with either disease processes. However, most gastroesophageal intussusceptions result in acute onset of severe clinical signs, whereas paraesophageal hernias usually result in low-grade, chronic, intermittent clinical signs.⁵ Dyspnea and tachypnea may be seen if the herniated abdominal contents occupy substantial space in the thorax. Other clinical signs that may be seen are associated with potential sequelae, such as increased respiratory effort or lung sounds associated with pulmonary disease caused by aspiration of regurgitated or vomited material.

In this reported case, the chronic low-grade clinical signs may have been attributed to the megaesophagus or the paraesophageal hernia. The sudden onset of more severe regurgitation may have been caused by the gastroesophageal intussusception, a condition for which megaesophagus is a risk factor.

Surgical treatment of gastroesophageal intussusception and paraesophageal herniation involves removal of the displaced abdominal viscera from the thoracic cavity. Once achieved, this should be maintained by performing a fundic gastropexy and hiatal herniorrhaphy. Medical management of the potential sequelae, such as megaesophagus, esophagitis, esophageal stricture, and aspiration pneumonia, as indicated is also vital if a successful outcome is to be achieved. Long-term prognosis appears to be directly associated with esophageal function.¹

1. Rassmussen L. Stomach. In: Slatter DH, ed. *Slatter's textbook of small animal surgery*. 3rd ed. Philadelphia: WB Saunders Co, 2002;592–640.
2. Leib MS, Blass CE. Gastroesophageal intussusception in the dog. A review of the literature and a case report. *J Am Anim Hosp Assoc* 1984;20:783–790.
3. Swanson DP, Halpert RD. Gastrointestinal contrast media: barium sulfate and water-soluble iodinated agents. In: Swanson DP, ed. *Pharmaceuticals in medical imaging*. New York: Macmillan, 1990;155–183.
4. Park RD. The diaphragm. In: Thrall DE, ed. *Textbook of veterinary diagnostic radiology*. 5th ed. St Louis: Saunders Elsevier, 2007;525–540.
5. Bright RM, Sackman JE, NeNovo D, et al. Hiatal hernia in the dog and cat: a retrospective study of 16 cases. *J Small Anim Pract* 1990;31:244–250.