RADIOGRAPHIC DIAGNOSIS: PERICARDIOPERITONEAL DIAPHRAGMATIC HERNIA AND CHOLELITHIASIS IN A DOG

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Signalment

Seven year old, neutered, male Shih Tzu

History and Physical Examination

The dog had a history of abdominal pain and vomiting of five days duration. An umbilical hernia had been surgically repaired years earlier. The dog was depressed, lethargic, and had painful palpations of the cranial abdomen. Body temperature (39°C), heart rate (110 bpm) and respiratory rate (44 breaths/min.) were normal. Heart sounds were clearly audible on the right side and muffled on the left side. There was a neutrophilia with a left shift (15,690 segmented neutrophils/μl (69%) and 9,100 bands/μl (4%)). Abnormalities on the serum chemistry profile included elevated values for liver enzymes (alkaline phosphatase: 562 IU/L (1-90 IU/L), aspartate transferase: 190 IU/L (10-62 IU/L), alanine transferase: 99 IU/L (1-94 IU/L), hypoalbuminemia of 2.4 g/dl (3.2-4.7 g/dl) and elevated creatinine kinase: 2862 IU/L (51-529 IU/L)). Radiographs of the thorax and abdomen were obtained (Figs. 1-4).

Radiographic Findings

The cardiac silhouette was enlarged and irregular in shape. There was incomplete visualization of the diaphragm and there were only six sternebrae. A spherical object of mineral opacity was superimposed upon the cardiac silhouette (Fig. 1, 2). The stomach was cranially displaced within the abdomen (Fig. 3, 4).

Radiographic Diagnosis

Congenital pericardioperitoneal diaphragmatic hernia with displacement of liver into the pericardial sac. Differential diagnoses for the mineralized object included an intraluminal intestinal foreign body or a cholelith within the gall bladder, herniated into the pericardial sac.

Surgical Findings

The right medial liver lobe and the gall bladder were displaced through a pericardioperitoneal diaphragmatic hernia. The gall bladder was necrotic and it ruptured during reduction of the hernia. Its contents included purulent bile and a large cholelith. The common bile duct draining the remaining liver lobes was intact. The herniated liver lobe and the gall bladder were resected, the pericardial sac was lavaged with warm saline (0.09% NaCl) and the diaphragmatic defect was repaired. Enterococcus sp. was isolated from the gall bladder. Histologically, the gall bladder and resected liver lobe were characterized by necrotizing, suppurative, and granulating cholecystitis; fibrosis, glissonian capsulitis; hepatitis with pericapsular hemorrhage, and coalescing bridging portal fibrosis. Antibiotic medication (cephazolin, 20 mg/kg IV, every six hours) was administered during hospitalization. No post-operative complications occurred and the dog was discharged two days after surgery. Antibiotic therapy (cephalexin, 10 mg/kg PO, every eight hours) was continued for seven days. After recovery from surgery the dog’s clinical signs resolved. Five weeks post-operatively the owner noted that even the occasional vomiting, which had been present prior to the acutely painful episode, had not recurred.

Discussion

Pericardioperitoneal diaphragmatic hernia is an uncommon congenital anomaly in dogs and cats. It is associated with other anomalies of the abdominal body wall such as ventral abdominal hernias and sternal abnormalities. The dog in this report had a previously repaired, umbilical hernia and had only six sternebrae. The pericardioperitoneal diaphragmatic hernia may be incidental in some dogs and clinical significance depends on the condition of herniated tissues into the pericardial sac.

Cholelithiasis is also an uncommon condition in dogs and cats that may be clinically silent. Clinical signs of cholelithiasis are usually evident when there is an associated cholecystitis, biliary obstruction, or biliary rupture. Clinical signs of cholecystitis include vomiting, anorexia, polyuria, polydypsia, weight loss, icterus, fever, and abdominal pain. A cholelith may be visible on abdominal radio-
Fig. 1. Right lateral radiograph of the thorax. The cardiac silhouette is enlarged and irregular, the diaphragm is not completely visualized and only six sternebrae are present. A round, mineral opacity is superimposed upon the cardiac silhouette.

Fig. 2. Ventrodorsal thoracic radiograph. The mineral opacity is spherical and superimposed on the enlarged cardiac silhouette.

Fig. 3. Right lateral radiograph of the abdomen. The stomach is craniately displaced in these abdomen and there is incomplete visualization of the diaphragm.

Fig. 4. Ventrodorsal radiograph of the abdomen. The stomach is crani ally displaced and there is incomplete visualization of the diaphragm.
graphs although not all choleliths are radiopaque. Pure cholesterol choleliths are radiolucent, pigment stones and choleliths of mixed contents are variable in opacity and calcium bilirubinate choleliths are radiopaque. The cholelith in this dog was comprised of calcium carbonate. In this dog, herniation of the gall bladder and liver lobe into the pericardial sac may have contributed to formation of the cholelith and was likely associated with the cholecystitis and hepatitis. Cholecystectomy is indicated for treatment of cholelithiasis with cholecystitis. Microbial culture of bile or gall bladder tissue is recommended as an underlying infection is common. Escherichia coli, Streptococcus sp., Enterococcus sp., and Klebsiella sp. are common bacterial agents in infectious cholecystitis. Specific antimicrobial sensitivity should be determined for selection of appropriate antibacterial medication, however, if this is not available, then empirical medication may include a first-generation cephalosporin, fluoroquinolones, or ampicillin.

The dog in this report was unique in that two, potentially incidental abnormalities, pericardioperitoneal diaphragmatic hernia and cholelithiasis, were present simultaneously and that both conditions contributed to the dog’s medical problem. Surgical management by cholecystectomy and herniorrhaphy led to complete resolution of the clinical signs.

REFERENCES