What Is Your Diagnosis?

In collaboration with the American College of Veterinary Radiology

Figure 1—Ventrodorsal (A), right lateral (B), and left lateral (C) thoracic radiographic images obtained after therapeutic thoracocentesis in a 6-year-old 3.84-kg spayed female domestic shorthair cat with a 5-day history of increased respiratory rate and effort. Images published with permission of Stacy Meola, DVM, DACVECC and Wheat Ridge Animal Hospital, the copyright holders; all rights reserved. Individuals wishing to reproduce the images should contact Wheat Ridge Animal Hospital, 10140 W 44th Ave, Wheat Ridge, CO 80033.

History

A 6-year-old 3.84-kg spayed female domestic shorthair cat was evaluated for a 5-day history of dyspnea characterized by increased respiratory effort without open-mouth breathing or coughing.

On initial examination, the cat was tachypneic and had decreased lung sounds diffusely. Heart sounds were difficult to auscultate, and the remaining findings on physical examination were unremarkable. Results of a CBC indicated mild nonregenerative anemia (Hct, 27%; reference range, 32% to 47%) and mild lymphopenia (663 cells/ μ L; reference range, 1,500 to 6,000 cells/ μ L); findings on serum biochemical analyses were unremarkable. Three-view thoracic radiography was performed and revealed a large amount of pleural fluid. Therapeutic thoracocentesis yielded 90 mL of red-tinged fluid, and then 3-view thoracic radiography was repeated (**Figure 1**).

Formulate differential diagnoses, then continue reading.

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Diagnostic Imaging Findings and Interpretation

Thoracic radiography repeated after thoracocentesis (**Figure 2**) revealed a moderate amount of pleural fluid remaining bilaterally, characterized by dorsal retraction of the lung lobes on lateral projections. In addition, multiple pleural fissure lines that flared toward the periphery were visible. The cranial aspect of the cardiac silhouette was border effaced by an indistinct soft tissue opacity that widened the cranial mediastinum. The remaining visible aspects of the cardiac silhouette were radiographically normal, as were findings for the caudal pulmonary vasculature.

Differential diagnoses for cranial mediastinal widening included a cranial mediastinal mass (eg, lymphoma, thymoma, ectopic thyroid carcinoma), effusion (pleural or mediastinal and causing subsequent lateral lung lobe retraction), metastatic mediastinal lymphadenopathy, and nonneoplastic etiologies, such as reactive lymphadenopathy, granuloma, mediastinal fluid, and branchial cyst. Differential diagnoses for pleural fluid in cats included heart failure, neoplastic effusion, pyothorax, chylothorax,

hypoproteinemia, feline infectious peritonitis, and hemorrhage.

Ultrasonography revealed a homogeneously hypoechoic mass (approx 4.02 X 1.43 X 2.15 cm) with rounded and smooth margins in the cranioventral aspect of the mediastinum, consistent with sternal lymphadenomegaly (**Figure 3**); thickened pericardium, because of which echocardiography was recommended; and diffusely hyperechoic pancreas, suggestive of chronic pancreatitis or fibrosis. An ultrasound-guided fine-needle aspirate sample of the suspected enlarged sternal lymph node was submitted for cytologic examination, and echocardiography revealed a structurally normal heart with a uniformly subjectively thickened pericardium (2.3 to 2.9 mm thick). Given the findings of pleural fluid, a structurally normal heart, and a thickened pericardium, constrictive pericarditis was the primary differential diagnosis.

Cytologic examination and analysis of pleural fluid obtained during therapeutic thoracocentesis confirmed a chylothorax: the cat's serum triglyceride concentration was 74 mg/dL (reference range, 24 to 135 mg/dL) and pleural fluid triglyceride concentration was 1,229 mg/dL. No abnormal or neoplastic cells were noted in the fluid, which was reviewed

Figure 2—Same images as in Figure 1. The cranial mediastinum is widened by an indistinct soft tissue opacity (white arrows). There is dorsal retraction of the lung lobes (black arrows) by a moderate volume of pleural fluid, and multiple pleural fissure lines (white arrowheads) flare toward the periphery. Images published with permission of Stacy Meola, DVM, DACVECC and Wheat Ridge Animal Hospital, the copyright holders; all rights reserved. Individuals wishing to reproduce the images should contact Wheat Ridge Animal Hospital, 10140 W 44th Ave, Wheat Ridge, CO 80033.

Figure 3—Sagittal plane ultrasonographic image of the presumed sternal lymph node (4.02 X 1.43 cm in this image), consistent with lymphadenomegaly (A), and a short-axis ultrasonographic view of the heart showing subjectively markedly thickened pericardium (0.5 cm between the calipers; B) in the cat described in Figure 1. Images published with permission of Stacy Meola, DVM, DACVECC and Wheat Ridge Animal Hospital, the copyright holders; all rights reserved. Individuals wishing to reproduce the images should contact Wheat Ridge Animal Hospital, 10140 W 44th Ave, Wheat Ridge, CO 80033.

by a board-certified veterinary pathologist. Cytologic findings for the fine-needle aspirate sample of the suspected enlarged sternal lymph node suggested mesenchymal cell proliferation, with mesenchymal cells that had moderate atypia, potentially neoplastic or reactive fibroplasia.

Treatment and Outcome

The cat underwent subtotal pericardiectomy and thoracic lymphatic duct ligation; the sternal lymph node was not removed. The pericardium was markedly thickened and irregular. The cat recovered from surgery and was discharged 4 days postoperatively with a fentanyl patch (12 µg/h) topically placed and owner instructions to continue to monitor respiratory rate and effort.

Results of histopathologic evaluation with immunohistochemical analysis of tissue sections of the pericardium confirmed diagnosis of pericardial hemangiosarcoma. Aerobic and anaerobic bacterial cultures performed on samples of pericardium and pleural fluid yielded no growth.

After discharge from the hospital, the cat returned multiple times because of labored breathing. Repeated therapeutic thoracocentesis confirmed recurrent chylous effusion. The owner elected for euthanasia of the patient 18 days after surgery.

Comments

Pleural fluid was identified on thoracic radiography of the cat of the present report; however, the finding was nonspecific. Due to the soft tissue opacity of pleural fluid, potential etiologies within the thoracic cavity may be obscured. As performed for the cat of the present report, repeated thoracic radiography after thoracocentesis may reveal etiologies. In cats, pleural fluid has a wide variety of causes (eg, left-sided congestive heart failure, hemorrhage,

pyothorax, and neoplasia), and the combination of cytologic examination of pleural fluid and repeated thoracic radiography after thoracocentesis may help in refining a differential diagnosis list. A cranial mediastinum that is widened by soft tissue opacity may be indicative of a cranial mediastinal mass (eg, lymphoma or thymic epithelial tumors), lymphadenopathy, or less common differential diagnoses such as an abscess, hematoma, granuloma, or branchial cyst. Thoracic ultrasonography was used to visualize the cranial mediastinum, and careful examination revealed a thickened pericardium in our patient.

Echocardiography is the gold standard for examination of cardiac function and measurement of cardiac chambers and wall thickness. A presumptive diagnosis of constrictive pericarditis is considered for cats with idiopathic pleural effusion, no evidence of structural heart disease, and a thickened pericardium.¹ Constrictive pericarditis is a thickening and decreased pliability of the pericardium that results in decreased diastolic filling and eventual right heart failure. Increased cranial vena caval pressure can create a subsequent increase in pressure within the thoracic lymphatic duct drainage, leading to chylous effusion.² Constrictive pericarditis is idiopathic in most patients; however, infectious etiologies have also been demonstrated.³ Very few cases of pericardial neoplasia are reported to cause constrictive pericarditis with secondary chylothorax in cats.⁴ Although concurrent chylothorax and constrictive pericarditis is idiopathic in nature for most cats, neoplasia should be included as a differential diagnosis.⁵

Histopathology of the pericardium was necessary to provide a specific diagnosis of pericardial hemangiosarcoma in the cat of the present report. Pericardial hemangiosarcoma is a rare tumor in cats, and to our knowledge, there is 1 case reported in the veterinary literature.¹ Tumors more commonly found in the pericardium of cats include lymphoma, metastatic mammary adenocarcinoma, and metastatic

lung adenocarcinoma. In dogs, hemangiosarcoma is typically found to be a mass located in the right atrium or right auricle, rather than within the pericardium. Findings in the cat of the present report underscored the importance of including consideration of constrictive pericarditis as an inciting cause in cats with chylothorax.

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