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Cardiac involvement secondary to mediastinal lymphoma in a cat: regression with chemotherapy

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Abstract Mediastinal lymphoma with neoplastic invasion into the heart was diagnosed in a 9-year-old castrated male domestic short hair cat. The neoplastic infiltrate was seen throughout the atria and atrial septum, surrounded the aortic root, and resulted in narrowing of the right ventricular outflow tract. Chemotherapy resulted in resolution of the echocardiographic abnormalities and the cat's clinical signs until the patient was euthanized 58 days later following development of neurologic signs. Mediastinal lymphoma with myocardial invasion and response to chemotherapy has not been documented previously in the veterinary literature.
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A 9-year-old 6.8 kg castrated male domestic short hair cat was presented to the Oradell Animal Hospital for evaluation of chronic ocular discharge, mandibular lymphadenopathy, and dyspnea. The owner reported ocular discharge as the first clinical sign; treatment with triple antibiotic ointment and hyaluronic acid failed to improve the ocular signs. Two months later, respiratory signs developed and the cat's condition deteriorated despite treatment with orbifloxacin (1 drop OU q 12 h) and prednisone (0.75 mg/kg PO q 12 h). The cat was hospitalized by the referring veterinarian for an episode of dyspnea soon after the development of respiratory signs where the prednisone was discontinued and the cat was treated with furosemide, cefovecin, and nebulization.

On presentation to the referral hospital due to persistent clinical signs, the cat had severe bilateral chemosis, protrusion of the third eyelid, and mucoid ocular discharge. A grade II/VI systolic heart murmur was ausculted over the left parasternal border, which had not been previously documented. The cat was tachypneic with increased respiratory effort and increased bronchial sounds

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List of abbreviations

FS	fractional shortening
IVSd	interventricular septum thickness at end-diastole
LVIDd	left ventricular internal diameter at end-diastole
LVPWd	left ventricular free wall thickness at end-diastole

bilaterally. Marked mandibular lymphadenopathy was identified (12 mm diameter). The patient was assessed to be 5–7% dehydrated. Complete blood count revealed a neutrophilia of 30.68 K/μL (Reference range 1.15–10.29 K/μL), a lymphocytosis of 7.59 K/μl (Reference range 0.92–6.88 K/μL), and a monocytosis of 1.54 K/μL (Reference range 0.05–0.64 K/μL). Blood chemistry revealed a blood urea nitrogen of 44 mg/dL (Reference range 16–36 mg/dL) and a creatinine of 3.5 mg/dL (Reference range 0.8–2.4 mg/dL), which was suspected to be secondary to furosemide therapy. Alkaline phosphatase was low at 10 U/L (14–111 U/L). The remainder of the complete blood count and blood chemistry was within normal reference ranges.

Thoracic radiographs (Fig. 1) identified a large cranial mediastinal mass widening the mediastinum and displacing the trachea dorsally. There was atelectasis of the right middle lung lobe. Additionally, there was suspicion for right cranial, left cranial and left caudal lung lobe atelectasis resulting in a shifting of the heart to the left. Thoracic ultrasound [a,b] identified a large cranial mediastinal mass surrounding the cranial vena cava and ultrasound-guided fine needle aspiration of the mass was performed. Subsequent echocardiography allowed visualization of an abnormal soft tissue density throughout the atrial septum, around the aorta, and in the wall of the left and right atrium (Fig. 2). This infiltrative tissue narrowed the right ventricular outflow tract at the level of the infundibulum and was associated with a mild increase in the right ventricular outflow tract velocity (Reference range 1.59 m/s). Additionally the left ventricular lumen was subjectively decreased in size (LVIDd = 11.0 mm, reference range 10.8–21.4 mm) associated with moderate ventricular septal (IVSd = 7.4 mm, reference range 3.0–6.0 mm) and free wall hypertrophy (LVPWd = 7.8 mm, reference range 2.5–6.0 mm). Left atrial enlargement was not identified with a left atrial dimension to aortic root dimension ratio of 1.08 (reference range < 1.50).[1] Pseudohypertrophy from hypovolemia was suspected although infiltrative disease within the ventricle or hypertrophic cardiomyopathy were also considerations. Based on the fractional shortening percentage (FS = 63%) its systolic function was considered normal. Mild to moderate pericardial effusion without cardiac tamponade was visualized. The mass infiltrating the heart base extended cranially and was contiguous with the mass effect in the cranial mediastinum surrounding the cranial vena cava. Based on the presentation, radiographic, and ultrasonographic findings, the severe myocardial infiltrates were suspected to be neoplastic, with lymphoma being the most likely differential diagnosis.

Cytological evaluation of the mediastinal mass revealed a predominance of lymphoblasts exhibiting moderate anisocytosis and anisokaryosis with large and eccentrically-placed nuclei and round, centrally-placed prominent nucleoli; findings supportive of high grade lymphoma. The patient was started on a combination chemotherapy protocol and received L-asparaginase (10,000 IU/m^2 SQ) and prednisolone (0.75 mg/kg PO q 12 h) along with oxytetracycline ointment (1/4″ OU q 12 h). Re-evaluation three days after L-asparaginase showed improvement in the degree of chemosis and respiratory effort had normalized. Blood work showed resolution of the lymphocytosis (1.01 K/μL) and improvement of the neutrophilia (11.96 K/μL) and monocytosis (0.57 K/μL). At this point in treatment, the cat became anemic with a hematocrit of 24%. Chemotherapy treatment with vincristine (0.7 mg/m^2 IV) followed and 1 week later the cat showed continued improvement with resolution of chemosis, lymphadenopathy, and the heart murmur on auscultation. Thoracic ultrasound showed resolution of the cranial mediastinal mass. On echocardiogram, the myocardial infiltrates involving the wall of the atria, the periaortic tissue, and the right ventricular outflow tract had completely resolved (Fig. 3). The right ventricular outflow tract velocities had normalized, no effusions were present, and mild basilar septal hypertrophy persisted.

Remission persisted for 1 month while receiving the chemotherapy protocol. The owner then noted behavior changes and progressive limb weakness and ataxia; these signs were felt to be suspicious for a central nervous system lesion. Physical examination revealed cervical pain and spinal ataxia. Given the medical history, the differentials for these new signs included spinal lymphoma and less likely

[a] Vivid 7, GE Healthcare, Waukesha, WI, USA.
[b] GE Ultrasound 5.0–9.0 MHz, GE Healthcare, Waukesha WI, USA.

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