A 3-year-old sexually intact female domestic shorthair cat was submitted to the Indiana Animal Disease Diagnostic Laboratory for postmortem examination. The cat had been taken to a low-cost spay-neuter clinic for routine ovariohysterectomy. No previous clinical signs were reported. Following induction of anesthesia, the cat became hypoxemic and was awakened from anesthesia; however, it died before radiography could be performed.

**Gross Findings**

At necropsy, the cat's body condition was good. A soft, gray-white, lobulated cranial mediastinal mass (approx 12 X 10 X 3 cm) occupied almost 75% of the thoracic cavity (Figure 1). The mass encircled the pericardial sac, obscuring the heart from view. The lungs were displaced caudodorsally by the mediastinal mass and were dark red and collapsed. Slices of lung tissue sank when placed in a container of formalin. The thoracic cavity lacked negative pressure and contained approximately 30 mL of cloudy, dark red fluid.

Formulate differential diagnoses from the history, clinical findings, and Figure 1—then turn the page →
Histopathologic Findings

The mediastinal mass consisted of a densely cellular sheet of intermediate-size to large lymphocytes in a scanty fibrovascular stroma with multifocal necrosis (Figure 2). The neoplastic lymphocytes had a round to ovoid nucleus with stippled chromatin and an inconspicuous nucleolus, with moderate anisokaryosis and anisocytosis. There was 1 or 2 mitotic figures/400X field. The neoplastic cells had scanty eosinophilic cytoplasm with indistinct cell borders. Numerous apoptotic cells and tingible body macrophages were scattered among intact neoplastic cells. In the lungs, alveolar spaces were diffusely collapsed. Immunohistochemical analysis revealed cytoplasmic labeling with antibody against CD3 in > 90% of the neoplastic cells, identifying them as T lymphocytes. Neoplastic cells were not labeled immunohistochemically with antibodies against pancytokeratin (ie, AE1 and AE3). No evidence of neoplastic cells was observed in any other tissues examined histologically.

Morphologic Diagnosis and Case Summary

Morphologic diagnosis and case summary: mediastinal lymphoma with hemorrhagic pleural effusion and pulmonary atelectasis in a cat.

Comments

The differential diagnoses for cranial mediastinal masses in cats include thymoma, lymphoma, and cranial mediastinal lymphadenopathy.1 The histologic features of a sheet of monomorphic lymphocytes without an epithelial component are consistent with mediastinal lymphoma.

Lymphomas are the most common neoplasms of cats.2,3 In cats, most lymphomas affect anatomic sites other than the lymph nodes and are classified on the basis of the organs or tissues affected (mediastinal, multicentric, alimentary, and extranodal), morphologic appearance, and cytochemical or immunohistochemical markers.4–6 The mediastinal form may originate from either the mediastinal lymph nodes or the thymus.1 The alimentary and mediastinal forms are more common than the multicentric or extranodal forms; the mediastinal and multicentric forms have historically been associated with FeLV infection.2,5,7

The distribution of ages of cats at the time of lymphoma diagnosis is bimodal, with peaks in young adult cats approximately 2 years of age and in mature cats approximately 10 to 12 years of age.2,8 Young cats with lymphoma are usually FeLV antigen positive, whereas older cats are usually FeLV antigen negative.8 The mediastinal form of lymphoma is typically identified in young FeLV-antigen–positive cats.2,8 The FeLV-associated lymphomas are usually of T-cell lineage; non-retroviral-associated
lymphomas may be of T-cell or B-cell lineage. There is no association between FeLV infection and thymoma in cats.

For the cat of the present report, the space-occupying mass in the cranial mediastinum was the cause of the hypoxemic episode during induction of anesthesia. Cats with mediastinal lymphoma typically have signs of dyspnea, coughing, or regurgitation caused by compression from the neoplasm. Pleural effusion would have exacerbated the respiratory insufficiency in the case described in this report. Other physical examination findings may include decreased bronchovesicular sounds and dorsocaudal displacement of normal pulmonary sounds on thoracic auscultation and a noncompressible cranial mediastinum. Radiographic changes include a cranial or sometimes caudal mediastinal mass with or without pleural effusion. Grossly, these lymphomas are large, white to gray, lobulated cranial mediastinal masses that displace the lungs and surrounding structures. Pleural effusion is variably present and sometimes chylous. Histologically, mediastinal lymphomas are composed of densely packed sheets of small to large neoplastic lymphocytes. Mediastinal lymphomas can be distinguished from thymomas by the presence of neoplastic thymic epithelial cells in the latter. Thymomas with a high degree of lymphocytic infiltration can resemble lymphomas; immunohistochemical analysis to detect cytokeratin is useful in their differentiation because the thymic epithelial component is cytokeratin positive.

With increased frequency of FeLV antigen testing and vaccination among cats, the prevalence of lymphomas associated with FeLV antigen positivity has decreased. Accordingly, the proportion of lymphomas that has been most commonly associated with FeLV infection, namely mediastinal and multicentric, has decreased with a shift toward the intestinal type more commonly seen in FeLV-antigen-negative cats. However, although detection of FeLV antigen in a cat’s blood indicates active infection, the absence of antigenemia does not rule out latent infection with FeLV provirus integration into the host cell genome.

The association between FeLV provirus detection and lymphoma development is not clear, but the presence of FeLV provirus (detected by PCR assay) in a high percentage of B- and T-cell lymphomas suggests that FeLV provirus alone in the absence of FeLV antigen may have a role in the development of lymphoma in cats. For the cat of this report, no information regarding FeLV antigen status, FeLV proviral status, or FIV status was available, and immunohistochemical analysis for FeLV in samples of the mass failed to detect FeLV-positive cells.

For cats with lymphoma, prognostic factors include anatomic location, response to treatment, stage of disease, body condition at time of diagnosis, and retroviral infection status. A mediastinal location is considered a negative prognostic indicator in terms of survival time.

References

New Veterinary Biologic Products

<table>
<thead>
<tr>
<th>Product name</th>
<th>Species and indications for use</th>
<th>Route of administration</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Canine Lymphoma Vaccine, DNA (conditionally licensed [Merial Inc, Athens, Ga, US Vet Lic No. 298])</td>
<td>Canine, for vaccination of dogs diagnosed with large B-cell lymphomas upon achieving remission following veterinary therapy. The reasonable expectation of efficacy was based upon the extension of time to recurrence of lymphoma in dogs treated with this product.</td>
<td>Transdermal</td>
<td>USDA licensed 9/16/15</td>
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