Published in final edited form as:

Vet Clin Pathol. 2012 December ; 41(4): 599–600. doi:10.1111/j.1939-165x.2012.00483.x.

What is your diagnosis? Pleural effusion in a dog with hypertension

Julie L. Webb¹, Howard Steinberg¹, Timothy J. Stein², and Kristen R. Friedrichs¹

¹Department of Pathobiological Sciences, School of Veterinary Medicine, University of Wisconsin–Madison, Madison, WI, USA

²Department of Medical Sciences, School of Veterinary Medicine, University of Wisconsin–Madison, Madison, WI, USA

Keywords

Dog; IgM; lymphoplasmacytic lymphoma; Waldenstrom's macroglobulinemia

Case Presentation

An 8-year-old male neutered Labrador Retriever was presented to the Oncology Service at the University of Wisconsin-Madison Veterinary Medical Teaching Hospital with stridorous panting and increased respiratory effort. Mild mature neutrophilia was noted on the CBC (11,512 cells/ μ L, reference interval [RI] 3000–11,500 cells/ μ L). The biochemical panel revealed moderate hyperproteinemia (10.5 g/dL, RI 5.0–8.3 g/dL) due to hyperglobulinemia (7.8 g/dL, RI 2.4–4.3 g/dL).

On thoracic radiographs there was moderate pleural effusion and mediastinal widening. The effusion was serosanguineous and was characterized by a nucleated cell count of 42,000 cells/ μ L and a total protein concentration of 6.0 g/dL (Figure 1). Abdominal ultrasonographic examination revealed multiple enlarged rounded and hypoechoic para-aortic and mesenteric lymph nodes ranging in size from 1–4 cm. A fine-needle aspirate of one of the enlarged mesenteric lymph nodes was obtained (Figure 2).

The dog continued to show signs of labored breathing with hypoxia (SpO₂ of 86–88%, RI > 94%). Persistent hypertension was noted with systolic pressures of 180 mmHg (RI 130–150 mmHg). The owners elected humane euthanasia, and a complete necropsy was performed.

Diagnosis

Lymphoplasmacytic B-cell lymphoma with IgM secretion (Waldenstrom's macroglobulinemia)

In the effusion, 90% of nucleated cells were lymphocytes ranging from 10–15 μ m in diameter with basophilic cytoplasm, finely stippled to clumped chromatin, and indistinct nucleoli (Figure 1). Nuclei were often eccentric and there was a prominent paranuclear clear zone (plasmacytoid appearance). The remaining 10% of nucleated cells were well-differentiated plasma cells. The mesenteric lymph node contained the same 2 cell populations, but they were present in approximately equal proportions (Figure 2). A

diagnosis of lymphoma with plasmacytoid features was made. The high proportion of plasma cells was presumed to represent reactive plasmacytosis.

At post-mortem examination, a large cranial mediastinal mass and multiple enlarged abdominal lymph nodes were found. Bone marrow was not collected. Histologically, normal tissue in the mass and nodes was effaced by a neoplastic population of lymphocytes, 8–14 μm in diameter, with scant eosinophilic cytoplasm, finely stippled chromatin, and multiple nucleoli (Figure 3). Moderate numbers of well-differentiated plasma cells were scattered among the lymphocytes. Approximately 80% of neoplastic cells had strong membrane immunoreactivity to CD20, and 30–50% percent of cells had strong nuclear immunoreactivity to MUM1.

Serum protein electrophoresis demonstrated a monoclonal peak in the gamma region. Radial immunodiffusion revealed the gammopathy was IgM in origin (9165 mg/100 mL, RI 100–200 mg/100 mL). A final diagnosis of lymphoplasmacytic B-cell lymphoma with IgM secretion (Waldenstrom's macroglobulinemia) was made.

Discussion

Waldenstrom's macroglobulinemia (WM) is a rare disorder characterized by a combination of lymphoplasmacytic lymphoma and IgM monoclonal gammopathy (macroglobulinemia). Clinically, WM often is described as a hybrid of lymphoma and multiple myeloma. Organs affected tend to be those affected by lymphoma,¹ but clinical signs tend to result from macroglobulinemia and are more suggestive of multiple myeloma.^{1–3} However, in WM marrow infiltration is not associated with lytic lesions.³ Neoplastic cells consist of small lymphocytes, plasmacytoid lymphocytes, and plasma cells in varying proportions.¹ Because some neoplasms have a similar microscopic appearance⁴ and others rarely produce an IgM paraprotein,² a final diagnosis of WM is reserved for cases that demonstrate both features. Immunohistochemical staining depends on the degree of plasma cell differentiation. Small and plasmacytoid lymphocytes are immunoreactive for CD20 and CD79 α but not MUM1, whereas plasma cells are immunoreactive for MUM1, variably express CD79 α , and do not express CD20.⁵ Plasmacytoid lymphocytes and plasma cells both express the same IgM monoclonal protein.⁵

References

1. Vitolo U, Ferreri AJM, Montoto S. Lymphoplasmacytic lymphoma – Waldenstrom's macroglobulinemia. *Crit Rev Oncol Hematol*. 2008; 67:172–185. [PubMed: 18499469]
2. Giraudel JM, Pages JP, Guelfi JF. Monoclonal gammopathies in the dog: retrospective study of 18 cases and literature review. *J Am An Hosp Assoc*. 2002; 38:135–147.
3. Jaillardon L, Fournel-Fleury C. Waldenstrom's macroglobulinemia in a dog with a bleeding diathesis. *Vet Clin Pathol*. 2011; 40:351–355. [PubMed: 21827519]
4. Sueiro FAR, Alessi AC, Vassallo J. Canine lymphomas: a morphological and immunohistochemical study of 55 cases with observations on p53 immunoexpression. *J Comp Pathol*. 2004; 131:207–213. [PubMed: 15276860]
5. Andriko JW, Aguilera NSI, Chu WS, Nandedkar MA, Cotelingam JD. Waldenstrom's macroglobulinemia: a clinicopathologic study of 22 cases. *Cancer*. 1997; 80:1926–1935. [PubMed: 9366295]

Figure 1.
Thoracic fluid, cytocentrifuged preparation. Wright-Giemsa, x100 objective.

Figure 2.
Fine-needle aspirate of a mesenteric lymph node. Wright-Giemsa, x100 objective.

Figure 3. Histologic section of the right kidney. Note effacement of normal tissue by neoplastic lymphocytes and plasma cells. H&E, x40 objective.