

Canine Lymphoma: A Practical Diagnostic Approach to Your Workup

Background

Canine lymphoma is one of the most common cancers diagnosed in veterinary oncology. Lymphoma is an umbrella term for many different types of lymphoproliferative neoplasia. The most common presentation in dogs is multicentric lymphoma (diffuse large cell) where peripheral lymph nodes are affected, +/- involvement of any other lymphoid or non-lymphoid organs. There are several tests that can be used to obtain a diagnosis, as well as several staging tests that can be used on a case by case basis that can provide helpful prognostic information.

Diagnosis

Fine Needle Aspirate and Cytology

Because most dogs with lymphoma present with more than one lymph node involved, and typically there is effacement of nodes with large lymphocytes/lymphoblasts, cytology by fine needle aspirate is a highly sensitive and specific way to diagnose lymphoma and should be considered the first diagnostic test when presented with a patient with lymphadenomegaly¹. A trained clinical pathologist can often make a diagnosis of lymphoma based on cytology, though some variations of lymphoma are more difficult (intermediate or small cell lymphomas) and may require additional diagnostics.

Biopsy and Immunohistochemistry (IHC)

If cytology does not provide a definitive diagnosis, then histology is one diagnostic that can be considered next. Some forms of lymphoma are diagnosed by assessing the architecture of the whole lymph node, ex: T-zone lymphoma². For this reason, it is ideal to remove the node in its entirety (avoid tru-cut or incisional biopsies), including the capsule.

Flow Cytometry

Flow Cytometry is an excellent diagnostic test to not only diagnose lymphoma/leukemia, but also to determine phenotype. Furthermore, it can differentiate between the many subtypes of lymphoma (t-zone, marginal zone, small cell, etc.)³. This test utilizes a machine to determine the size and granularity of cells, as well as the proteins that they express. This can often provide prognostic and diagnostic information comparable to IHC. This sample requires viable cells in order to properly execute the test.

PARR (PCR for Antigen Receptor Rearrangement)

PARR is a clonality assay used to determine whether the lymphocytes in question are arising from a single clone (neoplastic) vs. polyclonal (reactive). PARR uses DNA from the cells of a given sample and primers from conserved regions of T-cell receptors or Ig genes are used to amplify those regions⁴. PARR's primary utility is to differentiate reactive from neoplastic populations of lymphocytes where this is ambiguous on cytology or histology.

Immunophenotyping

Determining the type of lymphocytes that are comprising the tumor (B or T cell) is generally not required for treatment but can be helpful in providing prognostic information to pet owners regarding survival times. This can be done on cytology slides (immunocytochemistry, ICC), by immunohistochemistry (IHC), by flow cytometry, or by PARR. Flow cytometry and IHC are considered superior tests for determining phenotype.

Diagnostic Tests for Staging and Treatment

Blood work

Full blood work and urinalysis at the time of diagnosis is ideal and is required prior to starting chemotherapy. A complete blood count (CBC) can indicate if there is likely bone marrow involvement (cytopenias, lymphoblasts in circulation) or an immune-mediated thrombocytopenia. A full chemistry panel can reveal elevations in liver enzymes or renal values, which could be supportive of other organ involvement. A high total calcium may indicate paraneoplastic hypercalcemia and warrant measuring ionized calcium. Prior to treatment, ensuring adequate organ function is important depending on which chemotherapy is being used and its primary route of excretion.

Thoracic Radiographs

Thoracic radiographs are not needed prior to initiating therapy, though they should be considered since mediastinal involvement is a negative prognostic factor and expected survival times are less in these patients. Additionally, having baseline images of the pulmonary parenchyma can be helpful if using drugs that can cause pulmonary fibrosis (Tanovea)⁵.

Abdominal ultrasound

In dogs that are substage a (feeling well and no clinical signs) and have no significant abnormalities on blood work (ex: severe azotemia), abdominal ultrasound is unlikely to change prognosis or treatment options. It is common for dogs with multicentric lymphoma to have spleen and/or liver involvement (Stage IV), though this does not change expected response to treatment or overall survival compared to patients with no spleen and/or liver involvement.

References

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