**Diagnostic Exercise**

*From The Davis-Thompson Foundation*

**Case #: 86 Month: November Year: 2017**

*Answer Sheet*

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**Follow-up questions:** Morphologic diagnoses; Differential diagnoses; Immunohistochemical findings given the probable etiology.

**Morphologic diagnoses:**
Bursa of Fabricius, liver, kidney, and other viscera (testicle, spleen, proventriculus): Lymphoma
Kidney: Degeneration, tubular, multifocal, moderate, with luminal urates & mineral
Ureters: Urate urolithiasis, bilateral, moderate, with biliverdinuria (gross diagnosis)

**Differential diagnoses:** Etiologies to consider include viral-induced lymphoproliferative neoplasia and spontaneous neoplasia of unknown etiology. Viruses to consider include Herpesviridae (Marek’s disease, Gallid herpesvirus 2) and Retroviridae (e.g. avian leukosis virus and reticuloendotheliosis).

<table>
<thead>
<tr>
<th>Marek's disease</th>
<th>Avian leukosis</th>
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<tbody>
<tr>
<td>Herpesvirus</td>
<td>Retrovirus</td>
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<tr>
<td>Affects T lymphocytes</td>
<td>Affects various hematopoietic cells (e.g. lymphoid leukemia is a B-cell lymphoma; ALV-J infects myeloid cells)</td>
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<td>Younger birds (4 weeks), possible in older birds too</td>
<td>&gt; 16 weeks old</td>
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<td>Paralysis (neurolymphomatosis)</td>
<td>No paralysis</td>
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<tr>
<td>Liver, spleen, kidney, nerves, iris (gray eye or ocular lymphomatosis), skin (feather follicles)</td>
<td>Liver, spleen, kidney, bursa of Fabricius</td>
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<tr>
<td>Lymphoblast size variable</td>
<td>Lymphoblast size uniform</td>
</tr>
<tr>
<td>Possible intranuclear inclusion bodies</td>
<td>Never any intranuclear inclusion bodies</td>
</tr>
</tbody>
</table>

Table modified from JPC Systemic Pathology Nervous System May 2014 N-V08

**Immunohistochemical findings given the probable etiology:** In this case, given the patient’s age (40 weeks), the uniform histological appearance of the round cells, the lack of nervous tissue
involvement, the intrafollicular involvement of the bursa of Fabricius, and no herpesvirus detected on PCR of the spleen, this is probably a retroviral lymphoid leukosis; with neoplastic cells therefore expected to be a B-cell immunophenotype.

**Typical gross findings:** Chicken older than 14 to 16 weeks with multifocal visceral lymphoma that involves the bursa of Fabricius and that generally spares the nervous system.

**Typical microscopic findings:** Uniform large lymphoblastic tumor cells that infiltrate intrafollicular bursal follicles or viscera following metastasis.

**Discussion:** Avian leukosis virus (ALV) in chickens is a member of the leukosis/sarcoma group of avian retroviruses and is classified into six ALV subgroups: A, B, C, D, E, J. Exogenous ALVs (Subgroups A, B, C, D, J) can induce a variety of neoplasms, of which lymphoid leucosis (LL), a B-cell lymphoma of chickens, is the most common and usually attributed to subgroup A. Other types of proliferative conditions include myeloblastosis, myelocytomatosis, hemangioma, erythroblastosis, osteopetrosis, and nephroblastoma. Lymphoid leukemia originates in the follicles of the bursa of Fabricius and metastasizes to the viscera. The presence of enlarged lymphoid nodules in the bursa is considered nearly pathognomonic for LL; however, Marek’s disease can cause interfollicular diffuse bursal enlargement, and reticuloendotheliosis virus can induce bursal lymphoma. Because of the lengthy retroviral incubation period, neoplasms are infrequent in patients less than 14-16 weeks, which is helpful when trying to differentiate it from Marek’s disease. Although much rarer, certain forms of reticuloendotheliosis virus infection (e.g. chronic B-cell lymphoma) can mimic the gross and microscopic lesions of lymphoid leukemia and require viral assays for definitive diagnosis. Yet, in this case, given the ubiquitous nature of ALV, lymphoid leukemia is favored. The biliverdinuria in this case is attributed to hepatic lymphoma and the organ’s subsequent dysfunction.

**References and Recommended literature:**


**Interesting histological finding (Figure 8):** Focally, in one section of lung, amongst mild histiocyctic and heterophilic inflammation, occupying air capillaries and obscuring the pulmonary parenchyma, there are spherical to wavy to branching strands of globular basophilic material. The material does not stain with special fungal stains and is determined to be mineral. Given this patient’s urate urolithiasis and renal pathology, a “uremic pneumopathy”-like pathogenesis is speculated.
*The Diagnostic Exercises are an initiative of the **Latin Comparative Pathology Group (LCPG)**, the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the CL Davis website ([http://www.cldavis.org/diagnostic_exercises.html](http://www.cldavis.org/diagnostic_exercises.html)).

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