Renal Nodules in a Red-tailed Hawk

Case number: L1300851

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Signalment & History

- 32 years old, female, red-tailed hawk (*Buteo jamaicensus*)
- 1983 – Presented to LSU-SVM as a gunshot victim; amputated her right wing
- 2010 - Last infection of aspergillosis
- 2012 - Decreased appetite and depressed behavior, green urates/feces and dyspnea

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<thead>
<tr>
<th>ALT(2220 ug/dL)</th>
<th>Bile acid (395 ummol/L)</th>
<th>Sedated to administer IV fluids.</th>
<th>Arrested in the cage</th>
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<td>Dec 26, 2012</td>
<td>Jan 15, 2013</td>
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Gross Findings
Histological Findings
Morphological Diagnosis

Kidney: Tubular proliferative nodules, multifocal, chronic, moderate to severe with multifocal pleomorphism

Differential Diagnoses

- Non-neoplastic renal tubular proliferation
  - Regenerative nodules
  - Hyperplastic nodules
- Renal neoplasms
  - Adenoma
  - Adenocarcinoma - the most common renal neoplasm in raptors
  - Oncocytoma* - abundant eosinophilic granular cytoplasm
**Non-neoplastic v.s. Neoplastic**

Mild compression of the surrounding parenchyma by the un-encapsulated, well demarcated nodules

Non-neoplastic proliferative nodules are favored over a renal neoplasm

**Regenerative or Hyperplastic**

The nodular pattern of regeneration and hyperplasia - unusual in the kidney

No report (to our knowledge)
The nodule of the hawk

Renal oncocytoma in human
(wikimedia.org/wiki)

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Renal Oncocytoma

• **Humans**
  – The most common benign renal tumor, accounting for 3-7% of all renal neoplasms
  – Reported in multiple organs, including the kidney, thyroid, parathyroid, salivary and adrenal glands

• **Animals**
  – Dogs - a rare benign renal tumor, reported in thyroid, larynx, nasal cavity
  – Cats - reported in parotid and nasal cavity
  – **No report in avian species** (to our knowledge)
<table>
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<td><strong>Gross</strong></td>
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| **HE** | Nesting, alveolar or tubular patterns  
Neoplastic cells with abundant eosinophilic granular cytoplasm |
| **PAS** | PAS positive cytoplasmic granules |
| **PTAH** | Dark blue cytoplasmic granules |
| **IHC** | Renal cell carcinoma marker +, Endogenous avidin-binding activity +, CD117(c-kit) +, CK7-, Vimentin- |
| **TEM** | Round mitochondria with lamellar cristae in the neoplastic cells |

HE: Hematoxylin & Eosin, PAS: periodic acid Schiff, PTAH: Phosphotungstic acid hematoxylin  
IHC: immunohistochemistry, TEM: transmission electron microscopy

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PAS stain did not accentuate the cytoplasmic granules in the cells.

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Dark blue granules with PTAH are not specifically expressed in the nodules.

Renal oncocytoma is less likely
Conclusion

• Non-neoplastic (regenerative/hyperplastic) nodules are favored over a renal neoplasm.

• The nodular pattern of non-neoplastic proliferation is unusual in the kidney.

• Occasional bizarre epithelial cells that show marked anisocytosis and anisokaryosis may be indicative of partial malignant transformation.

• The cause of the renal tubular proliferation is undetermined.
  – It is uncertain if aspergillosis and/or treatments may have played a role in the development of these lesions.

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