Case # 13-123325 (SEVPAC Case 59) Multiple Endocrine Neoplasia-like syndrome in a Bluetick Coonhound

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Signalment/clinical history

- 10-yr-old, F/S, Bluetick Coonhound

- Hypertension, proteinuria (131.8mg/dL), USG 1.013, ALP 437 IU/L (14-152 IU/L)

- Bilaterally enlarged adrenal glands
  
  Left adrenal gland - 4.92 cm x 2.54 cm
  Right adrenal gland - 4.38 cm x 2.05 cm

- Hypercalcemia - 12.9 mg/dL (9.6-12.0 mg/dL)

- Enlarged left thyroid and parathyroid glands

http://www.dogbreedinfo.com/bluetickphotos.htm

Permission granted only for viewing on SEVPAC website
Histopathology - Thyroid mass

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Histopathology - Thyroid mass
Immunohistochemistry - Thyroid transcription factor-1 (TTF-1)
Histopathology - Parathyroid mass

2X H&E

10X H&E

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Histopathology - Parathyroid mass

40X H&E

Chromogranin A

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Final diagnosis

- Left thyroid gland - Thyroid carcinoma
- Left parathyroid gland - Parathyroid carcinoma

Additional findings

- Oral squamous cell carcinoma with metastasis to mandibular lymph node
- Bilaterally enlarged adrenal glands
Multiple endocrine neoplasia (MEN) syndrome in humans

- Multiple endocrine neoplasia are autosomal dominant inherited multiglandular diseases

<table>
<thead>
<tr>
<th>Types</th>
<th>Endocrine glands</th>
<th>Gene mutations</th>
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<tbody>
<tr>
<td>Type 1</td>
<td>Parathyroid, anterior pituitary and endocrine pancreas</td>
<td>MEN1 gene – tumor suppressor gene</td>
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<tr>
<td>Type 2</td>
<td>Medullary thyroid carcinoma, pheochromocytoma and primary hyperparathyroidism</td>
<td>RET gene – proto-oncogene</td>
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<tr>
<td>- Type 2a</td>
<td>Medullary thyroid carcinoma, pheochromocytoma and primary hyperparathyroidism</td>
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<tr>
<td>- Type 2b</td>
<td>Medullary thyroid carcinoma, pheochromocytoma and ganglioneuroma</td>
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<td>- FMTC</td>
<td>Familial medullary thyroid carcinoma</td>
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<td>Type 4</td>
<td>Variant of Type 1</td>
<td>CDKN1B – tumor suppressor gene</td>
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</tbody>
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MEN like syndrome in Veterinary Medicine

- Thuroczy et al., (1998). Multiple endocrine neoplasia in a dog
  - Corticotrophic tumor, bilateral adrenocortical tumors and pheochromocytoma

- Kiupel et al. (2000) Multiple endocrine neoplasia in a dog
  - Insulinoma, bilateral adrenocortical adenocarcinomas and aortic paraganglioma

- Proverbio et al., 2012. Potential variant of multiple endocrine neoplasia in a dog
  - Adrenocortical carcinoma, thyroid carcinoma and bilateral interstitial cell testicular adenomas
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