Proceedings of the 35th World Small Animal Veterinary Congress
WSAVA 2010

Geneva, Switzerland - 2010

Next WSAVA Congress:

2011 WSAVA CONGRESS
14-17 October, 2011  Jeju, KOREA

Reprinted in IVIS with the permission of WSAVA
HYPERCALCEMIA AND PRIMARY HYPERPARATHYROIDISM
Richard E Goldstein DVM, DACVIM, DECVIM-CA
Ithaca NY USA

Clinical signs
Mild to moderate hypercalcemia may cause no clinical signs obvious to the owner, so this is commonly an incidental finding on geriatric or pre-anesthetic screening blood work. Other signs closely associated with hypercalcemia in dogs and cats include:

- Muscle weakness and lethargy.
- Polyuria and polydipsia (PU/PD).
- Lower urinary tract signs caused by calcium urolithiasis from increased calciuresis.
- Anorexia and weight loss
- Constipation
- Vomiting

Differential Diagnosis of canine hypercalcemia

<table>
<thead>
<tr>
<th>Cause of Hypercalcemia</th>
<th>Total Calcium</th>
<th>Ionized Calcium</th>
<th>PTH</th>
<th>PTH-rp</th>
<th>Phosphorus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malignancy (humeral)</td>
<td>Very high</td>
<td>Very high</td>
<td>Low</td>
<td>High</td>
<td>Normal to low</td>
</tr>
<tr>
<td>PHPT</td>
<td>Very high</td>
<td>Very high</td>
<td>High to normal</td>
<td>Low</td>
<td>Low to normal</td>
</tr>
<tr>
<td>Renal Disease</td>
<td>High</td>
<td>Normal</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Addison’s Disease</td>
<td>High</td>
<td>Normal to high</td>
<td>Low</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Toxicity</td>
<td>Very high</td>
<td>Very high</td>
<td>Low</td>
<td>Low</td>
<td>Very High</td>
</tr>
<tr>
<td>Idiopathic (cats)†</td>
<td>High</td>
<td>High</td>
<td>Normal to low</td>
<td>Low</td>
<td>Normal</td>
</tr>
<tr>
<td>Granulomatous or Fungal Disease</td>
<td>High</td>
<td>Normal to High</td>
<td>Low</td>
<td>Low</td>
<td>Mildly High</td>
</tr>
</tbody>
</table>

PRIMARY HYPERPARATHYROIDISM
This is the 1st or 2nd most common cause of pathologic hypercalcemia in dogs. It is caused by an inappropriate secretion of PTH in the presence of ionized and total hypercalcemia. This results in most cases (80-85%) from a solitary parathyroid adenoma but may also be caused by malignant parathyroid neoplasia (very rare) or parathyroid hyperplasia. Older dogs (mean age 10.5 years) are affected by this condition with an over-representation of Keeshonden. These dogs tend to be relatively asymptomatic except for PU/PD, slow onset of weakness, lethargy and sometimes weight loss. Many have concurrent urolithiasis (calcium oxalate).

Diagnosis: In addition to the tests described above, cervical US often shows a singular (likely adenoma) or multiple (likely hyperplasia) enlarged parathyroid glands.

Definitive Treatment: For a solitary adenoma, surgical parathyroidectomy is usually curative. Alternatives to surgery are percutaneous ethanol injection (PEI) or heat ablation, which have a high success rate as well. Surgical removal of 3 of 4 affected glands when all are affected by hyperplasia will result in eucalcemia but the disease will likely reoccur, typically within months to one year.

PEI or heat ablation for the treatment of primary hyperparathyroidism
Ultrasound guided PEI or heat ablation is utilized safely for the treatment of primary hyperparathyroidism in dogs at a university and private practice setting with a success rate of approximately 90%.
- Side effects from this procedure are minimal and transient.
- More than one injection may be necessary for successful therapy.
- After a successful injection: Total calcium, ionized calcium and PTH concentration normalize within 2-5 days.
- Multiple parathyroid masses can be injected sequentially.
- Surgical excision is possible after unsuccessful PEI or heat ablation therapy.
- Specialized ultrasonographic equipment and expertise are necessary.

Post treatment monitoring:
Intensive post-treatment monitoring (ideally hospitalization for 5-10 days with twice daily calcium monitoring) for hypocalcemia is necessary after surgery, PEI or heat ablation. Calcium and vitamin D need to be supplemented in some cases when clinical or profound hypocalcemia occur. Supplementation may be worthwhile prophylactically in cases where the pre-treatment calcium is very high (over 14mg/dl or 3.5mmol/L).