## Parathyroid Diseases in dog and cat

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### Objectives

a) To understand calcium metabolism.

b) To establish the differential diagnosis of hypercalcemia and hypocalcemia.

c) To know the etiology of secondary hyperparathyroidism.

d) To know the diagnosis and treatment protocol of hyperparathyroidism and hypoparathyroidism.

### Hypoparathyroidism

Decrease of PTH production and/or liberation, that triggers hypocalcemia. Frequent in medium aged sprayed females of Poodle, Schnauzer miniature, Labrador retriever, German shepherd, Teckel and terrier breeds. Males are more predisposed in cats.

**Etiology**

Primary hypoparathyroidism is usually iatrogenic in cats and immunomediated in dogs. It can also be caused by congenital hypoplasia or aplasia of the gland and by end-organ resistance. Secondary hypoparathyroidism is due to hypomagnesemia and to low calcium:fosforum relation in diet.

**Pathogenesis and clinical signs**

- **Neuromuscular signs**: ↑ membrane permeability and ↑ excitability.
  - Focal or general convulsions (80%), ataxia, facial rub, hyperthermia, tremor, muscle fasciculations, muscle spasms, panting, rigidity, weakness, excitation or lethargy.
- **Cardiovascular signs**: ↓ intracellular calcium and contraction failure, ↓ calcium entrance and noradrenaline release in the cardiomyocytes, ↑ vascular volume.
- **Cataracts**.

**Diagnosis**

a) History + Physical exam.

b) Haematology + Biochemistry + Urinalysis.

c) PTH immunoassay + Serum ionized calcium.

d) Histopathology: lymphocytic parathyroiditis.

**Treatment**

- **Acute and subacute therapy**
  
<table>
<thead>
<tr>
<th>Elemental calcium dose</th>
<th>Drug dose</th>
<th>Administration interval</th>
<th>Administration route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute therapy</td>
<td>5-15 mg/kg</td>
<td>0.5-1.5 ml/kg</td>
<td>10-30 min</td>
</tr>
<tr>
<td>Infusion</td>
<td>60-90 mg/kg/d</td>
<td>6.5-9.7 ml/kg/d</td>
<td>continuous</td>
</tr>
<tr>
<td>Injections</td>
<td>5-15 mg/kg</td>
<td>0.5-1.5 ml/kg</td>
<td>6-8 h</td>
</tr>
</tbody>
</table>

**Chronic therapy**: oral vitamin D + oral calcium.

### Hyperparathyroidism

Excess of PTH secretion that increases ionized calcium concentration in serum. Frequent in Keeshond, Siberian husky and Golden retriever dogs, and in Siamese cat.

**Etiology**

Extracapsular adenoma of parathyroid gland is the first cause of primary hyperparathyroidism. Secondary hyperparathyroidism can be nutritional, renal or iatrogenic.

**Pathogenesis and clinical signs**

- **Polydipsia and polyuria**: ↑ renal blood flow, ↓ medullary hypertonicity, ↓ transport in loop of Henle, ↓ tubules response.
- **Apathy and weakness**: ↓ neuromuscular excitability.
- **Anorexia, vomits and constipation**.
- **Calcare deposition in tissue** (cardiac muscle and blood vessels)
- **Periodontal disease. Dental loss and fractures**: bone demineralization.

**Diagnosis**

a) Second determination.

b) History + Physical exam.

c) Abdominal echography + Thoracic radiography.

d) Haematology + Biochemistry + Uralanalysis.

e) PTH immunoassay + Serum ionized calcium.

f) Cervical echography.

g) ⁹⁹Tc nuclear mammography / Magnetic resonance.

**Treatment**

- **Medical**
  
<table>
<thead>
<tr>
<th>Fluid therapy</th>
<th>0.9% saline serum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid infusion</td>
<td>1000-2000 U/kg once daily to once weekly</td>
</tr>
<tr>
<td>Biologic half-life</td>
<td>5-21d</td>
</tr>
</tbody>
</table>

- **Surgical**
  
<table>
<thead>
<tr>
<th>Surgery</th>
<th>Election</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternatives</td>
<td>Radiofrequency heat ablation.</td>
</tr>
<tr>
<td>Chemical ablation with ethanol.</td>
<td></td>
</tr>
</tbody>
</table>

Hypocalcemia is the most common complication (58% of the cases).

### Conclusions

This review exposes the differential diagnosis of hyper and hypocalcemia, and shows the incidence of their causes. Image techniques are essential for the diagnosis, especially for hypercalcemia. It’s crucial to monitor the iCa in serum during the treatment. PTH treatment is undergoing research, and it could improve hypoparathyroidism treatment.