PARATHYROID DISEASES in dog and cat

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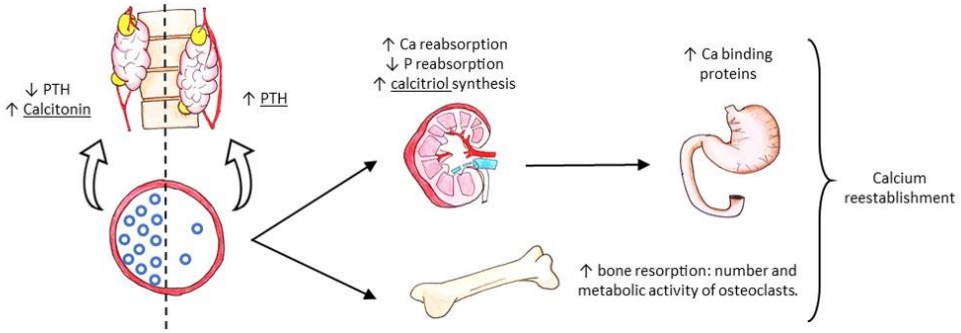
OBJECTIVES

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.

Pathogeny 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

	Elemental calcium dose	Drug dose	Administration interval	Administration route
Acute therapy	5-15 mg/kg	0.5-1.5 ml/kg	10-30 min	IV
Infusion	60-90 mg/kg/d	6.5-9.7 ml/kg/d	continuous	IV
Injections	5-15 mg/kg	0.5-1.5 ml/kg	6-8 h	SC

Chronic therapy: oral vitamin D + oral calcium.

Drug	Initial dose	Mantenance dose	Onset of action	Biologic half-life
Calcidiol	4000-6000 U/kg/d	1000-2000 U/kg once daily to once weekly	5-21d	1-18s
Dihydrotachysterol	0.02-0.03 mg/kg/d for 2d	0.01-0.02 mg/kg/ 24-48h	1-7d	1-3s
Calcitriol	0.02-0.03 µg/kg/d for 3-4d	0.005-0.015 µg/kg/d	1-4d	48h

Hypercalcemia, nephropathy and soft tissue calcification can happen in case of overdose. A good monitorization is necessary.

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**.

Pathogeny 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**.
- **Calcium deposit 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 + Urianalysis.
e) PTH immunoassay + Serum ionized calcium.
f) Cervical echography.
g) ^{99}Tc nuclear gammagraphy / Magnetic resonance.

Treatment

Medical
Fluid therapy 0.9% saline serum
✓ Furosemide
✓ Prednisolone
✓ Bisphosphonates
✓ Calcitonin
✓ Bicarbonate

Surgical
Election

Alternatives
✓ Radiofrequency heat ablation.
✓ Chemical ablation with ethanol.

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.