

# Hypercalcemia in Cats – Causes, Symptoms and Treatment

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 [www.cat-world.com.au/hypercalcemia-in-cats.html](http://www.cat-world.com.au/hypercalcemia-in-cats.html)

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## What is hypercalcemia?

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Hypercalcemia is an abnormally high level of calcium in the blood (greater than 11 mg/dl). Calcium is the most abundant mineral found in the body, approximately 99% is found in bone and the remaining 1% in extracellular fluid (fluid found outside of the cells and between the cells in body tissues). It is essential for many important functions including providing strength to bones and teeth, cardiac function, proper nerve impulses and muscle contractions, blood clotting, cell growth and division and hormone secretion. In combination with phosphorus, it forms calcium phosphate, the dense, hard material of bones and teeth. The skeleton stores calcium and releases it as required.

Cats any age can develop hypercalcemia. In one review of 427 cats with idiopathic hypercalcemia, the average age being around 9.8 years of age, long-haired cats were over-represented and both genders were equally represented.

## Causes:

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The most common cause of hypercalcemia is idiopathic (IHC), meaning no underlying cause can be found. Most cases of hypercalcemia are due to increased gastrointestinal uptake from the food or excessive mobilisation of stored calcium from the bones. Some diseases which can lead to hypercalcemia (in order of incidence) include:

- Acute or chronic renal failure.
- Cancer (lymphoma, squamous cell carcinoma, multiple myeloma).
- Primary hyperparathyroidism (overactive parathyroid gland).

Less common causes include:

- [Addison's disease](#)
- Ingestion of certain houseplants
- [Vitamin D toxicity](#), generally caused by over supplementation or [rodenticide poisoning](#)
- [Hyperthyroidism](#)
- Granulomatous disease
- Certain cancers ([multiple myeloma](#))
- [Vitamin A toxicosis](#)

## Symptoms:

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Cats are more resistant to the clinical consequences of hypercalcemia than dogs and many may remain asymptomatic. Often hypercalcemia is discovered only during routine blood tests.

Hypercalcemia affects all organs, however, most symptoms relate to neuromuscular, gastrointestinal, kidney and heart function. Symptoms include:

- Loss of appetite
- Increased thirst and urination
- Lethargy
- Weight Loss

As calcium levels continue to rise in the blood, additional symptoms may occur such as:

- Gastrointestinal disturbances including vomiting and constipation due to a decreased excitability of the GI smooth muscle.
- Neuromuscular disorders, twitching and seizures.
- Mineralisation of the tissues, particularly the heart and kidneys can occur leading to renal dysfunction and eventually organ failure
- Build up of calcium can lead to the formation of bladder stones, which can result in difficulty urinating.

## Diagnosis:

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Your veterinarian will perform a complete physical examination of your cat and obtain a medical history from you. Some tests he may wish to perform include:

- **Biochemical profile** which may or may not reveal high serum calcium concentrations and normal to low serum phosphorous. BUN and creatinine may also be elevated due to renal failure.
- **Complete blood count.**
- **Urinalysis:** High urine calcium can be indicative of parathyroidism. Low urine calcium due to hypocalciuric hypercalcemia. Urinalysis can also reveal an underlying infection, inappropriate urine concentration, and urinary crystals or stones.
- Serum ionized calcium (iCA): Ionized calcium (free calcium) is calcium that is freely flowing in your blood and not attached to proteins.
- ECG to monitor the heart.

## Finding the cause:

- **Ultrasound** of the parathyroid glands.
- **ACTH stimulation test:** To test for Addison's disease: This test measures the ability of the adrenal glands to respond to a hormone known as adrenocorticotrophic hormone (ACTH) which is made in the pituitary gland, travelling through the bloodstream to the adrenal glands where it stimulates the secretion of other hormones such as hydrocortisone from the cortex. The ACTH stimulation test measures levels of cortisol in the blood before and after an injection of synthetic

ACTH.

- **Serum parathyroid hormone concentration:** To check levels of parathyroid hormone (PTH) in the blood.
- **Parathyroid hormone-related peptide (PTHrP) test:** To detect a protein secreted by some cancers.
- **X-Ray:** To look for calcium oxalate uroliths and cancers.
- **Fine needle aspirates** from the lymph nodes to evaluate for lymphoma.
- **Blood test** to check vitamin D levels.

## Treatment:

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The goal of treatment is to address the underlying cause and manage symptoms related to high calcium levels. This may include:

- Fluid therapy to treat dehydration.
- Loop diuretics such as Furosemide (Lasix®) to increase calcium excretion from the kidneys. Loop refers to the drug's action on the loop of Henlé, a structure of the kidney involved in reabsorbing water.
- Glucocorticoids such as prednisone to decrease bone resorption.
- Sodium bicarbonate helps decrease serum calcium levels by increasing the alkaline level of the blood. This helps to shift the ionized calcium into protein-bound calcium, which is less harmful.
- Surgery to remove the abnormal parathyroid gland.
- Medications such as *diphosphonates* which inhibit bone resorption, calcitonin which inhibits bone resorption and mithramycin which inhibits osteoclastic bone resorption.
- Dietary changes to treat mild cases, which may include high fibre diet, low calcium diet or a prescription diet for cats with chronic kidney disease.

