

Hyperparathyroid diseases

Overview

Calcium in the body is regulated by the parathyroid glands. There are four separate glands that are embedded within the thyroid glands – two parathyroid glands and one thyroid gland on each side of the trachea (windpipe). They are located about halfway down the neck. Hypercalcemia, or an increase in calcium concentrations in the blood occurs when the glands produce and secrete an excessive amount of parathyroid hormone (also named PTH). Primary hyperparathyroidism in dogs is most commonly caused by a functional benign tumor (adenoma) or hyperplasia of one or more of the parathyroid gland(s), but can be caused by a malignant tumor (carcinoma). Primary tumors of the parathyroid glands are rare in cats. Other causes of hypercalcemia include hypercalcemia of malignancy (caused by other tumors in the body), hypoadrenocorticism, hypervitaminosis D, hyperplasia (non-neoplastic) of the parathyroid glands.

Symptoms

Dogs and cats may have no symptoms or may only show subtle signs that most commonly include increased drinking and urination, lethargy, incontinence, inappetence, and weakness. Less commonly seen signs include vomiting, constipation, and urolithiasis (bladder stones). More importantly, hypercalcemia is a condition that can be sub-clinical (your pet is not showing any signs). Therefore, regular bloodwork done at your local vet are important part of the regular check-up.

Exam and Diagnosis

A physical exam and general diagnostic procedures will be performed during your pet's initial work up prior to surgery to establish a preliminary diagnosis for hypercalcemia, evaluate your pet's overall health and the size and invasiveness of the tumor.

The most common procedures performed are:

- *Laboratory analyses:* Blood work to include Complete Blood Count, Serum Chemistry, calcium panel (parathyroid hormone assay, ionized calcium, PTHrP) and Urinalysis
- *Imaging:*
 - Cervical and Abdominal Ultrasonography
 - Abdominal and Thoracic Radiography (X rays)
 - CT Scan (rare)
 - MRI (rare)
- *Histopathology* of a surgical tissue sample (systematically done after surgical removal)

Treatment Options

Surgical removal is the treatment of choice for primary hyperparathyroidism and hyperplastic parathyroid glands. Most parathyroid tumors involve only one parathyroid gland, but a hyperplastic parathyroid may involve all four glands. Complete removal of a primary parathyroid tumor is most often curative.

Alternative options include injection of sterile ethanol (alcohol) into the enlarged parathyroid gland(s) under ultrasound guidance or hyperthermia (heat) therapy. These treatments are reported to be less efficacious than surgical treatment, with a higher incidence of persistent hypercalcemia (with surgery needed post-procedure), recurrence or a local reaction outside the gland. We currently only offer surgical removal at the Purdue Veterinary Hospital.

Surgical procedure

During surgery, your pet will be fully anesthetized (general anesthesia) and a skin incision and approach made along the underside of the neck to look at all the parathyroid glands, and remove the abnormal looking tissue.

Risks and complications

Complications specific to removal of thyroid tumors include:

- Seroma formation, or swelling at the surgical site
- Laryngeal Paralysis - Damage to the recurrent laryngeal nerve, which is responsible for movement of the larynx (upper airway cartilages) during breathing and swallowing. This can be transient or permanent.
- Hypocalcemia – Dogs and Cats may experience low calcium from removal of one or more glands. This is usually seen 1-5 days post operatively with clinical signs including facial or muscle twitching, ataxia, panting and seizures
- Reoccurrence of hypercalcemia
- Anesthetic risks: There are always risks associated with general anesthesia. Risks can be increased by other health issues of your pet and any concurrent disease he/she may have.

In-hospital care

An intravenous catheter will be placed that will allow us to take frequent blood samples to monitor calcium levels while your pet is in the hospital. Some pets will need supplementation of vitamin D and calcium to maintain their calcium within safe blood levels. We will closely monitor your pet in hospital, until we feel it is safe for them to go home.

At home care

After surgery your pet may have a soft bandage around their neck. You should avoid putting any leashes or collars around your pet's neck until he/she has healed from surgery and the sutures are removed (usually 10-14 days). During this time period you should keep your pet's activity limited.

Your pet's calcium levels will need to be checked several times during recovery, and medications (vitamin D) and or calcium supplementations might be needed on regular intervals to prevent hypocalcemia. It is very important that you ask your local veterinarian specifically about checking the IONIZED calcium (calcium free in the blood stream). That may require going to an Emergency Clinic as not every hospital might have the equipment needed to measure this in-house. Alternatively, we can schedule your



rechecks through the Purdue VH Soft Tissue Surgery Service. Based on the ionized calcium levels (whether measured at the PUVH, or relayed to us via your veterinarian) we will start to taper medications, in the hope that the remaining glands will take over hormone production and being able to discontinue medication supplementation for your pet. However, every pet is different: some might not need supplementation, some might take days, weeks or months to taper off the medications, and some might never fully get off the supplementation.

Prognosis

Most primary parathyroid tumors are benign and are cured by complete excision. Secondary changes associated with hypercalcemia usually resolve after removal of the tumor. Recurrence of hypercalcemia is possible if a tumor develops at a new site or if the remaining glands or ectopic tissues continue to secrete excess hormone after surgery, requiring an additional surgery or medical management of hypercalcemia.