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Hyperthyroidism

(Excessive Production of Thyroid Hormone)

Basics

OVERVIEW

- Disease condition caused by high levels of thyroid hormones that increase metabolism in the body
- The thyroid gland normally produces thyroid hormones in response to stimulation by the pituitary gland, the "master gland" of the body; the thyroid hormones normally increase chemical processes occurring within cells of the body; however, in hyperthyroidism, the excessive hormone levels put the cells and body into "overdrive"
- Thyroid hormones are known as "triiodothyronine" or "T3" and "tetraiodothyronine" or "T4"

GENETICS

- No known genetic predisposition

SIGNALMENT/DESCRIPTION OF PET

Species

- Cats; most common hormonal (endocrine) disease of cats; one of the most common diseases seen in late middle-aged and old cats
- Rare in dogs

Breed Predilections

- None

Mean Age and Range

- Mean age in cats, approximately 13 years; range 4–22 years

SIGNS/OBSERVED CHANGES IN THE PET

- Involves many organ systems due to the overall increase in metabolism
- Weight loss
- Unkempt appearance
- Poor body condition
- Increased appetite (known as "polyphagia")
- Vomiting
- Diarrhea
- Increased thirst (known as "polydipsia")
- Rapid breathing (known as "tachypnea")
- Difficulty breathing (known as "dyspnea")
- Heart murmur; rapid heart rate (known as "tachycardia"); particular abnormal heart beat, known as a "gallop

rhythm”
- Hyperactivity
- Aggression
- Large thyroid gland
- Thickened nails
- Less than 10% of pets are referred to as “apathetic”; these pets exhibit atypical signs (such as poor appetite, loss of appetite, depression, and weakness)

CAUSES

- Cats—autonomously hyperfunctioning thyroid nodules (where the thyroid nodules produce excess thyroid hormones outside of the control of the pituitary gland, so-called “autonomous” production); rarely, thyroid cancer (known as “thyroid carcinoma”)
- Dogs—thyroid hormone (T4 or T3) secretion by a thyroid cancer (thyroid carcinoma)

RISK FACTORS

- Some reports have linked hyperthyroidism in cats to some canned food diets
- Advancing age increases risk

Treatment

HEALTH CARE

- Outpatient management usually suffices for cats, if drugs that inhibit the production of thyroid hormones (known as “antithyroid drugs”) are used
- Treatment using a radioactive form of iodine (known as “radioiodine treatment”) or surgical removal of the thyroid gland (known as “thyroidectomy”) require inpatient treatment and monitoring
- Rare cases of congestive heart failure require emergency, inpatient intensive care

ACTIVITY

- No alterations recommended

DIET

- Poor absorption of many nutrients and high metabolism suggest the need for a highly digestible diet, with high availability of protein in untreated hyperthyroidism
- Resolution of signs resulting from excessive levels of thyroid hormones in the body (condition known as “thyrotoxicosis”) eliminates the need for dietary modifications in many pets
- Dietary modification may be necessary to treat or control complications (such as kidney damage)

SURGERY

- Surgical removal of the thyroid gland (thyroidectomy) is one recommended treatment for hyperthyroidism in cats
- Surgical treatment of thyroid carcinoma (dogs and cats) is usually not curative, but can control signs (known as “palliative treatment”)

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- Radioiodine (radioactive form of iodine) is a safe and effective treatment; use of radioactive iodine requires special facilities; availability of veterinary facilities offering this treatment is limited, but increasing
- Methimazole (Tapazole) inhibits the production of thyroid hormones (antithyroid drug) and is recommended most often
- Methimazole can be administered through the skin (transdermally); transdermal methimazole must be prepared by a pharmacist; resolution of signs resulting from the excessive levels of thyroid hormones in the body (thyrotoxicosis) takes longer with transdermal methimazole than with methimazole given by mouth
- β-blockers—sometimes used to treat some of the heart and nervous system effects of excess thyroid hormones;

can be used in combination with methimazole; mainly used to prepare the pet for surgical removal of the thyroid gland (thyroidectomy) or radioiodine therapy; atenolol is useful for controlling rapid heart rate (tachycardia), but addition of an ACE inhibitor is necessary to control high blood pressure (known as "hypertension") in cats with hyperthyroidism
- Carbimazole—another useful antithyroid drug that inhibits production of thyroid hormones; not available in the United States
- Propylthiouracil—is an antithryoid drug that inhibits production of thyroid hormones; it can be useful if methimazole is unavailable; side effects may be more common and more severe than with methimazole
- Ipodate—a radiographic contrast agent; can be used to treat some cases of mild hyperthyroidism, but not effective in most hyperthyroid pets; long-term effectiveness has not been established

Follow-Up Care

PATIENT MONITORING

- Methimazole—physical examination, complete blood count with platelet count, serum biochemical analysis, and serum thyroid hormone (T4) determination every 2–3 weeks for the initial 3 months of treatment; the dosage is adjusted to maintain serum thyroid hormone (T4) concentration in the low-normal range
- Surgical removal of the thyroid gland (thyroidectomy)—watch for development of low blood-calcium levels (known as "hypocalcemia") and/or paralysis of the voice box (larynx) during the initial postoperative period; measure serum thyroid hormone (T4) concentrations in the first week of surgery and every 3–6 months thereafter, to check for recurrence
- Radioiodine (radioactive form of iodine)—measure serum thyroid hormone (T4) concentrations 2 weeks after treatment and every 3–6 months subsequently
- Kidney function—kidney filtration rates decline following treatment in most affected pets; therefore, perform a physical examination, serum biochemistry, and urinalysis 1 month after treatment and then as indicated by clinical history

POSSIBLE COMPLICATIONS

- Untreated disease can lead to congestive heart failure; diarrhea that is difficult to treat; kidney damage; detachment of the retina (a layer in the back of the eye) as a result of high blood pressure (hypertension); and death
- Complications of surgical treatment include low levels of parathyroid hormone (known as "hypoparathyroidism"; the parathyroid glands are small glands adjacent to the thyroid gland, which may be removed at the time of the surgical removal of the thyroid gland); low levels of thyroid hormone (known as "hypothyroidism"); and paralysis of the voice box (larynx)
- Low levels of thyroid hormone (hypothyroidism) is rare following radioiodine therapy (radioactive form of iodine)

EXPECTED COURSE AND PROGNOSIS

- Uncomplicated disease—prognosis is excellent; recurrence is possible and most commonly is associated with poor owner compliance with medical management; regrowth of overactive thyroid tissue is possible, but uncommon after surgical removal of the thyroid gland (thyroidectomy) or radioiodine treatment (radioactive form of iodine)
- Reported mean survival time for cats treated with radioiodine is 4 years; mean survival time for cats treated with methimazole is 2 years; mean survival time for cats treated with radioiodine and methimazole is 5.3 years
- Cats with pre-existing kidney disease have a poorer prognosis; kidney failure is the most common cause of death in hyperthyroid cats
- Dogs or cats with thyroid cancer (thyroid carcinoma)—prognosis is poor; treatment with radioiodine (radioactive form of iodine), surgery, or both usually is followed by recurrence of disease; chemotherapy is of questionable benefit

Key Points

- Disease condition caused by high levels of thyroid hormones that increase metabolism in the body
- Most common hormonal (endocrine) disease of cats; one of the most common diseases seen in late middle-aged

and old cats
- Rare in dogs
- Potential side effects of drugs that inhibit the production of thyroid hormones (antithyroid drugs) and surgical complications
- Be aware of possible (rare) recurrence after treatment

Notes

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