



# WINN FELINE FOUNDATION

For the Health and Well-being of All Cats

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## **Feline Hyperthyroidism**

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Hyperthyroidism (also called thyrotoxicosis) is one of the most common diseases of the middle-aged and older cat and generally considered the most common endocrinopathy of cats.<sup>3</sup> It is a multi-system disorder caused by an increase in the amount of thyroid hormones (called T3 and T4) produced by an enlarged thyroid gland. It was first documented in cats in 1979 but the cause of the disease has been elusive.<sup>5</sup> Numerous nutritional and environmental factors have been indicated in different studies to play a role in the pathology of this disease.<sup>1</sup> Although the enlargement in the thyroid gland is caused by a tumor, called an adenoma, it is non-cancerous. Approximately 4% of cases are thyroid carcinomas, malignant thyroid tumors.<sup>4</sup>

The most common clinical signs of hyperthyroidism in cats include weight loss, increased appetite (although some patients have decreased appetite), vomiting, increased thirst and urination, hyperactivity, and diarrhea. The high levels of thyroid hormones can cause the development of cardiac signs in some form, and these patients may have a heart murmur, difficulty breathing, high heart rate and arrhythmias.

Veterinarians will request a blood chemistry panel, complete blood count (CBC), and urinalysis as well as a thyroid hormone (T4) level in cats suspected of being affected by this disease. It is important to evaluate the health of other major organs, including the kidneys and heart in these patients. Typically, hyperthyroid cats have elevations in their liver enzymes; total T4 concentrations and liver enzyme elevations are significantly correlated.<sup>2</sup> Chest x-rays and cardiac ultrasound may reveal secondary left-sided heart enlargement. Generally, the cardiac changes will reverse when the hyperthyroidism is treated. If the heart continues to remain enlarged, further exploration for an underlying form of hypertrophic cardiomyopathy should be performed. In some cases, specific heart medication may be needed to stabilize cardiovascular health. Some cats with hyperthyroidism also have mild systemic hypertension (high blood pressure). This can be readily diagnosed and treated. Moderate to severe hypertension in these cases is now more closely associated with other conditions such as chronic kidney disease. When hypertension does not respond to treatment for hyperthyroidism, anti-hypertensives, such as amlodipine, can be added to the treatment regimen.<sup>7</sup> In recent years, it has been recognized that many hyperthyroid cats have concurrent chronic kidney insufficiency that is being masked by the effects of hyperthyroidism. Treatments directed at curing hyperthyroidism in these patients could lead to a worsening of their kidney function.

Most hyperthyroid cats will have elevated levels of the thyroid hormone T4 in their bloodstream on a routine screening test. However, a small percentage of hyperthyroid cats will have normal T4 levels. If hyperthyroidism is still strongly suspected in these patients, repeating the serum T4 concentration in 2 weeks may be diagnostic if the T4 swings in and out of the reference range.<sup>6</sup> In addition, another option is to measure concentrations of free T4 or TSH (thyroid stimulating hormone). Thyroid scintigraphy, a type



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of imaging of the thyroid gland using radioisotopes, is also helpful with diagnosis. Other Dynamic Thyroid Function Testing, such as a T3 Suppression or TRH Stimulation test could be considered when repeat total T4 measures remain within the reference range, free T4 concentrations are equivocal, or thyroid scintigraphy is unavailable.<sup>1</sup>

Once hyperthyroidism has been confirmed, there are several treatment options. They include treatment with radioactive iodine (I-131), surgical removal of the gland (thyroidectomy), treatment with anti-thyroid medications, and nutritional management. The initial choice of treatment is often guided by concern about the patient's kidney function status. Some cats have detectable impairment of kidney function at the time of their diagnosis, but many do not. It is difficult to assess kidney function accurately from routine blood and urine testing in cats. Generally at least 2/3 of the kidney function must be lost before routine blood tests will show any abnormalities. This can make it very difficult to detect which cats with hyperthyroidism actually have concurrent chronic kidney insufficiency, and many veterinarians will recommend a trial of anti-thyroid medication to assess response before a decision is made to pursue I-131 or thyroidectomy. If mild to moderate kidney disease is present, this circumstance by itself should not prevent permanent treatment of hyperthyroidism. Leaving a cat untreated or poorly controlled with oral therapy may aid in development or progression of kidney disease based on more recent studies.<sup>8</sup> It is possible treating and curing hyperthyroidism may help reverse kidney damage and maintain the remaining kidney function.

Since hyperthyroidism induces increases in blood pressure and blood supply to the kidneys, treating the disease will result in a drop in the blood supply to the kidneys. In a cat with kidney failure, this can cause a worsening of their kidney function in the few months after treatment for hyperthyroidism with either radioactive iodine or surgical removal of the gland. In those cats that develop azotemia subsequent to treatment, the degree might be mild and few clinical signs noted. For this reason, patients with known kidney disease are often treated initially with anti-thyroid medications and with a gradually increasing dose rather than surgery or I-131. If their condition deteriorates, the anti-thyroid medication can be discontinued in an effort to preserve their remaining kidney function. Using medication allows better control over the concurrent kidney disease and may allow the patient to survive longer.<sup>7</sup>

Anti-thyroid medications in current use in North America include propylthiouracil (PTU), carbimazole, and methimazole; methimazole being the most commonly utilized of the three. Although they are all three effective in decreasing thyroid hormone levels, PTU is associated with more adverse effects than methimazole or carbimazole. Methimazole is better tolerated and safer for long-term use in the cat. Approximately 15% of patients will suffer from side effects when taking methimazole. These may range from poor appetite, vomiting, lethargy, and skin rash to more serious problems such as bone marrow depression and liver toxicity. In most cats, the adverse effects are mild and transient and do not interfere with continued treatment. Methimazole is also widely available in a transdermal gel formulation that is helpful when it is difficult to administer oral medication or in some cases when the cat has gastrointestinal signs (loss of appetite, vomiting, prolonged diarrhea).



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Another form of management of hyperthyroidism is available through the feeding of an iodine deficient diet (Hill's Prescription y/d®). Iodine is a necessary component of T4 and T3 production and excess thyroid hormone cannot be produced if levels of iodine are not sufficient.<sup>9</sup> This type of management is most effective in cats with a moderate increase in thyroid hormones. Cats fed this diet must eat only this diet with no other diets, treats, or table food allowed. Feeding the diet is not a permanent cure and must be a lifetime dietary commitment unless another treatment option is chosen. The thyroid tumor will continue to grow larger and thyroid adenomas can potentially still transform overtime to thyroid carcinoma in a small number of cats.

For hyperthyroid cats that are assessed with normal kidney function or diagnosed at a younger age where a longer lifespan is anticipated, thyroidectomy or I- 131 treatment are most often recommended. Both of these options provide a cure for hyperthyroidism and avoid the need for life-long administration of medications or a special diet. In areas where I-131 treatment facilities are available, it is usually the treatment of choice since this option avoids the risks of anesthesia and surgery. Treatment facilities are more available and widespread than in the past. However, where this treatment is not as widely available and veterinarians have become very skilled surgically at thyroidectomy, this procedure is a reasonable option for treatment of hyperthyroidism in many cats.

In general, the treatment a cat receives for hyperthyroidism should be determined on an individual basis. Each treatment option involves advantages and disadvantages for consideration. Several factors such as age, costs of treatment, ability to treat with medications or diet, concurrent disease (significant heart and kidney dysfunction) are among various issues for consideration. Concern about chronic kidney insufficiency is a major determinant of the course of treatment and may eliminate I-131 or surgery as an option. Close monitoring of the hyperthyroid patient by the veterinarian is essential to ensure treatment success.

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