HYPERTHYROIDISM IN SENIOR DOMESTIC CATS

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Feline hyperthyroidism and feline hypothyroidism are conditions of the thyroid gland, commonly seen in older cats. Hyperthyr - oidism is disease which attacks senior cats, and is being seen more often in recent years, as cats are living longer because of advances in veterinary science and increased awareness on the part of caregivers (Kerry S., 2008). Hyperthyroidism is the most common hormone abnormality in cats. It is very rare in dogs. It is a disease of older cats. The average age at which it is first diagnosed is 8-13. Nine out of ten cats that develop hyperthyroidism are over ten years old.

Hypothyroidism is an endocrine gland disorder. (The thyroid gland is considered the "master gland" of the endocrine glands.) The thyroid gland secretes hormones to regulate many metabolic processes, including growth, development and energy expenditure. Hyperthyroidism; also known as thyrotoxicosis is caused by the overactivity of the thyroid gland (Tolbert and Ward, 2010) which produces more than the normal level of thyroid hormones T4 & T3, which are released into the bloodstream. Excessive secretion of the thyroid hormones, T4 and T3, results in signs that reflect an increased metabolic rate and produces clinical hyperthyroidism (Boretti, *et al*., 2009). It is most common in middle-aged to old cats but also develops rarely in dogs. Functional thyroid adenoma (adenomatous hyperplasia) is the most common cause of feline hyperthyroidism; in 70% of cases, both thyroid lobes are enlarged. Thyroid carcinoma, the primary cause of hyperthyroidism in dogs, is rare in cats (1-2% of hyperthyroidism cases). Hyperthyroidism, also known as "hyperthyroid disease," occurs when the thyroid gland enlarges, and starts producing excess amounts of thyroid hormone (thyrotoxicosis). This anomaly is usually caused by a benign tumor on one or both (Fig. 1) of the thyroid gland's lobes (Peterson and Broome, 2010). Although thyroid tumors can be cancerous, the chances are only 2% to 5% of malignancy in cats.

This article discusses the diagnosis and treatment of these conditions, and treatment, including medicine, surgery and radioiodine treatment.

Fig. 1: Thyroid Glands (Rt. & Lt.) in a cat

Fig. 2: Poor Coat and Skin Lesions on Face of Cat

Five Cats (aged about 10-12 years old) were presented in a year to Pet Aid Center with following clinical signs. The most common signs include weight loss (Fig. 3), increased appetite, increased activity and restlessness, aggressive or "cranky" behavior (Fig. 4), a poor hair coat (Fig. 2), occasionally difficulty in breathing, increased water drinking, hyperexcitability, polydipsia, Polyuria, and palpable enlargement of the thyroid gland. GI signs are also common and may include vomiting, diarrhea, and increased fecal volume. Cardiovascular signs include tachycardia, systolic murmurs, dyspnoea, cardiomegaly. Only two cats exhibit apathetic signs (e.g., anorexia, lethargy, and depression); weight loss remains a common sign in all the cats.

Diagnosis was made by conducting CBC; since hyperthyroidism can mimic the symptoms of other diseases, such as CRF (chronic renal failure) or liver disease, a blood panel would usually show the "big picture." combined with a thyroid-specific test was conducted, revealed the T4, assessing the increased thyroid levels. Elevated levels of T4 confirmed the presence of hyperthyroidism. A diagnosis of hyperthyroidism was made to asses the level of thyroid hormone which was increased in the blood. Three of the hyperthyroid cats had very high levels of hormone but two cats had signs of hyperthyroidism with normal or only slightly increased levels of thyroid hormone. Because thyroid hormone levels can vary over time so it was necessary to check blood levels several times or perform a different test called a T3 suppression test (Peterson *et al.*, 1990). The enlarged thyroid gland(s) were felt in the neck. High basal serum total thyroid hormone concentration was the hallmark of hyperthyroidism and confirms the diagnosis. In these cats, a high free T4 concentration along with consistent history and physical examination findings was diagnostic of hyperthyroidism.

Fig. 3: Weight Loss

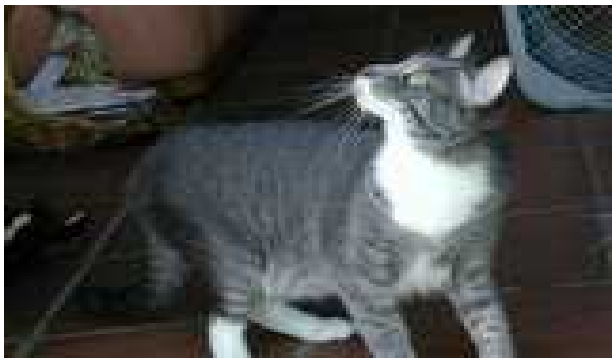

Fig. 4: Cranky Behaviour

Cats with hyperthyroidism were treated two by radioiodine therapy as recommended by Malik *et al*., 1994; two by thyroidectomy, one by chronic administration of an antithyroid drug. Radioactive iodine provided a simple, effective, and safe treatment and is considered the treatment of choice. The radioiodine is concentrated within the thyroid tumor, where it selectively irradiates and destroys hyperfunctioning thyroid tissue.

Surgical thyroidectomy is also an effective treatment for hyperthyroidism in cats. One Cat With unilateral thyroid tumors, hemithyroidectomy was conducted, corrected the hyperthyroid state, and thyroxine supplementation usually was not necessary.

Other Cat with bilateral thyroid tumors, complete thyroidectomy was conducted, but parathyroid function was preserved to avoid postoperative hypocalcemia. Thyroxine supplementation was started 1-2 days after complete thyroidectomy. The other Cat developed iatrogenic hypoparathyroidism, which was treated with vitamin D and calcium.

One Cat was treated with methimazole, an antithyroid drug, which controls hyperthyroidism by blocking thyroid hormone synthesis. Propylthiouracil, another antithyroid drug, was not recommended for use in cats because of the high incidence of serious side effects (especially hemolytic anemia and thrombocytopenia). The typical recommended

initial dose of methimazole was 1.25 to 2.5 mg twice a day (Peterson *et al.,* 1988). The dose was adjusted to maintain circulating thyroid hormone concentrations within the normal range and was given daily. It was suggested that adverse effects, the more serious of which are agranulocytosis and thrombocytopenia, develop in <5% of treated cats but was not noticed in this case. It is recommended that if this occurs, methimazole should be discontinued and supportive therapy instituted; these adverse reactions should resolve within 2 wk. To maintain normal levels of thyroid hormone and to monitor for adverse reactions during the first 3 months of treatment (when the most serious side effects associated with methimazole therapy develop), complete blood counts and serum thyroid hormone determinations should be repeated at 2- to 4-wk intervals, and the drug dose adjusted as necessary. Subsequently, serum T_4 concentrations should be measured at 3- to 6-months intervals to monitor dosage requirements and response to treatment.

The most important indicator of the success of therapy is clinical improvement. Reversal of changes in coat and body weight should be assessed only after 1-2 months of therapy. When clinical improvement is marginal or signs of thyrotoxicosis are seen, the clinical observations can be supported by therapeutic monitoring of serum thyroid hormone concentrations ("post-pill testing"). With once-daily administration of T_4, the peak serum concentration of T_4 generally should be slightly high to high-normal 4-8 hr after dosing and should be low-normal to normal 24 hr after dosing (Peterson *et al.,* 2001). Animals on BID administration probably can be checked at any time, but peak concentrations can be expected at the middle of the dosing interval (4-8 hr) and the nadir just before the next dose. When the dose is stabilized, serum T_4 (with or without T_3) concentrations should be checked 1-2 times per year.

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