

## Hyperthyroidism in Cats

**Hyperthyroidism** (overactive thyroid glands) is a very common disorder of older cats. It is caused by an increase in production of thyroid hormones from the thyroid glands, which are situated in the neck. Clinical signs associated with hyperthyroidism can be quite dramatic and cats can become seriously ill with this condition. However, in most cases hyperthyroidism is treatable and most cats will make a complete recovery.

Thyroid hormones have an important role in controlling the body's metabolic rate and thus the general activity level, so cats with hyperthyroidism tend to burn up energy too rapidly and typically suffer weight loss despite having an increased appetite and increased food intake.

In the vast majority of cases the increased thyroid hormone production is due to a benign (non-cancerous) change. Both of the thyroid glands are involved, although one gland may be more severely affected than the other. The abnormal thyroid tissue becomes enlarged, but the underlying cause of this change is currently unknown. Cats usually respond extremely well to treatment, and if the condition is recognised early and treated appropriately, then the outlook for the affected cat is generally very good.

A malignant (cancerous) tumour known as thyroid adenocarcinoma can also be an underlying cause of some cases of hyperthyroidism. Fortunately, this is rare, and is only the cause in around one to two per cent of all hyperthyroid cats. When a thyroid adenocarcinoma is present treatment is much more difficult.

### Typical clinical signs

Hyperthyroidism is almost exclusively seen in middle aged to elderly cats, and is rarely seen in cats less than seven years of age. Male and female cats are affected with an equal frequency. The 'classic' signs of hyperthyroidism are:

- Weight loss
- Increased appetite (polyphagia)
- Increased thirst (polydipsia)
- Increased irritability
- Restlessness / Hyperactivity
- Rapid heart rate (tachycardia)
- Unkempt coat
- Mild to moderate diarrhoea and/or vomiting

Some affected cats will be noticeably intolerant of heat and seek out cooler places to sit, and some (especially advanced cases) may pant when they are stressed. Most hyperthyroid cats will show some degree of polyphagia (excessive appetite) and restlessness, but in some advanced cases there will be generalised weakness, lethargy and loss of appetite and the signs will be less characteristic.

## Secondary complications

Thyroid hormones have effects on virtually all the organs in the body, and therefore it is not surprising that this disease can sometimes cause secondary problems that may lead to the necessity for additional investigations and treatment. The effect of thyroid hormones on the heart is to stimulate a faster heart rate (more rapid beating of the heart) and a stronger contraction of the heart muscle. Over time, with hyperthyroidism the muscle of the largest chamber in the heart (the left ventricle) enlarges and thickens - so called 'left ventricular hypertrophy'. If left untreated and unmanaged, these changes will eventually compromise the normal function of the heart and can even result in heart failure.

Hypertension (high blood pressure) is another potential complication of hyperthyroidism and can cause additional damage to several organs including the eyes, kidneys, heart and brain.

Kidney disease (chronic renal failure) does not occur as a direct effect of hyperthyroidism, but the two diseases often occur together because they are both common in older cats. Care is needed where both these conditions are present, as the hyperthyroidism tends to increase the blood supply to the kidneys, which may improve their function. Thus blood tests taken to assess kidney function in a hyperthyroid cat may show normal or only mild changes, but potentially more severe renal failure may be masked by the presence of hyperthyroidism. For this reason, irrespective of what treatment is chosen for long-term management of the hyperthyroidism (see below), it is usually advisable to start on medical treatment (tablets) initially and to monitor the response with repeat blood and urine tests to look at thyroid function and kidney function. Just occasionally, successful treatment of the hyperthyroidism results in a dramatic decline in kidney function.

## Reaching a diagnosis

If you or your veterinary surgeon suspects hyperthyroidism, a thorough physical examination and some blood tests will be required to confirm the diagnosis. On examination, one or two enlarged thyroid glands can often be palpated (felt) as a small, firm mass in the neck (these are often about the size of a pea or a baked-bean in hyperthyroid cats). However, in some cats there is no palpable thyroid enlargement, and this can be because the overactive tissue is present in an unusual (ectopic) site (often within the chest cavity). The diagnosis is confirmed by determination of thyroid hormones in the blood. A blood test looking at thyroxine (T4) concentration is usually all that is required for the diagnosis as this is usually elevated in clinical cases. Where possible, blood pressure should also be checked with hyperthyroid cats, and if secondary heart disease is suspected then an electrocardiogram (ECG - electrical tracing of heart activity), and a chest x-ray or ultrasound may be helpful.

## Treatment

There are three main options for the treatment of hyperthyroidism:

### 1) Medical management (drug therapy)

Anti-thyroid drugs are available in tablet or liquid form and these act by reducing the production and release of thyroid hormone from the thyroid gland. They do not provide a cure for the condition, but they do allow either short-term or long-term control of hyperthyroidism. Thyroid hormone concentrations usually fall to within the reference range within three weeks; treatment is then adjusted according to response. To maintain control of hyperthyroidism, treatment needs to be given daily for the rest of the cat's life. Anti-thyroid drug treatment has the advantage of being readily available and economical, but it is not curative. Life long treatment, usually involving twice daily oral dosage, will be required and for some owners, and some cats, this may be difficult to achieve. Routine blood tests should be done periodically during treatment to monitor the effectiveness of therapy, to monitor kidney function and to look for potential side effects.

## 2) Surgical thyroidectomy

Surgical removal of the affected thyroid tissue (thyroidectomy) can produce a permanent cure and is a common treatment for many hyperthyroid cats. In general this is a very successful procedure and is likely to produce a long-term cure or permanent cure in most cats. However, surgery will not be successful if 'ectopic' thyroid tissue is present. Even after successful surgery, occasionally signs of hyperthyroidism develop again at a later time if previously unaffected thyroid tissue becomes diseased.

## 3) Radioactive iodine therapy

Radioactive iodine ( $I_{131}$ ) is a very safe and effective cure for hyperthyroidism wherever the location of the overactive thyroid tissue. It has the advantage of being curative in most cases with no ongoing treatment required.

Radioactive iodine is administered as a single injection given under the skin - the iodine is then taken up by the active (abnormal) thyroid tissue, but not by any other body tissues, resulting in a selective local accumulation of radioactive material in the abnormal tissues. The radiation destroys the affected abnormal thyroid tissue, but does not damage the surrounding tissues or the parathyroid glands.

The advantages of radioactive iodine are that it is curative, has no serious side-effects, does not require an anaesthetic and is effective in treating all affected thyroid tissue at one time, regardless of the location of the tissue. For this reason, the treatment can only be carried out in certain specially licensed facilities and a treated cat has to remain hospitalised until the radiation level has fallen to within acceptable limits. This usually means that the cat must be hospitalised for between three and six weeks (depending on the facility) following treatment. Most treated cats have normal thyroid hormone concentrations restored within three weeks of the treatment, although in some it can take longer.

### Treatment of thyroid adenocarcinoma

The rare cases of thyroid adenocarcinoma (malignant tumour) are more difficult to treat but can be successfully treated using very high doses of radioactive iodine. However, currently only the University of Bristol is licensed to administer this high dose.