fab information sheet

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.

This cat is showing weight loss and poor coat - typical signs of hyperthyroidism

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 a 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- to old-aged cats, and is rarely seen in cats less than seven years of age. Male and female cats are affected with an equal frequency and although no studies have shown any breeds that are particularly prone to developing hyperthyroidism, there is some evidence that it is less common in Siamese cats.

Cats affected with hyperthyroidism usually develop a variety of clinical signs, which are usually quite subtle at first, but then become more severe as the disease progresses. Also, as this disease occurs mostly in older cats, some affected cats will have other diseases that can complicate and even mask some of the clinical signs.

The 'classic' signs of hyperthyroidism are weight loss, usually despite an increased appetite (polyphagia), increased thirst (polydipsia), increased irritability, and restlessness or even hyperactivity. Many affected cats have a rapid heart rate (tachycardia) and develop an unkempt coat. Mild to moderate diarrhoea and/or vomiting is also quite common. 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. This means that in some cats with hyperthyroidism, additional treatment may be required to control secondary heart disease. However, once the underlying hyperthyroidism has been controlled, the cardiac changes will often improve, or may even resolve completely.

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. If hypertension is diagnosed along with hyperthyroidism, drugs will be needed to control the blood pressure to reduce the risk of damaging other organs. As with heart disease, following successful treatment of the hyperthyroidism, the high blood pressure will sometimes resolve and permanent therapy may not, therefore, be necessary.

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 the 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. If this is detected it may be necessary to reduce the dose of therapy so that the hyperthyroidism is not fully controlled but renal function is not too severely compromised.

Reaching a diagnosis

If you or your veterinary surgeon suspects hyperthyroidism, a thorough physical examination and some blood tests will be required to be performed by your vet 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).

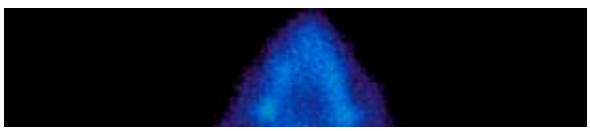
Cat with large visible swelling in its neck

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. Other laboratory tests may also be abnormal – for example liver enzymes are commonly increased secondary to hyperthyroidism, and assessment of routine blood and urine tests is usually advised to help rule out any other concurrent disease (such as renal failure). 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.

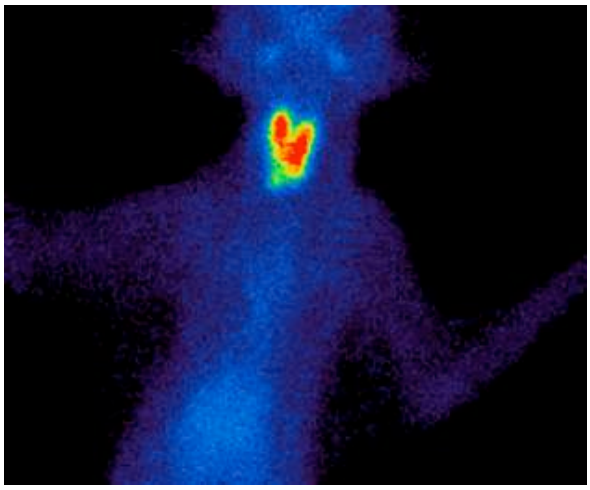
In occasional cases, hyperthyroidism may be strongly suspected on the basis of the clinical signs, but blood testing may reveal a normal thyroid hormone (T4) concentration. There are a number of potential reasons for this and usually on a repeat test it will be elevated. If not, additional tests may need to be undertaken to confirm or rule out hyperthyroidism.

Technetium scan

Technetium scanning is a technique that is available at a few specialist centres and can be useful in the investigation of some hyperthyroid cats. This technique can be used both to diagnose hyperthyroidism and also to locate exactly



where the abnormal tissue is. This can be particularly helpful if surgery is being considered but there is not a clearly identifiable enlarged thyroid on clinical examination. It is also important as some cats have 'ectopic' overactive thyroid tissue located in the chest, and in these cases therefore surgical removal of the thyroid tissue in the neck would not cure the hyperthyroidism. With this technique a very small dose of a radioactive chemical (technetium) is injected into the cat's vein. The technetium is selectively taken up by abnormal thyroid tissue, and this can be detected using a special camera (a 'gamma camera'). This is a simple, safe and easy procedure that may be recommended in some situations.



Technetium scan of a cat showing bilateral hyperthyroidism

Treatment

There are three main options for the treatment of hyperthyroidism, each with advantages and disadvantages:

Medical management (drug therapy)

Anti-thyroid drugs are available in tablet 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. Two options are available:

- Methimazole (Felimazole; Dechra) a twice daily medication, although once stabilised some cats only require once daily.
- Carbimazole (Vidalta; Intervet Schering-Plough) a slow release formulation meaning that it only needs to be given once daily. The tablets must not be broken or crushed.

Thyroid hormone concentrations usually fall to within the reference range within 3 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.

For most cats methimazole and carbimazole are safe and effective treatments for hyperthyroidism. Side effects are uncommon and if they do occur they are usually mild and reversible. Poor appetite, vomiting and lethargy are the most likely side effects and often resolve after the first few weeks of treatment and/or by temporarily reducing the dose of treatment and administering the tablets with food. More serious problems, including reduced white blood cell counts, reduced platelet counts (which help the blood to clot), liver disorders, or skin irritation are rare, but if they do occur then an alternative treatment must be used.

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 checked periodically during treatment to monitor the effectiveness of therapy, to monitor kidney function (see above) and to look for potential side effects.

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 and even after successful surgery, occasionally signs of hyperthyroidism develop again at a later time if previously unaffected thyroid tissue becomes diseased.

To reduce anaesthetic and surgical complications, where possible it is always recommended that hyperthyroid patients are initially stabilised with anti-thyroid drugs for three to four weeks before surgery. Any associated heart disease must also be treated where necessary. Good success and avoidance of postoperative complications depend on good surgical skills, and experience is necessary to achieve good results. The major risk associated with surgery itself is inadvertent damage to the parathyroid glands – these are small glands that lie close to, or within, the thyroid glands themselves, and have a crucial role in maintaining stable blood calcium levels. Damage to these glands can result in a life-threatening fall in blood calcium concentrations (hypocalcaemia). This is most likely to occur when both thyroid glands are removed at the same time, since this can result in damage to both parathyroid glands. To minimise the risk of this complication in those cats that require removal of both thyroid glands it may be appropriate to perform the procedure in two stages, removing the most affected gland first and allowing six to eight weeks for recovery of

parathyroid hormone production before removing the second thyroid gland.

It is usually recommended that cats remain hospitalised for a few days after surgery so that blood calcium concentrations can be monitored and any treatment given, if required. Clinical signs of low blood calcium include muscle twitches and weakness, which can progress rapidly to convulsive seizures. Treatment is with supplemental calcium by injection and then by mouth. Additional treatment with vitamin D3 is also needed to allow the calcium given by mouth to be used effectively. Once stable, continued treatment can be given at home, but in most cats the damage to the parathyroid glands is only temporary and treatment may only be needed for a few days or weeks.

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. However, it does involve the handling and injection of a radioactive substance. This carries no significant risk for the patient, but precautionary protective measures are required for people who come into close contact with the cat. 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.

A single injection of radioactive iodine is curative in around 95 per cent of all hyperthyroid cases, and in the few cats where hyperthyroidism persists the treatment can be repeated. Occasionally a permanent reduction in thyroid hormone levels (hypothyroidism) occurs following radioactive iodine treatment, and if this is accompanied by clinical signs (lethargy, obesity, poor haircoat) then thyroid hormone supplementation may be required (in the form of tablets).

The licensed facilities currently available in the UK are at the Animal Health Trust near Newmarket, the university veterinary schools at Bristol, London and Glasgow, the Barton Veterinary Hospital in Canterbury, Cardiff Cat Clinic, and Bishopton Veterinary Group, Ripon, North Yorkshire.

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.

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