



Radioactive iodine therapy in hyperthyroid cats

Brochure 2021

WHAT IS HYPERTHYROIDISM?

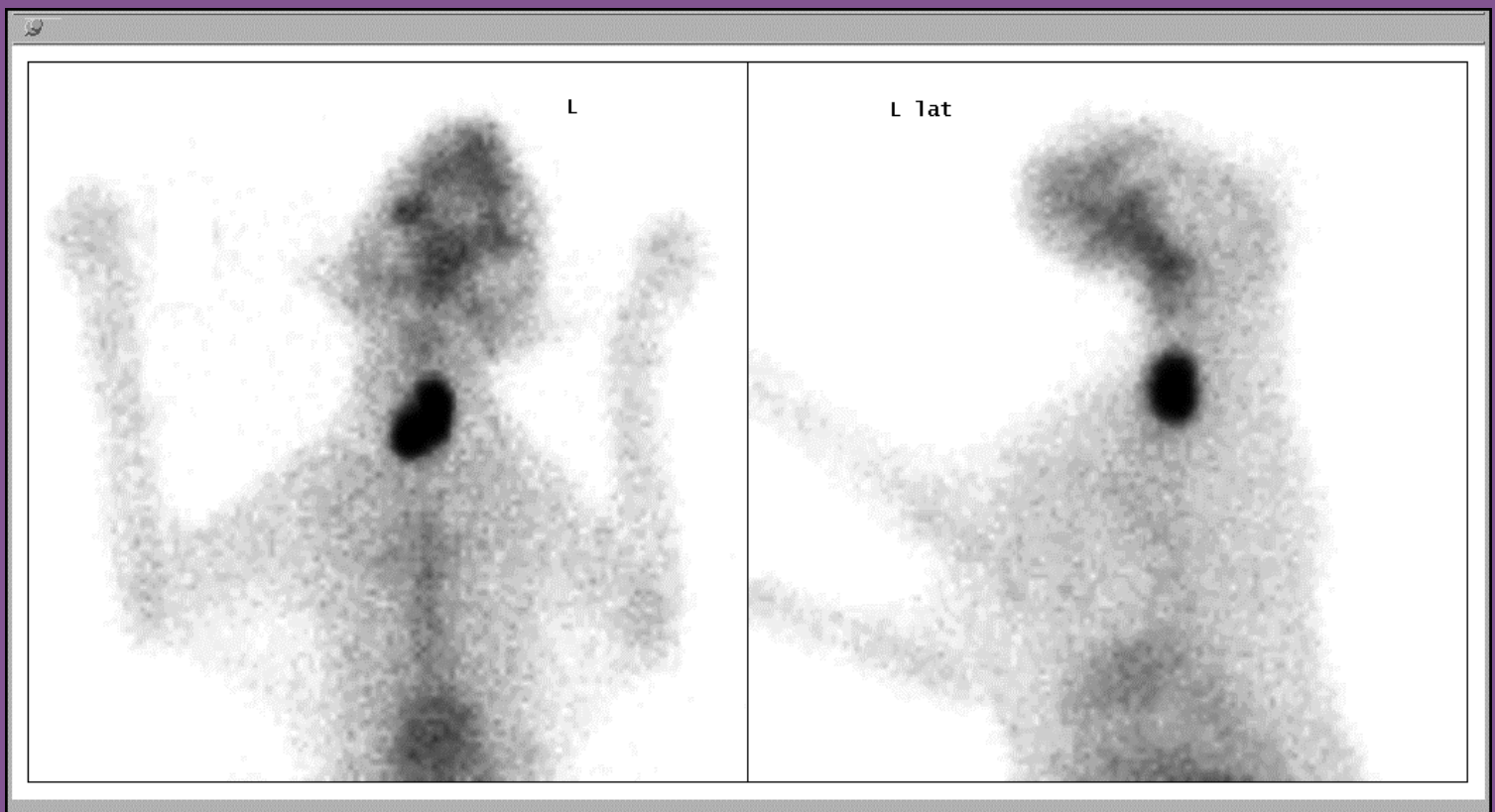
Your cat has been diagnosed with hyperthyroidism, one of the most common hormonal problems in aging cats. This is the overproduction of thyroid hormone. Most often this is caused by a benign tumor (hyperplasia or adenoma), only rarely do malignant growths occur in the cat. However, this tumor must be treated: the overproduction of thyroid hormone has a lot of influence on the metabolism and can have harmful consequences for the cat.

The symptoms develop gradually and often it is not immediately clear that something is wrong. The most common symptoms are increased appetite (begging or even stealing food) and losing weight. Because the cat still eats well, it does not seem to be sick immediately. However, due to the excess hormone, the cat needs much more energy, which it tries to compensate for by eating more. If this is not enough, the cat will 'burn' the fat reserves and eventually the muscles as an energy source. Other symptoms include frequent vomiting, more drinking and urinating, seeking more attention, showing busier or even aggressive behavior, a high heart rate and/or a poorly groomed coat.

However, none of these symptoms are exclusive to hyperthyroidism and can also be caused by other diseases. A visit to the veterinarian is therefore necessary to determine the cause.

A minority of cats are more likely to show atypical symptoms, such as decreased appetite or even anorexia, they become drowsy and suffer. This can also be part of hyperthyroidism.

The diagnosis is made on the basis of a blood test, which shows an increase in the thyroid hormone (thyroxine or T4). It is best to carry out a complete blood test, to detect or exclude other diseases.



WHICH ARE THE TREATMENT OPTIONS?

There are various treatment options: lifelong medication, an adapted iodine-poor diet, surgical removal of the affected thyroid gland(s) or the use of radioactive iodine.

1. MEDICATION (METHIMAZOLE, CARBIMAZOLE)

Medication (methimazole, carbimazole) should be given daily (1 or 2 times) for life. Not all cats are equally easy to take medication. Regular blood tests are needed to monitor the cat's condition and adjust the dosage of the medication. In a number of cats, side effects can occur due to the medication, such as severe liver problems, gastrointestinal complaints, severe itching, bone marrow suppression, ... When these side effects occur, the medication should be stopped. Since this treatment does not eliminate the cause of the hyperthyroidism, the benign tumor can greatly increase in size over time, and in some cases even show signs of malignancy. Increasing the dose is often necessary over time.

2. LOW IODINE DIET (HILL'S Y/D)

A low-iodine diet prevents too much thyroid hormone, for which iodine is necessary, from being produced. However, it cannot be used preventively. In addition, it is very important that the cat only eats that food (no sweets!), making it more difficult to give to outdoor cats, when there are several cats in the family, when the cat does not like the diet or when another diet is necessary (e.g. for diabetes).

Since this treatment does not eliminate the cause of the hyperthyroidism, the benign tumor can greatly increase in size over time, and in some cases even show signs of malignancy. Little is known about the long-term efficiency of the diet.

Trial treatment with medication or the low-iodine diet may be appropriate in some cases, such as cats with concomitant other diseases or suspected kidney problems, but are not required for treatment with radioactive iodine.

3. SURGICAL REMOVAL OF THE THYROID GLAND

Removal of the thyroid gland(s) or thyroidectomy is effective but has several disadvantages. Cats with hyperthyroidism are usually older and often have heart defects that make them not a suitable candidate for the anesthesia needed for this operation. When removing the thyroid glands, the nearby parathyroid glands can be damaged or taken away, which can cause additional complications such as calcium deficiency.

In addition, ectopic thyroid tissue (= small areas of thyroid tissue along the trachea or thyroid tissue in the chest cavity) may be present that cannot be removed surgically. Often both thyroid glands are affected. When only 1 thyroid gland is removed, it cannot be excluded that in the long term the other thyroid gland also becomes hyperactive, and therefore a second surgery is needed. Preventive removal of both thyroid glands is not recommended.

4. TREATMENT WITH RADIOACTIVE IODINE

The big advantage of using radioactive iodine (¹³¹I) is that it is an easy and non-invasive treatment. Because the radioactive iodine is injected through a catheter and absorbed from the blood into the thyroid glands, it reaches all thyroid tissue that works too fast, including the tissue that is located in the chest, for example. Like surgical removal, this is an irreversible therapy. However, there is no risk of damage to the parathyroid glands, and very few side effects are known.

The success rate is high: 90 to 95% of cats have a normal thyroid function after only a few weeks, in some cases it can take up to 6 months before the thyroid hormone has reached a normal level. Only a small percentage of cats become hyperthyroid again over time.

A small proportion of hyperthyroid cats remain hyperthyroid after the first treatment with radioactive iodine. Often these are cats that have been hyperthyroid for a long time and have been treated with medication or Y / D and have developed a large thyroid tumor, sometimes there is even a possible malignant change. A second treatment may be necessary and can be carried out without any problems. Although most patients respond well to a second treatment, there are still a fraction of these patients who have not been fully treated.

On the other hand, there are also cats that react too strongly to radioactive iodine therapy. Often there is still enough normal thyroid tissue present after the treatment to produce a normal amount of thyroid hormone. However, some cats have too little thyroid tissue left, and produce too little hormone. This is often temporary and then we speak of a transient hypothyroidism (the opposite of hyperthyroidism). However, if it persists for more than 6 months, if the cat gets clinical complaints (such as drowsiness, dull coat, overweight, ...) or if other organ systems (especially the kidneys) are bothered by the shortage of thyroid hormone, it is recommended to supplement thyroid hormone. This is an easy treatment in the form of a pill or syrup that can be mixed into the feed. Thyroid hormone or thyroxine supplementation has no known side effects and is well tolerated by the cats, unlike thyroid inhibitors **that can cause serious side effects**.

HOW DOES RADIOACTIVE IODINE (¹³¹I)

WORK?

In order to function properly, a thyroid gland needs iodine. The thyroid gland makes no distinction whether the iodine comes from the diet or is injected, nor whether it is radioactive or non-radioactive iodine. The cat's hyperactive thyroid tissue accumulates the radioactive iodine (in this case: ¹³¹I). The radioactive iodine then releases its radiation to the cells that work too fast.

One part of the radiation (beta particles) is released very locally (maximum 2 mm all around) so that the affected thyroid cells are destroyed. In this way, only the affected thyroid tissue is treated and the normal tissue is spared. Normal thyroid tissue often lies temporarily still for a while, suppressed by the excessive thyroid function of the affected thyroid gland. The parathyroid glands that lie outside the thyroid gland also remain unharmed.

Another part of the radiation, the gamma rays, do leave the cat, and allow us to check the absorption of the radioactive iodine in the thyroid gland with a special camera (the gamma camera). This is also the part of the radiation that we as veterinarians or as owners are exposed to when we are near the cat.

The part of the radioactive iodine that is not absorbed by the thyroid gland leaves the body through urine, feces and saliva. Therefore, the patients must stay with us for a few days after the treatment (most of the radioactivity is excreted during the first 72 hours after the treatment) and you must also take precautions at home afterwards (see below).

The big **advantage** of this treatment is that no major actions are required (such as surgery), that only a short or even no sedation is needed (for the diagnostic scan, see below) and that the majority of patients only need one treatment. In addition, the extra or ectopic tissue (which may be in the chest) is also treated.

The **disadvantage** of the treatment is that we work with radioactivity, and that your cat has to be hospitalized for a few days. Furthermore, this also means that you will have to respect some measures after returning home (see below).



WHICH PROCEDURE HAS TO BE FOLLOWED?

Preliminary tests: blood tests prior to radioactive iodine therapy are preferably carried out by your own veterinarian. Other examinations, e.g. a cardiological ultrasound in cats with a heart murmur, can be performed both here and with an external veterinary specialist. For a smooth process, we need the results of these examinations before we can schedule an appointment.

This way we can give specific advice and possibly advise additional examinations, which can be carried out at your veterinarian or here. Animals that are too sick or not stable, due to hyperthyroidism or other causes, are less good candidates to undergo radioactive iodine therapy. Once treated, the cats are radioactive and further research options, such as blood or urine tests, are limited in the coming weeks. That is why it is important to have all these investigations take place in advance.

- At the first blood test, a complete hematological and biochemical blood test should be performed, and thereby the "TT4" or total thyroxine - this is the thyroid hormone. In particular, the blood cells, kidney, liver and thyroid function are examined.
- Because the kidneys sometimes also cause problems in aging cats, we also recommend a urine test (specific gravity and protein / creatinine ratio).

Possible scenarios: there are roughly 3 different scenarios possible before your cat receives radioactive iodine treatment.

- *No medication:* You choose to have the radioactive iodine treatment carried out immediately. This can be done, for example, when the cat does not want to take or does not tolerate the thyroid-inhibiting medication. In that case, we ask for an extensive blood test (see above) that is up to 6 weeks old. If it is older, have a new study done. It is important to have the thyroid and kidney function checked properly after the treatment.
- *A short period with thyroid inhibitors / iodine-poor diet:* it may be advisable to give thyroid inhibitors for a short test period in order to be able to check kidney function with a normal amount of thyroid hormone. A thyroid gland that works too fast can cause the kidneys to appear to be better than they really are ("falsification" of kidney function). By giving the medication for a few weeks, the amount of thyroid hormone will decrease and the actual kidney function will be visible. This is certainly interesting in cats that already have rather high kidney values with an excess of thyroid hormone. It is not true that the treatment of hyperthyroidism causes kidney failure!

In the short term, an excess of thyroid hormone can somewhat support kidney function (hence the improved kidney values), but in the longer term, the kidneys will even be damaged if the hyperthyroidism is not treated.

Practically, the *trial period* is as follows:

- The diagnosis of hyperthyroidism is made by your veterinarian (extensive blood tests).
- Test period of ± 3 weeks with thyroid-inhibiting medication.
- Blood tests while the cat is still receiving medication: control of total T4 and kidney values (urea and creatinine), possibly also a urine test in the 3rd week.
- If the kidney values are good or remain stable, you can make an appointment for the iodine treatment. Before the cat receives this treatment, it must be off the medication for 2 weeks. (*Note: in consultation we can decide to shorten the medication-free period. For this we need all the patient's data, in order to be able to assess the clinical condition as well as possible.*)
- If the first blood test (i.e. the blood test for the test period with medication) is not older than 6 weeks at the time of the iodine treatment, no additional examination needs to be done. In the other case, 5 days before the cat comes here (Thursday), have an additional blood test performed (total T4, urea, creatinine).
- *A longer period with thyroid inhibitors / iodine-poor diet:* some cats have been receiving thyroid-inhibiting medication for a long time (months or even years). If you still decide to proceed with radioactive iodine treatment, we ask you to request the complete file of the cat from your veterinarian.

A recent blood test is needed to determine the TT4 and kidney function, while the cat is still receiving medication. If both are good, you can make an appointment with us.

At the time of radioactive iodine treatment, the cat must be off the medication for 2 weeks. In the second week that you stop the medication, you have a blood test done on Thursday for TT4 determination. This gives us information about the extent to which the thyroid gland is affected. (*Note: in consultation we can decide to shorten the medication-free period. For this we need all the data from the patient, in order to be able to assess the clinical condition as well as possible..*)

It is important that we get the cat's blood tests and medical records before you come to us.

WHAT DO YOU DO ON THE DAY OF THE TREATMENT?

If a heart murmur is detected, we recommend having an *ultrasound of the heart* done (*cardiological examination*). As mentioned above, this can possibly be done on the day of the radioactive iodine treatment by appointment with our cardiologists, or with a veterinary specialist in your area.

Heart problems are often associated with hyperthyroidism: the heart starts beating very fast (*tachycardia*), and the heart muscle can become thickened (*hypertrophic cardiomyopathy or HCM*). This can cause a heart murmur. Often it is a temporary and transient problem, in other cases it is advisable to give (temporary) medication to support the heart. After treatment of the hyperthyroidism, this can return to normal, but here too a good assessment is recommended.

When there are very increased liver values from the blood test, we recommend that you have an *ultrasound of the abdomen*. A mild increase in liver values can be the result of hyperthyroidism, with a severe increase it is sometimes useful to rule out an underlying liver problem. Whether an ultrasound is needed will be assessed on the basis of the blood tests. This can also be done by your veterinarian or with us.

- The cat must be sober: food is allowed until the day before (up to 22 p.m.). On the day of admission, do not feed the cat in the morning. Water is always allowed.
- Bring a pillow or a blanket that the cat is familiar with (*Attention: this may not be returned!*). This sometimes helps the cat to get through the hospitalization period more easily.
- You may bring some food that the cat likes. Cats sometimes dare to be picky and their own trusted food can help to eat well during their stay with us.
- As mentioned earlier, stop the thyroid inhibitors (Felimazole, Thiafeline, carbimazole (ointment or tablets) or the Y/D diet 14 days before admission **unless otherwise agreed**.
- Please continue to give **other medication** (e.g. for the heart) and also bring it with you.

HOW DOES THE TREATMENT WORK?

- You bring your cat in on **Tuesday** between 9 and 12 o'clock. If a cardiological examination is required, this is done by appointment at the cardiology department. The scan of the thyroid gland and the treatment (radioactive iodine administration) take place in the afternoon.
- An intravenous catheter is placed in the patient's front leg. This is necessary to administer the radioactive iodine. Before the dose of radioactive iodine is determined, a *diagnostic scan* (or *perchnetate scan*) is first performed. On this scan it becomes clear which thyroid gland is involved (left, right, both), whether there is still extra thyroid tissue present, and this helps us to determine the dose as correctly as possible. This scan takes 1 to 2 minutes. The cat is usually briefly put under anesthesia.

- The dose of radioactive iodine is determined based on the cat's blood test, scan and medical history. The radioactive iodine is then injected through the catheter into the front leg.
- During the hospitalization period, the amount of radiation emitted by the cat is checked. We do this by keeping a dose rate meter or Geiger-Müller counter with the cat. Every day the litter box is checked and changed several times and the water and food is changed.
- The length of hospitalization depends on the rate at which the activity that the animal radiates, decreases. Under normal circumstances, the cats can go home after 4 days (on Friday after radioactive iodine treatment). Afterwards, there are still some measures to be respected to limit contact with radiation as much as possible: see further "what after the treatment?".

WHAT SHOULD YOU DO AFTER THE TREATMENT?

The first 2 weeks after returning home, follow the following simple **guidelines**:

- NO contact between the cat and pregnant women or young children. Also, keep the litter box away from them.
- Limit contact with the cat: do not let the cat sleep on the bed, do not keep it on your lap for too long, A short stroke or hug are no problem, provided you wash your hands afterwards.
- Preferably the cat stays inside for 2 weeks.
- Avoid contact with urine, faeces and saliva. Wear disposable gloves when changing the litter box and wash your hands thoroughly afterwards.
- The contents of the litter box of the first 2 weeks after returning home must be collected and stored separately for 3 months after the cat's return home (garden house, garage, ...). After these 3 months it may be given with the household waste, there is no longer any risk of any presence of radioactivity.

Control tests:

- The blood tests can be done by your own veterinarian. We recommend a control blood test at 3, 6 and 12 months after therapy. Especially the thyroid value (total T4 or 'TT4' or 'thyroxine') and the kidney values (urea and creatinine) are important. In order to properly evaluate the kidney function, a urine test is indicated.
- After that, we recommend an annual blood test check-up. You can request a routine blood test for old cats by your veterinarian, combined with the thyroid value.
- We also ask with emphasis that you also provide us with the results of any blood tests taking place after the treatment (or you can ask your veterinarian to keep us informed). We use this follow-up data to continuously improve our therapy.
- If the cat also has a heart problem, an ultrasound may be needed for verification. This will be communicated to you by the cardiologist.

CONTACT