

Hyperthyroidism

Hyperthyroidism is probably the second most common disease that we can see in older cats. The exact causes are unknown despite continuing research. The good news is that not only is it manageable with medication or diet, but it is potentially curable with surgery or radioactive iodine treatment.

Pathophysiology:

- The exact reason for hyperthyroidism in cats is still unclear. It does not fit any human or canine models. Cats have two thyroid glands, which sit on either side of the trachea in the neck. These glands produce hormones that affect many areas of the body in ways that are not completely understood, but they primarily affect metabolism and can also act as a mood regulator.
- What we do know is that cats with hyperthyroidism develop hyperplastic tissue in their thyroid glands that becomes hyperfunctional. Meaning, certain areas of the thyroid glands enlarge, and produce excess thyroid hormone.

Clinical Signs:

- There are a variety of symptoms that we can see in cats with hyperthyroidism, ranging from metabolic to behavioral.
 - **Weight loss.** Probably the most common symptom we will see is weight loss with a normal appetite, or maintaining weight with an increased appetite from an increased metabolism.
 - **Caterwauling.** This is a common symptom. Some cats will start crying at all hours, which can be very concerning to owners.
 - **Increased aggression or affection.** Since the thyroid can help to moderate emotions, we can see increased emotions displayed.
 - **Inappropriate elimination.** Some cats will start urinating outside of the box as a result of hyperthyroidism.
 - **Vomiting.** Hyperthyroidism has been closely related with the development of inflammatory bowel disease.
 - **Blindness.** Hyperthyroidism can cause high blood pressure, which in turn can cause detached retinas resulting in blindness in one or both eyes.

Associated Diseases:

- Since elevated levels of thyroid hormone affect metabolism, they can be very hard on multiple body systems and organs. Some of the disease processes that can be a result of hyperthyroidism are:
 - **Chronic Kidney Disease (CKD).** Hyperthyroidism is extremely hard on the kidneys, but part of its damage is that it hides what it is doing to the kidneys. As long as the thyroid hormones are elevated, the kidneys will have an increased glomerular filtration rate (GFR), so on blood work or urinalysis, they will appear to be functioning normally. Not until the thyroid levels are under control does the damage become apparent.

- **Thyrotoxic Hypertrophic Cardiomyopathy.** Hyperthyroidism is also very hard on the heart muscle, and will result in thickening of the walls of the heart. If this type of heart disease is caught early, and the thyroid levels are brought back to normal, some of the thickening of the heart muscle can actually be reversed.
- **Hypertension.** Elevated thyroid hormones can also result in high blood pressure. This may or may not be reversible once the thyroid levels return to normal.
- **Inflammatory Bowel Disease (IBD).** Current findings have shown that hyperthyroidism may be contributing to the development of IBD.
- **Hepatic Lipidosis.** Most cats are used to a certain caloric intake. When that caloric intake drops off sharply, or the caloric needs are significantly increased, then the body will start to utilize fat stores. If too many fat stores are utilized in a short amount of time, the fat can start to build up in the liver causing the liver to become non functional. This is known as hepatic lipidosis, or fatty liver disease. If a cat with hyperthyroidism has a decreased appetite due to other factors, then they are much more prone to hepatic lipidosis.
- **Thyrotoxic Liver Disease.** Elevated thyroid hormones can also be toxic to the liver. Some cats will go into liver failure in spite of aggressive treatment for the hyperthyroidism.
- **Interstitial Cystitis.** Interstitial cystitis is a stress induced disorder of the bladder, resulting in inflammation of the bladder lining, pain, and blood in the urine. Hyperthyroidism can increase stress levels due to the lack of moderation of emotion, leading to interstitial cystitis.

Diagnostic Tests:

- Most cats with hyperthyroidism can be diagnosed with a blood test. For the few cats that are hyperthyroid that do not show up on a basic thyroid level screening, we do have more advanced tests, or in some cases, we may just treat based on clinical signs and response to treatment.
 - **Total T4.** This is the most common test used to diagnose hyperthyroidism. This value will be elevated in about 90% of cats with hyperthyroidism.
 - **Free T4 by equilibrium dialysis.** This is a more sensitive test for detecting hyperthyroidism, and will catch 90% of the cats who were negative on the total T4 test.
 - **Physical exam.** If we can palpate an enlarged thyroid gland on your cat in conjunction with symptoms consistent with hyperthyroidism, then that may be enough to warrant treatment, even if both blood tests were negative.
 - **Technetium scan.** This is a more advanced test that can only be done at more specialized veterinary practices such as teaching hospitals and referral centers. This involves injecting a radioactive contrast agent into your cat, which will show only the functioning part of the thyroid glands. Since normal healthy thyroid tissue will become dormant with hyperthyroidism, it can be very easy to distinguish an abnormal thyroid gland with a technetium scan.
 - **Abnormalities on CBC and serum chemistry.** While these are not diagnostic for hyperthyroidism, certain things such as an elevated red blood cell percentage, an abnormally low creatinine level, and an elevated ALT can all point towards hyperthyroidism.

Treatment Options:

- There are four primary treatment options for hyperthyroidism. Diet, medication, surgery, or radioactive iodine treatment.
 - **Diet.** This consists of feeding a very specific prescription diet called Science Diet Y/D. For this diet to work, it has to be fed exclusively. Absolutely no other food, treats, or even supplements that might contain iodine. In order to produce thyroid hormone, the thyroid glands require iodine, which is in the food they eat. Y/D has an extremely low level of iodine, so low, that the thyroids cannot overproduce thyroid hormone, because they don't have enough iodine to make it. This diet can be fed to other cats in the home. The disadvantage of this diet are; it is not very tasty, not a lot of cats will eat it, and it is too new to really know the long term prognosis by feeding this diet alone as a treatment.
 - **Medication.** There are two medications that can be used to treat hyperthyroidism – one is used very commonly, the other one is only used as a last resort drug if the first one cannot be tolerated.
 - **Methimazole.** This is considered the standard for medical management of hyperthyroidism. It can be given as a twice a day pill, a twice a day liquid, or as a once or twice a day ear paste that is smeared onto the inside of the outer ear to absorb through the skin into the bloodstream. Methimazole will work well for about 95% of cats, but it can have some serious side effects.
 - **Anorexia and/or nausea.** When methimazole is given orally, about 20% of cats can get an upset stomach. While this can go away after a few months, your cat has to eat, so we will often switch to ear paste if this occurs as ear paste only seems to cause an upset stomach in less than 5% of cats.
 - **Bone marrow suppression.** In rare cases, methimazole can cause suppression of white blood cell and platelet development. This side effect is life threatening, and requires stopping the drug.
 - **Self-excoriation.** If your cat suddenly starts scratching at their face or other body parts incessantly, then this is not a tolerable side effect, and requires stopping the drug.
 - **Lethargy and/or jaundice.** Not only is hyperthyroidism hard on the liver, but in some cases, so is methimazole. If your cat's liver enzymes start to elevate, and they were not previously elevated, then that may require stopping the drug.
 - Treating with methimazole is not a cure. While it will result in your cat feeling better, gaining weight, and overall acting better, it does not completely stop the damage being done to the organs, it just slows it down drastically. Most cats that are diagnosed with hyperthyroidism and are treated only with medical management will live an average of 3-5 years before dying of either heart failure or kidney failure. But, those 3-5 years can be good quality years.
 - **Surgery.** This used to be the treatment of choice until radioactive iodine became more widely available.

- Surgery involves removing one or both of the enlarged thyroid glands. If only one is removed and it was the only gland affected, then it is a cure. If both glands are affected, and only one gland is removed, then it will do little for the disease, and the other gland must be removed.
 - There is a catch for removing both glands. We have now removed the source of a hormone that the body needs, and so your cat may need to be on thyroid hormone supplementation.
 - The other catch is that the parathyroid hormones are very tightly adhered to the thyroid glands, and it can be very difficult to remove just the thyroid gland without taking the parathyroid gland, or if the parathyroid gland is left behind, not leaving diseased thyroid tissue adhered to it. The parathyroid glands regulate calcium metabolism, and so if they are not present, your cat can develop life threatening hypocalcaemia until put on lifetime medical treatment for it.
 - But, surgery is a viable option, and will have your cat back home to you the next day, and it is a potential cure.
- **Radioactive iodine (I131) treatment.** This is considered the ideal treatment for hyperthyroidism, and has a 96% chance of a cure. This can be done at any time after the diagnosis of hyperthyroidism, but of course, the sooner, the better to minimize the damage done to organs.
 - I131 treatment involves injecting your cat with radioactive iodine. Since the only part of the body that takes up iodine is the active part of the thyroid, this only affects the thyroid gland. In addition, with hyperthyroidism, only part of the gland is affected, and the healthy thyroid tissue will become dormant. So, the I131 only attacks the diseased part of the thyroid, leaving the healthy tissue behind.
 - The primary reason for not doing this procedure is generally cost, but since it is a cure, it stops all damage from hyperthyroidism being done to your cat's organs, and if you factor in the cost of medication for 3-5 years, the costs are pretty comparable. Costs can range from \$700 to \$1500 depending on where you have it done.
 - We do recommend if you are considering I131 treatment, to first do a month of methimazole as a trial, and then check the kidney enzymes, blood pressure, and a chest x-ray to determine what quality of life your cat will have after the treatment to assess how much damage may have already been done by the hyperthyroidism.

If you have any questions or concerns on any of the above, please do not hesitate to contact us at All Feline Hospital at 402-467-2711 or info@allfelinehospital.com.