

# Feline hyperthyroidism – advances and nurse’s role in treatment and follow-up

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**Sarah Caney** BVSc, PhD, DSAM(Feline), MRCVS, discusses the clinical signs, diagnostic tools and management options associated with this common endocrinopathy in cats, plus the importance of VNs having a relationship with patients’ carers to support and advise

## Summary

HYPERTHYROIDISM is the most common endocrinopathy to affect cats. It is especially common in older cats, with most affected patients aged 10 years or older. Four management options are available – anti-thyroid medication, iodine-restricted food, radioiodine and surgical thyroidectomy. All treatments have potential advantages and disadvantages, so the treatment decision should be based on the individual cat’s circumstances and discussions with the carer. Follow-up monitoring is essential to assess treatment success and check for side effects. Many cats suffering from hyperthyroidism have additional medical problems – especially chronic kidney disease – which may also complicate management and monitoring.

Nurses play a vital role in supporting and advising carers of hyperthyroid cats both prior to and following a diagnosis of hyperthyroidism. Good teamwork between carer and health care professional aids successful management of this common condition.

## Key words

**feline, hyperthyroidism, radioiodine, anti-thyroid, transdermal, thyroidectomy, iodine-restricted**

**HYPERTHYROIDISM** is very commonly seen in general practice. Nurses play a crucial role in helping diagnose this condition, supporting and educating carers and assisting with the treatment plan.

## How can nurses help diagnose more cases?

Although many cats with hyperthyroidism are presented for assessment since they are unwell, there is evidence this condition is still under-diagnosed in practice. Nurses are essential clinical team members in assisting diagnosis of hyperthyroidism at an earlier stage through:

- Paying special attention to the cats most at risk of this condition (cats more than eight years of age).
- Understanding what the common clinical signs of hyperthyroidism are ([Table 1](#)) and educating carers about these so a diagnosis can be made promptly.
- Running preventive health care clinics that encourage carers of older cats (especially those more than 11 years of age) to bring in their cat for a history, physical examination and weight check. The author advocates that practices follow the International Cat Care ([www.icatcare.org](http://www.icatcare.org)) WellCat guidelines ([Table 2](#)). Cats suffering from hyperthyroidism may be identified through documenting weight loss, systemic hypertension and/or reduced urine specific gravity (less than 1.035).

## Initial management

Once a diagnosis of hyperthyroidism has been made, veterinary nurses have a number of important roles, including explaining the diagnosis and educating a carer about the condition. Carers appreciate the time nurses spend talking to them explaining, for example, how to medicate their cat and what side effects they might expect (Caney, 2013a). The number of possible management options has expanded in recent years and includes:

- oral anti-thyroid medication;
- iodine-restricted food;
- radioiodine;
- surgical thyroidectomy; and
- transdermal anti-thyroid medication (not veterinary licensed).

All the treatment options have potential advantages and disadvantages ([Table 3](#)) and the most appropriate long-term treatment choice often depends on factors including the individual patient circumstances, home background, presence/severity of concurrent disease and financial limitations.

In addition to management of their hyperthyroidism, patients may also require specific treatment for complications associated with this, such as congestive heart failure, urinary tract infections and systemic hypertension.

All treatments have the potential to unmask or worsen pre-existing renal disease. This is due to the reduction in renal blood flow and glomerular filtration rate that occurs with successful treatment of hyperthyroidism.

## **Oral anti-thyroid medication**

The two UK veterinary licensed thioureylenes are carbimazole (Vidalta, MSD) and methimazole (Felimazole, Dechra Veterinary Products; Thiafeline, Animalcare). Thioureylenes have a rapid mechanism of action and typically result in euthyroidism within a few weeks of starting treatment.

Carbimazole is rapidly metabolised to the active drug, methimazole, following administration. Methimazole blocks synthesis of both of the thyroid hormones (T4 and T3) within the thyroid gland. Continuous treatment is required since this is a reversible therapy – levels of thyroid hormones rapidly return to pre-treatment levels if dosage is stopped. Long-term treatment with thioureylenes is very popular and generally successful and well tolerated.

As with all drugs, the thioureylenes can cause side effects in some cats, although these are not common. Side effects usually occur within the first three months of treatment. Mild, typically transient side effects are seen in up to 20 per cent of cats and include reduced appetite, nausea and vomiting.

Severe side effects are seen in fewer than five per cent of treated cats and include persistent gastrointestinal signs, pruritic dermatitis affecting the head and neck, hepatopathies and haematological complications, such as thrombocytopaenia and leucopaenia. In cats suffering from severe side effects, the thioureylene medication usually needs to be withdrawn and an alternative treatment found. Switching the type of thioureylene is generally not helpful in this situation since any adverse effects seen will occur with all thioureylenes.

## **Iodine-restricted food**

Production of thyroid hormone requires iodine molecules; therefore, limiting the amount of iodine fed reduces the amount of thyroid hormone that can be produced and released by the thyroid gland. Blood total T4 levels decrease within a few weeks of the cat exclusively eating an iodine-

restricted food. No adverse effects have been reported when feeding an iodine-restricted food, although the same concerns over renal function would exist with this management option, as is the case with all other treatment modalities for hyperthyroidism.

Patient and carer compliance is essential to the success of this approach. The food is effective only if used as the sole source of nutrition. Carers, therefore, need to be aware their cat must not be allowed treats or other supplemental foods. Food bowls should not be used for other foods (for example, in the case of multi-cat households) and should be thoroughly cleaned before use.

Carers should also be advised to consult their veterinarian regarding any supplements or other medications their cat may be receiving. For example, some pill pockets and most pet treats contain iodine and therefore cannot be given to patients receiving an iodine-restricted food.

## **Radioiodine**

Treatment with radioactive iodine 131 (radioiodine), a form of radiotherapy, results in irradiation and destruction of functioning thyroid cells. It is often regarded as the “gold standard” treatment for hyperthyroidism as it is so safe and effective.

The treatment is given either by oral capsule or by injection and naturally targets the thyroid tissue. The radioactivity is able to destroy the abnormal thyroid tissue, shrinking the goitre and reducing the amount of thyroid hormones produced. Most cats will be euthyroid within a few weeks although, in some patients, it can take several months for the full effects of the radioiodine to be evident.

The dose of radioactivity required is very low and is therefore not damaging to other tissues of the body, such as the parathyroid glands and other structures that could be damaged by surgery. Hyperthyroid cats receiving anti-thyroid treatments, such as methimazole or an iodine-restricted food, usually need to stop this treatment one week to four weeks before the radioiodine is given.

## **Surgical thyroidectomy**

Surgical thyroidectomy is a potentially curative treatment that has disadvantages of requiring general anaesthesia (which may be contraindicated in some patients) and is suitable only for those cases with easily accessible hyper-functional thyroid tissue. Up to 20 per cent of patients may have ectopic hyper-functional thyroid tissue and this is commonly located in the anterior thorax – not an area suited to straightforward thyroidectomy.

In routine cases, side effects of thyroidectomy, such as damage to the parathyroid glands resulting in hypocalcaemia, are possible.

A number of techniques have been described for surgical thyroidectomy. In general, the modified intra and extra-capsular techniques yield the best overall results in terms of risk of postoperative

hypoparathyroidism and recurrence of hyperthyroidism. Preoperative stabilisation with carbimazole or methimazole is recommended to improve patient anaesthetic stability.

## Transdermal anti-thyroid medication

Transdermal preparations are designed to deliver therapeutic drug concentrations into the systemic circulation following application to the skin. Several publications have reported success in management of hyperthyroidism using transdermal methimazole (Lécuyer et al, 2006; Boretti et al, 2013).

Fewer gastrointestinal side effects are reported when using the transdermal route. Cats treated by this route generally need a similar or slightly higher dose than that required with oral dosing. It may take longer to achieve euthyroidism compared to oral anti-thyroid medication, although most treated cats are euthyroid by about four weeks. Extra care should be placed towards carer education when supplying transdermal medications. The carer should be aware of the use of a non-veterinary licensed product, under cascade guidelines.

Carers should be advised to wear gloves or a finger cot when handling the medication. The site of previous administration should be gently cleaned to remove any residual product before applying another dose.

If using the inner pinna, alternate which ear is used for each dose of medication. The medication can be applied to the gloved finger or directly to the inner pinna before gently rubbing in/spreading over this area. Carers should wash their hands after applying the medication.

## Check-ups

Depending on the individual management option, re-evaluation will be needed to assess progress and monitor for side effects. Nurses play an important role in carer communication in the long-term monitoring of cats receiving reversible treatments such as anti-thyroid medication or iodine-restricted food.

In the initial treatment period, check-ups of cats receiving reversible options focus on whether the carer is able to administer the treatment, if the disease is adequately controlled (clinical signs, T4 in lower half of the reference range) and whether there are any side effects such as renal complications or drug-related reactions ([Table 4](#)).

In the long-term, monitoring should also include assessment for common concurrent illnesses. Iatrogenic hypothyroidism (IH) is a described complication of treatment for hyperthyroidism and is known to have an adverse effect on prognosis through worsening renal complications.

IH can be avoided in cats receiving anti-thyroid medication by titrating the dose to achieve T4

levels within the lower half of the reference range.

Cats undergoing curative treatments such as radioiodine and thyroidectomy require follow-up to ensure their disease has been adequately treated (T4 within the reference range) and to check for side effects such as IH and renal complications. Patients undergoing unilateral thyroidectomy require close monitoring for recurrence of hyperthyroidism.

## Conclusions

The VN is essential to the successful treatment of hyperthyroid cats. Their role encompasses many skills such as carer support and education, as well as practical support during surgical procedures and long-term monitoring.

## References and further reading

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- WellCat information available on [www.icatcare.org](http://www.icatcare.org)
- Guides to blood pressure measurement, urine sample collection and other useful techniques in the older cat available on [www.vetprofessionals.com/catprofessional/free\\_downloads.html](http://www.vetprofessionals.com/catprofessional/free_downloads.html)



Routine preventive health care can assist in the early diagnosis of hyperthyroidism through documenting weight loss.



Teaching a carer to give a pill is often appreciated when oral anti-thyroid medication is prescribed.



| <b>Clinical sign</b> | <b>Approximate frequency – percentage of cats (Baral and Peterson, 2012)</b> |
|----------------------|--|
| Weight loss          | 88   |
| Polyphagia           | 49   |
| Vomiting             | 44   |
| Polyuria/polydipsia  | 36   |
| Increased activity   | 31   |

**TABLE 1.** Common clinical signs associated with hyperthyroidism

| Age of cat                                  | Test recommended  | Comment   |
|---|---|---|
| 0 years to six years                        | Annual history, physical examination, weight and body condition score. Discussion of appropriate preventive health care           |   |
| Seven years to 10 years – mature life stage | As above plus annual blood pressure and urinalysis  | Doppler methodology recommended for blood pressure checks. Free catch urinalysis is acceptable; urine specific gravity and dipstick assessed  |
| 11 years to 14 years – senior life stage    | As above plus annual blood profile. Consider increasing the frequency of blood pressure and urinalysis checks to every six months | The blood profile should ideally include haematology, serum biochemistry and a total T4 test. The author prefers to perform a history, physical exam and weight check every six months, if possible |
| 15 years or more – geriatric life stage     | Six-monthly history, physical examination, weight and body condition score, blood pressure and urinalysis. Annual blood profile   | The author prefers to perform a history, physical exam and weight check every three months, if possible   |

**TABLE 2.** WellCat guidelines for life stage-appropriate health checks in cats



| Factor  | Medical treatment   | Nutritional management                                   | Surgery   | Radioiodine   |
|---|---|--|---|---|
| Is it possible to cure the condition with this treatment?   | No  | No   | Yes   | Yes   |
| Other than the potential for reduced kidney function, which can occur with all treatments for hyperthyroidism, are side effects possible? | Yes   | None reported  | Yes   | Yes   |
| How common and how serious are the side effects?  | Less than 20 per cent of cats have mild and transient side effects. Less than five per cent of cats have serious side effects | None reported  | Typically, less than 10 per cent of cats suffer side effects, but these can be very serious | Less than five per cent of cats suffer side effects and these are usually treatable |
| Is there a risk of permanent hypothyroidism?  | No – the dose of treatment can be reduced to resolve this   | No – if hypothyroidism is seen the food can be withdrawn | Very rare (less than five per cent)   | Very rare (less than five per cent)   |
| Is there a risk of recurrence?  | Yes   | Yes, if the cat eats other foods                         | Yes   | Yes (much less common)  |
| Will my cat need to stay in hospital?   | Not usually   | No   | Yes, usually less than three to five days   | Yes, usually at least one week  |
| Will the treatment be available in my location?   | Yes   | Available in most countries                              | Yes   | Less common   |

**TABLE 3.** Considerations when choosing a management option for cats suffering from hyperthyroidism

|  | Timing of assessment   |  |   |  |   |   |   |                               |                             |                             |
|--|--|--|---|--|---|---|---|-------------------------------|-----------------------------|-----------------------------|
|  | Diagnosis  | Two to three weeks after starting treatment* | Two to three weeks after changing the dose of medication* | One month after achieving euthyroidism | Two months after achieving euthyroidism | Three months after achieving euthyroidism | Six months after achieving euthyroidism | Every three months thereafter | Every six months thereafter | Every six months thereafter |
| History <sup>1</sup>   | Green  | Green  | Green   | Green                                  | Green                                   | Green                                     | Green                                   | Yellow                        | Yellow                      | Green                       |
| Clinical examination <sup>2</sup>                            | Green  | Green  | Green   | Green                                  | Green                                   | Green                                     | Green                                   | Yellow                        | Yellow                      | Green                       |
| Blood pressure <sup>3</sup> (once stable or if normotensive) | Green  | Yellow                                       | Yellow  | Green                                  | Red                                     | Green                                     | Green                                   | Yellow                        | Yellow                      | Green                       |
| Urine tests <sup>4</sup>                                     | Green  | Red  | Red   | Red                                    | Red                                     | Red                                       | Red                                     | Red                           | Red                         | Green                       |
| Blood tests <sup>5</sup> (T4 and renal parameters)           | Green  | Green  | Green   | Green                                  | Yellow                                  | Green                                     | Green                                   | Yellow                        | Yellow                      | Green                       |
| Blood tests <sup>6</sup> (haematology and biochemistry)      | Green  | Yellow                                       | Yellow  | Green                                  | Yellow                                  | Green                                     | Green                                   | Yellow                        | Yellow                      | Green                       |
| <b>Key</b>   | <b>Colour in table above</b>   |  |   |  |   |   |   |                               |                             |                             |
| Recommended  | Green  |  |   |  |   |   |   |                               |                             |                             |
| Optional   | Yellow   |  |   |  |   |   |   |                               |                             |                             |
| Not required unless there is a specific concern              | Red  |  |   |  |   |   |   |                               |                             |                             |
| *  | Transdermal methimazole: checks should be done three weeks to four weeks after starting treatment or changing the dose as this option tends to be slightly slower to achieve euthyroidism  |  |   |  |   |   |   |                               |                             |                             |
| 1  | A thorough history looking for evidence of hyperthyroidism, iatrogenic hypothyroidism, evidence of renal disease and other concurrent illnesses  |  |   |  |   |   |   |                               |                             |                             |
| 2  | <ul style="list-style-type: none"> <li>• Bodyweight, including percentage weight changes</li> <li>• Body condition score</li> <li>• Examination of the eyes for possible evidence of systemic hypertension</li> </ul>                                    |  |   |  |   |   |   |                               |                             |                             |
| 3  | Doppler measurement is the recommended method for blood pressure assessment. Blood pressure should be assessed at the time of diagnosis, repeated again in the first few months of treatment and then every three months to six months thereafter        |  |   |  |   |   |   |                               |                             |                             |
| 4  | Where possible, urinalysis should include specific gravity, dipstick, sediment and bacteriology. Cats suffering from hyperthyroidism often have elevated urine protein to creatinine (UPC) ratios, which resolve on stabilisation of the hyperthyroidism |  |   |  |   |   |   |                               |                             |                             |
| 5  | Total T4, urea and creatinine  |  |   |  |   |   |   |                               |                             |                             |
| 6  | Complete blood count (haematology) and serum biochemistry (including liver enzymes, proteins, phosphate, electrolytes) where possible  |  |   |  |   |   |   |                               |                             |                             |

**TABLE 4.** A guide to check-ups in hyperthyroid cats receiving anti-thyroid medication. Vets or VNs (working under a vet’s directive) can perform these tests

