

IATROGENIC HYPOTHYROIDISM – WHEN AND WHY TO SUPPLEMENT

Hypothyroidism almost never occurs spontaneously in cats. It is typically iatrogenic, following bilateral thyroidectomy or I131 therapy for hyperthyroidism. Iatrogenic Hypothyroidism (IH) does not refer to the transient low thyroid levels sometimes seen in cats with concurrent illnesses (euthyroid sick syndrome), nor to cats overdosed with methimazole.

Why are we recommending thyroid hormone replacement therapy post-I131 treatment more often than we used to?

Cats often don't show obvious signs of illness with low thyroid hormone levels. After all, when is an older cat sleeping too much? And don't all cats seek heat? Veterinarians once believed that cats either didn't need thyroid hormones, or could tolerate very low levels. However, we now know that even cats with no outward signs of hypothyroidism can be deleteriously affected if their thyroid hormone levels are too low.

Why do some cats develop iatrogenic hypothyroidism after I131?

Are these cats receiving too much I131?

Certainly it is possible for cats to get 'too much' I131, particularly when treatment centers employ the 'fixed dose' approach, in which all cats get a uniform dose, e.g., 3, 4 or 5 mCi. Nationwide the incidence of IH is about 20% after I131 therapy.

At FHTC we dose our patients to their specific level of disease with the lowest dose of I131 (0.5 to 15 mCi) that we predict will eliminate the disease, and then adjust our treatment recommendations depending upon what we see at the rechecks. Typically, 90-95% of our patients become euthyroid after a single dose of I131. Conversely, about 3-5% of the cats we treat develop a level of hypothyroidism (IH) that requires thyroxine replacement therapy indefinitely.

Is radiation the sole cause of IH?

Typically, the normal tissue remaining after I131 reactivates when the T4 levels drop to normal. However, chronically suppressed tissue sometimes atrophies and is unable to resume production of adequate amounts of hormone after the hyperactive tissue is destroyed. There simply isn't enough functional thyroid tissue before or after I131 in these cats. This is more likely in cats with long-standing or aggressive thyroid disease, supporting a case for early treatment.

How much control do we have?

Radioiodine uptake (RIU) ability varies with each individual. Therefore, we don't have complete control of the outcome with even the most carefully-selected dose.

Cats with aggressive tumors often have lower RIU ability, so are treated with a more assertive dose, and are more likely to have tissue which can't reactivate, increasing the chances of needing supplementation after I131.

Do we ever intend IH?

Yes, but only in rare circumstances. If the hyperactive tissue is neoplastic, or even with aggressive hyperplastic adenomas, some endocrinologists strive to destroy most or all thyroid tissue, to reduce the risk of recurrence. Low thyroid hormones at the rechecks reassure us that the hyperactive cells have been destroyed, and that a recurrence is less likely in these genetically predisposed cats. Total thyroid

obliteration is the goal for humans with thyroid adenocarcinomas and Graves Disease. These patients will be on l-thyroxine replacement therapy indefinitely, a small price to pay for a healthier life.

What is considered hypothyroidism in cats?

In general, T4 less than 1.0 to 1.5 µg/dl is considered low. Most cats with normal kidney function tolerate T4's as low as 0.8-1.0 µg/dl with little apparent effect. We no longer wait to treat cats until they show signs of IH, because they often do not show obvious signs until their T4s are profoundly low, at 0.5 µg/dl or less.

Severe IH can be easy to identify.

Findings may include:

- History of lethargy, heat seeking, mental dullness, weight gain
- Excessive shedding, with dull, flaky, hair coats
- Constipation
- Bradycardia
- T4 < 0.4 µg/dl
- Nonregenerative Anemia

Borderline IH is less obvious and the cat may seem to tolerate it without apparent ill effect.

Sometimes changes are subtle or attributed to non-thyroid causes. Echocardiography may identify a decrease in cardiac contractility that might only become important during prolonged anesthesia or aggressive fluid therapy. Nonregenerative anemia is common in IH, but might be attributed to chronic inflammation or chronic kidney disease (CKD).

Recent attention has been given to the value of using TSH to define borderline IH. Study results vary, but the consensus is that it is probably helpful to run a thyroid panel, such as MSU's, which includes T4, T3, and FT4 in addition to the canine (there is no feline) TSH. High TSH's in cats with T4's ≤ 1.5 are suggestive of hypothyroidism.

Which cats need to be supplemented?

Whether or not a cat with IH needs supplementation depends upon how low the hormone level is, and its potential influence on any other conditions that individual may have.

Normal cats seem to tolerate T4s as low as 0.8 µg/dl long term without apparent ill effect or obvious need for supplementation.

- Cats with concomitant disease, such as **CKD**, have less tolerance for low thyroid hormones. If the T4 is less than 1.25-1.5, in cats with CRF, the azotemia often not only "unmasks", it worsens.
- Cats with innately low metabolisms are more likely to become obese if their hormones are even borderline low.
- Anemias stemming from any etiology are more likely to worsen in the face of IH.
- Cats with additional illnesses which drive thyroid hormones low, such as any ongoing inflammation, pancreatitis, diabetes, neoplasia, or immune-mediated disease are more likely to require supplementation than are cats with no additional 'sick euthyroid' factors.

When do we step in and supplement?

The IH may "remedy itself" and require no intervention:

(over)

FHTC

Feline Hyperthyroid Treatment Center

Restoring Health & Happiness To Senior Cats



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In the first month post I131, cats often have a low-ish T4, after the hyperactive tissue is destroyed, and the normal tissue hasn't fully reactivated. If the cat is doing well clinically, has normal kidney function, and the T4 is at least 0.4 µg/dl, we simply recheck the level in 1-2 months and in most cases, the T4 has risen to normal.

If the T4 is lower than 0.4, the cat has other disease influences, such as renal failure, or enough time has elapsed to declare the IH permanent, we advise supplementation.

Why do we supplement cats with kidney insufficiency sooner than those without?

Approximately 30-40% of hyperthyroid cats have pre-existing CKD.

In cats with renal failure, we intervene earlier with supplementation if IH develops, as it has great negative impact in these individuals.

Continued IH decreases glomerular filtration rate (GFR) to below normal, resulting in worsened azotemia, and lifespan is related to the levels of azotemia, regardless of cause. In cats with concurrent azotemia, even transient hypothyroidism that follows radioiodine therapy may contribute to additional renal function decline and worsening of the cats' CKD stage.

IH also compounds the effects of renal dysfunction. For example, anemia resulting from hypothyroidism exacerbates anemia from erythropoietin deficiency from renal failure. Constipation is a sequela of both diseases. A decreased GFR causing more azotemia and hyperphosphatemia leads to lethargy and inappetence, which in turn perpetuate the downward spiral of azotemia and decompensation in a CRF cat.

Treating "subclinical" iatrogenic hypothyroidism has become current standard of care for azotemic cats in overt (IRIS Stage 2-3) renal failure. If we see cats that we think will benefit from thyroid supplementation we will initiate therapy here, discuss it with your client and inform you of our decision.

We will discuss management of these cats in detail in our next newsletter.

Upcoming Newsletters: Etiology of Hyperthyroidism and Why Some Cats Go 'Round Again • Other Considerations: Optimizing Recovery After I131 • Methimazole Trials: What Are They Good For?

*We're available to consult about these topics any time –
please contact us if you have any questions.*

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What should we be telling our clients about I131 therapy in hyperthyroid cats?

I131 therapy remains the treatment of choice for most hyperthyroid cats, typically the earlier the better. If the cat has significant thyroid disease, it is still best to destroy the thyroid tumor(s), even if it means supplementing with thyroxine afterwards. Otherwise, tumors grow, become more aggressive and are tougher to treat. Some will eventually mutate into adenocarcinomas. Heart disease sometimes develops in cats on methimazole despite apparently well-controlled thyroid hormone levels and no other clinical signs of hyperthyroidism. We believe that the rate of significant side effects to methimazole is at least 40%. It's expensive to maintain and monitor a cat on this drug, and for the most effective control it must be given twice a day.

Veterinarians should no longer advise clients that their cats will never require oral medication if they choose I131. Despite a >90% chance of having normal thyroid hormone levels after I131, 3-5% cats will need thyroid hormone supplementation. This should not be seen as a treatment failure. Success is elimination of the thyroid tumors and avoiding the use of methimazole.

Natural hormone supplementation compared to methimazole maintenance, has many benefits. Levo-thyroxine has no side effects and can be easily administered in a small amount (.1 ml=.1 mg) of a palatable liquid once a day rather than twice. Leventia®, made by Schering Plough, the animal division of Merck, contains 0.1 mg/0.1ml dose. It is far less expensive than methimazole, and has a generous shelf life (18 months if refrigerated).

Our next newsletter will detail our approaches for hyperthyroid cats with chronic kidney disease.

Feline Hyperthyroid Treatment Center Offers Ongoing Support

From establishing candidacy for I131, to devising and instituting diagnostic and treatment plans, we will work with you to optimize your patient's chances of success. We can help prepare your clients for possible outcomes, and will follow their cat's progress through the post I131 rechecks until the hyperthyroidism is completely resolved and any necessary adjustments made.

If you have any questions about this information, or have specific cases you'd like to discuss, please feel free to call us!

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