



Should we look at TSH more often in cats?

Dr. Mark Peterson believes we should.

Why?

We can see normal cats' TT4s swing slightly above high end reference due to normal physiologic variation as well as in early emerging clinical hyperthyroidism. A TSH can help us in this situation because in the truly clinically hyperthyroid cat we expect the TSH to be unmeasurable. When we get back a measurable TSH we can feel almost 100% confident the patient is not hyperthyroid. Without a TSH, we may have falsely diagnosed clinical hyperthyroidism if further testing reveals a measurable value.

There are some TSH caveats to consider.

TSH

We cannot just use an extremely low or suppressed TSH as a means to diagnose hyperthyroidism. The fact is almost 1/3 of normal cats will have a unmeasurable TSH due to assay sensitivity when using the canine TSH assay for cats. If the TSH comes back unmeasurable and the TT4 is slightly elevated that could be a normal cat or a cat with early hyperthyroidism. Access to a validated more sensitive assay would improve our ability to distinguish normal versus hyperthyroid cats. Therefore, the combination of clinical signs, physical examination, TT4, TSH along with a possible FT4 may be needed to diagnose clinical hyperthyroidism in particular cats.



Post Radioactive Iodine Therapy

Measuring the TSH can be used as part of pre-treatment planning with radioactive iodine 131 (I^{131}) in cats that have been previously treated with chronic methimazole. Atrophy of the remaining normal thyroid gland generally prevents it from taking up much I^{131} . If the TSH is measurable that means the remaining normal thyroid gland might also take up and concentrate I^{131} increasing the risk of iatrogenic hypothyroidism. A cat may need to be off methimazole for at least two weeks prior to treatment. Your treatment center will be the best source of information on planning for therapy.



Hypothyroidism

Cats mainly develop iatrogenic hypothyroidism secondary to either anti-thyroid drugs, surgery or I131.

In **drug** induced hypothyroidism the TSH will climb before the serum TT4 becomes overtly low. A low normal TT4 or FT4 with a high TSH is considered subclinical or mild hypothyroidism. In cats with concurrent renal disease, subclinical hypothyroidism can have a negative impact on their renal function.

Surgery associated disease is generally only expected to last for a couple of months (if there was unilateral disease) as the pituitary regains TSH secretion and the atrophied gland recovers. Bilateral thyroidectomy will result in clinical hypothyroidism requiring permanent levothyroxine (L-T4) supplementation.

I131 associated hypothyroidism may be transient or permanent, subclinical or clinical and may or may not require L-T4 supplementation. Bilateral adenomatous disease carries a higher risk than unilateral disease. Again finding a low to low normal TT4 concentration together with significantly high TSH concentrations confirms primary iatrogenic hypothyroidism. The majority of reported cats with both overt and subclinical disease had no clinical signs or changes on PE. Recognizing the disease is once again important for cats with concurrent renal disease.

Natural hypothyroidism is rare with most cases being **congenital** disease diagnosed in kittens. Clinical signs include disproportionate dwarfism, goiter and constipation. Spontaneous disease in adults is also associated with goiter in the majority of cases although thyroid atrophy is reported.

The prevalence of **spontaneous hypothyroidism** may be higher than previously expected based on a recent prospective study. Clinical signs are vague. Only 3/7 cats were noted to be overweight or have a thin hair coat. Interestingly, 4/7 cats were azotemic with a creatinine ranging from approximately 194 umol/L to 300 umol/L. The authors note a younger than expected azotemic cat with normal sized kidneys and a goiter should prompt further investigation. TT4, FT4 and TSH again in combination can be used to make the diagnosis however **TSH** is the most sensitive and specific out of all three. It was elevated well over 1ng/ml in 7/7 cats in the referenced paper below. Azotemia resolved in the 4/7 cats treated and PUPD either resolved or improved.



References:

Serum TSH, an Essential Tool for Diagnosis and Monitoring of Thyroid Disease in Cats. ACVIM Proceedings 2021.

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Peterson ME, Carothers MA, Gamble DA, Rishniw M. Spontaneous primary hypothyroidism in 7 adult cats. *J Vet Intern Med*. 2018 Nov;32(6):1864-1873. doi: 10.1111/jvim.15239. Epub 2018 Oct 7. Erratum in: *J Vet Intern Med*. 2019 Mar;33(2):1111. PMID: 30294940; PMCID: PMC6271337.