

Diagnosis of “Equivocal” Feline Hyperthyroidism

Background

The diagnosis of hyperthyroidism can be confirmed in the majority of cats based on the presence of appropriate clinical signs and an increased circulating total T_4 concentration. At Axiom, a total T_4 value > 60nmol/L is considered supportive of hyperthyroidism. However, the upper end of the reference range in cats extends to 40nmol/L. Those cases with total T_4 values between 40-60 nmol/L are therefore in the equivocal range. There are several possible explanations for equivocal results. The most common explanations are either

- 1) very early hyperthyroidism
- 2) early hyperthyroidism with concurrent nonthyroidal illness
- 3) random fluctuation into the equivocal range in a euthyroid cat

Various diagnostic options are available in clarifying the thyroid status of cats with equivocal results.

“Evaluation in Context”

As in dogs, total T_4 concentrations generally decrease in cats with significant nonthyroidal illness. Thus most cats with obvious or chronic clinical abnormalities are expected to have subnormal or low-normal values. The presence of an equivocal result in these cases should be considered as inappropriate and increase the suspicion of early hyperthyroidism (*with/without concurrent nonthyroidal illness*). Certainly an equivocal result in a cat that looks clinically severely ill is highly suspicious of early hyperthyroidism with concurrent illness.

Wait and Retest

In otherwise relatively healthy cats it is often appropriate to wait for 4-6 weeks and re-test total T_4 concentrations. If euthyroid, it is unlikely that a second sample will be within the equivocal range. However, if hyperthyroid it is quite likely that the result will have increased into the diagnostic range. This approach is only appropriate for relatively clinically healthy cats.

Free T_4 Measurement

Free T_4 estimation is generally considered to be a slightly more diagnostically “sensitive” test for hyperthyroidism. i.e. it is slightly more likely to give a positive result in early cases than is total T_4 measurement. Free T_4 measurement may therefore be a useful second line test in equivocal cases. However, note that some cats with nonthyroidal illness will have temporary increases in free T_4 and so this is not routinely recommended as the sole test in routine investigation of feline hyperthyroidism

T_3 Suppression Test

Administration of exogenous T_3 to a euthyroid cat causes an increased negative feedback effect on TSH secretion from the pituitary gland and consequently circulating total T_4 concentrations decrease. However, cats with hyperthyroidism secrete T_4 independent of TSH control and so T_3 administration has little effect on total T_4 values in these cats. This test can therefore be used to evaluate “equivocal” hyperthyroidism.

Test Protocol: Collect blood for total T_4 measurement, administer 0.02 mg/kg T_3 (*Tertroxin*) orally, TID for 7 doses; collect blood 2-4 hours after the last dose of T_3 for total T_4 and total T_3 measurement. Total T_4 values should decrease to < 20nmol/L with >50 % suppression compared to the baseline value to indicate euthyroidism. Failure to suppress is consistent with hyperthyroidism. The T_3 measurement is performed solely to confirm adequate owner compliance in medicating with T_3 .