RESEARCH PROGRESS REPORT SUMMARY

Grant 02686-A: Pattern of Thyroid Function Tests during Recovery from Acute Nonthyroidal Illness

Principal Investigator: Timothy Bolton, DVM

Research Institution: Virginia-Maryland Regional College of Veterinary Medicine

Grant Amount: $13,792

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Progress Report: Mid-Year 3

Report Due: 6/30/2022 **Report Received:** 6/25/2022

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Original Project Description:

Hypothyroidism is the most common endocrine disease in dogs. A diagnosis of hypothyroidism relies on finding both appropriate clinical signs and low thyroid hormone levels. Unfortunately, other illnesses can suppress thyroid hormone levels and result in a misdiagnosis. This phenomenon of low thyroid hormone levels caused by a disease not involving the thyroid gland is known as nonthyroidal illness or euthyroid sick syndrome. It is important to distinguish between nonthyroidal illness and hypothyroidism as the treatment for each is different. Historically, the recommendation for a dog with nonthyroidal illness has been to resolve the underlying disease, followed by a recheck of thyroid hormone levels thereafter. However, the duration of time after resolution of the nonthyroidal illness necessary to perform accurate thyroid hormone level testing is unknown. This study will provide information about thyroid hormone levels during the course of nonthyroidal illness, and also establish the approximate duration of time for recovery of thyroid hormone levels to normal following illness resolution. These results will correlate clinically with more concrete recommendations for thyroid hormone level testing following resolution of nonthyroidal illness.

Publications: None at this time

Presentations: None at this time

Report to Grant Sponsor from Investigator:

To date, 93 cases have been screened for possible study enrollment. Of these, 23 have fulfilled all of the enrollment criteria (92% of total cases needed) and are still in the study, 7 were enrolled but ultimately excluded (either determined to have a chronic disease, did not follow-up, or determined to have overt or subclinical hypothyroidism), 8 were not enrolled despite having a low total T4 (owner did not allow for study enrollment or found to have a chronic disease during diagnostic work-up), and 55 had a normal total T4 (failed to fulfill this inclusion criteria).

Based on the case enrollment thus far, 19/21 dogs had normalization of total T4 by the 2-week recheck. Thus, in dogs where acute nonthyroidal illness is diagnosed, rechecking the total T4 two weeks after nonthyroidal illness resolution will result in an accurate assessment of thyroid hormone status for most patients. For those not normal at 2-weeks, a recheck again 2-weeks later (at the 4-week mark) would be most appropriate, as all dogs had a normal total T4 by 4 weeks.

As expected, 100% of dogs at that time of nonthyroidal illness diagnosed had a low total T4 and ~90% had a low total T3. These values returned to normal as the disease process resolved. Free T4 (low) and TSH (high) was normal in all but 8 cases. The TSH, in most cases, appeared to significantly increase at the 2- and/or 4-week rechecks, albeit still within the reference range. Interestingly, in three cases, the TSH increases above the reference range after normalization of all other thyroid hormones (total T4, free T4, total T3) prior to returning to normal.

Enunciating differences between the pattern of thyroid hormone recovery in dogs and humans with naturally occurring disease will be postponed until all cases are enrolled and analyzed.