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MORE ON AUTOIMMUNE THYROIDITIS

PREVALENCE

Recently, a very large population survey of canine serum samples submitted for diagnosis of suspected hypothyroidism found thyroid hormone autoantibodies in 6.3% (MSU Animal Health Diagnostic Laboratory; 18,135 of 287,948 samples). From this data base, the 10 breeds with highest prevalence were: Pointer, English Setter, English Pointer, Skye Terrier, German Wirehaired Pointer, Old English Sheepdog, Boxer, Maltese, Kuvasz, and Petit Basset Griffon Vendéen. Prevalence was associated with body weight and was highest in dogs 2-4 years old. Females were significantly more likely to have thyroid autoantibodies than males.

In a parallel study of some 2000 cases at Antech Diagnostics, the most commonly affected dog breeds included Golden Retriever, Shetland Sheepdog, American Cocker Spaniel, English Setter, Boxer, Doberman Pinscher, Labrador Retriever, German Shepherd Dog, Akita, Irish Setter, Old English Sheepdog, and Collie, but basically all breeds, and mixed breeds are affected to some extent.

Laboratory and pedigree analyses of affected families show a progressive earlier age of onset of thyroiditis and/or clinical signs of thyroid dysfunction, along with an increased proportion of affected versus normal offspring in successive litters. This situation has been seen previously with respect to autoimmune hemolytic anemia and thrombocytopenia, and may also apply to Addison's disease in affected dog breeds.

Genetic counseling for this heritable disorder has increased awareness of the need to screen canine breeding stock on a regular (annual) basis, starting at puberty. Consequently, more animals are diagnosed in the early stages of this autoimmune process, before they begin to show typical signs of thyroid dysfunction. Most experts agree that these dogs should be removed from the breeding program.

A question remains about whether to begin supplementation with thyroid hormone immediately, conceptually to reverse the production of thyroid autoantibody and the destruction of thyroid tissue, or wait until clinical signs develop. The recent report from MSU's one year followup of 173 thyroglobulin autoantibody positive dogs, indicated that 20% had converted to clinical hypothyroidism in that time period. Presumably, many of the remaining dogs will eventually become hypothyroid.

Given this expectation, there is rationale for beginning thyroid replacement once the diagnosis has been established.

ABERRANT BEHAVIOR AND THYROID DYSFUNCTION

An association has recently been reported between aberrant behavior and thyroid dysfunction in the dog. Typical clinical signs include unprovoked aggression towards other animals and/or people, sudden onset of a seizure disorder at puberty or in adults, disorientation, moodiness, erratic temperament, periods of hyperactivity, hypoatten-

MORE ON AUTOIMMUNE THYROIDITIS (CONT'D.)

tiveness, depression, fearfulness and phobias, anxiety, submissiveness, passivity, compulsiveness, and irritability. After the episodes, most of the animals appeared to be coming out of a trance-like state and were unaware of their previous behavior.

The study involves more than 1500 cases of dogs presented to veterinary clinics for aberrant behavior. The first 499 cases have been analyzed independently by a neural network correlative statistical program. Results showed a significant relationship between thyroid dysfunction and seizure disorder, and thyroid dysfunction and dog-to-human aggression. Treatment outcome followup in 95 cases showed a significant behavioral improvement in 61% of the dogs.

Based on these findings, we advise including thyroid antibody testing as part of the laboratory and clinical work up of any behavioral case.

VACCINATION AND ANTITHYROGLOBULIN ANTIBODIES

A recent study of 20 healthy research Beagles and 16 healthy pet dogs was undertaken to determine whether routine multivalent and/or rabies vaccination induced production of antibodies against canine thyroglobulin. Antibodies against bovine thyroglobulin were also measured. Published results indicated that a significant increase in anti-bovine thyroglobulin antibodies was found in all vaccinated research dogs in comparison with unvaccinated control dogs. Anticanine thyroglobulin antibodies were significantly increased in all research dogs receiving rabies vaccine but not in the group that received only the multivalent vaccine without a rabies vaccine. In the pet dogs, a significant increase in anticanine but not antiovine thyroglobulin antibodies was seen 2 weeks after vaccination with combined multivalent and rabies

vaccines. In some of the dogs, the level of anticanine thyroglobulin antibodies was in the range observed in dogs with spontaneous thyroiditis. While the duration of these vaccine-induced anticanine thyroglobulin antibodies is unclear, we recommend retesting the dogs in 4-6 months.

The clinical importance of these findings is unknown at the present time, although vaccine administration has been implicated as a contributing factor in autoimmune diseases such as thyroiditis, immune-mediated hemolytic anemia and thrombocytopenia, and immune arthropathies.

LABORATORY DIAGNOSIS (see Antech News November 1998 and February 2000)

The presence of thyroid antibodies may falsely increase measured T3 and T4 concentrations, thereby making it more difficult without complete thyroid profiling to identify affected animals. In the MSU cohort population study, 57 of 1000 hypothyroid dogs had falsely increased T3 concentrations, and 17 of 1000 hypothyroid dogs had falsely increased T4 concentrations.

The **thyroglobin autoantibody (TgAA)** concentration is expected to be elevated (positive, >200) in all cases of autoimmune thyroiditis that have elevated circulating T3 and/or T4 autoantibodies. However, in a few cases from Antech's case study (16 of 465, 3.4%), the TgAA test was negative in the presence of elevated T3AA (all 16 cases) and elevated T4AA (1 case).

The **total T4 concentration** was > 2.0 µg/dL in 48 (10%) of the above 465 cases of thyroiditis. English Setters and Golden Retrievers were overrepresented in this group. These findings underscore the importance of measuring more than just a total T4 concentration when evaluating a case for the presence of hypothyroidism and/or thyroiditis.

References: Nachreiner, RF et al. JAVMA 220:466 - 471, 2002; Graham, PA et al. Proc. 19th ACVIM, abstr. 105, 2001; Dodds, WJ. Proc AHVMA, 77-79 and 80-82, 1999; Dodds, WJ. Can Pract 22 (1): 18-19, 1997; Dodds, WJ. Adv Vet Sci Comp Med 39:29-96, 1995; Dodman, NH et al. JAVMA 207:1168-1171, 1995; Scott-Moncrieff, JC et al. JAVMA 221:515-521, 2002.

LAB TIPS

Canine TSH Assay

While many dogs with primary hypothyroidism have elevated cTSH concentrations, up to one-third of affected dogs have normal or low (< 0.10) cTSH concentrations, for reasons that are unclear. Conversely, some euthyroid dogs (7-18% in published studies) have elevated cTSH concentrations.