

Thyroid Function Tests in Normal Irish Setter Dogs

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A familial tendency for hypothyroidism and autoimmune thyroid disease in dogs has been reported. A number of breeds have been reported to have an increased prevalence of these disease which include the Irish Setter (#1 and #8). Therefore the charge to compare reference values (normal) for Irish setters to All-breed values was given by the ISCA board to the ISCA Health Committee. Blood collection was done at Lancaster , PA June 2001, and Lexington, KY, June 2002 at the National Specialties. Dogs between the ages of 12 to 24 months, all intact, apparently healthy according to a veterinarian's physical examination, were sampled - none of these dogs were on thyroid medications. There were 37 Males and 44 Females (81 total samples).

The following tests were performed:

| | |
|---------------------------------|---|
| Total Thyroxine | TT4 |
| Total Tri-iodothyroxine | TT3 |
| Free T4 by Equilibrium dialysis | FT4d |
| Free T3 | FT3 |
| T4 Autoantibody | T4AA |
| T3 Autoantibody | T3AA |
| Thyroid Stimulating Hormone | TSH |
| Thyroglobulin Autoantibody | TgAA (by serum and paper disc sampling) |

Statistical analysis:

The first statistical analysis was to determine if there was any statistical significance between males and females. This was performed using Mann Whitney U tests. There were statistical differences for total T4 and free T4 by equilibrium dialysis ($p < 0.006$). Therefore, the reference values for these two analyses are separated by sex and are for 37 males and 44 females. For all other tests the reference values are for a total of 81 Irish Setters.

Determination of the reference values was carried out using Harrell-Davis weighted quantile estimation.(#3)

Results of Just Irish Setters

All Breeds (MSU/AHDL) Michigan State University Animal Health Diagnostic Laboratory

TT4

Males 20-61nmol/L

Females 33-73 nmol/L

15-67 both sexes

TT3

Both sexes 0-2.4nmol/L

1.0-2.5 both sexes

FT4 ed (Equilibrium Dialysis)

Males 8-43 nmol/L

Females 12-44 nmol/L

6-42 both sexes

FT3

Both sexes 4-22

4.5 – 12 both sexes

T4 Autoantibody (T4AA)

Both sexes 2-16

0-20 both sexes

T3 autoantibody (T3AA)

Both Sexes 0-57

0-10 both sexes

TSH

Both sexes 0-14 mU.L

0-37 both sexes

TgAA

Both sexes 45-985

0-200 both sexes

Of the 81 total samples – 10 were strongly positive at 400 and above TgAA.

- 5 were moderately positive at 200-400. #6

When comparing Irish Setter reference ranges to all Breed (AHDL) the female Irish Setter TT4 ranges are slightly higher than males as well as the AHDL normals for all breeds. TT3 were comparable; FT4's were comparable; FT3 were comparable; T4AA were comparable; T3AA were slightly higher (0-57 compared to 0-10). TSH values of 0-14 were comparable to the low side of the normal all-breed reference range. The TgAA range was 45-985 compared to all breed reference range of 0-200. This is a striking difference. Ten dogs were TgAA strongly positive (#6). Five dogs were moderately positive 200-400; Animal Health Diagnostic Lab normal range is 0-200.

Discussion:

In this study, between ages 1-2, the thyroid gland was working at normal levels (TSH 0-14) and the FT4 ed (by equilibrium dialysis) also shows normal levels. The presence of elevated TgAA in 15 out of 81 dogs raises some concern. TgAA is thought to be predictive of lymphocytic thyroiditis, and idiopathic hypothyroidism. A continuing study has not been done on these TgAA dogs.

It appears that autoimmune thyroid disease occurs earlier in life than idiopathic hypothyroidism, supporting the concept that the idiopathic form results from the autoimmune disease (#5). TgAA is present when there is active thyroid disease (inflammation), directed against thyroglobulin. This test is important in the early years of life as a predictor of autoimmune thyroid disease.

Because the disease does not rapidly destroy the thyroid tissue, many dogs have had TgAA for year prior to diagnosis of hypothyroidism. In the later stages of the disease the dog may become seronegative as the thyroid atrophies. Most clinicians feel there should be clinical signs to support the laboratory diagnosis of hypothyroidism. Diagnosis then is made by clinic findings, FT4 ed (equilibrium dialysis), TSH, and TgAA. TgAA seems to be helpful as a predictor of hypothyroid disease. FT4 ed is more accurate than FT4 by radioimmune assay by reducing extra thyroidal influences which could falsely lower FT4. FT4 ed also greatly reduces the inaccuracy of a falsely elevated FT4 and FT3 concentrations when a T3AA and T4AA are present. (#2 and #9) In those dogs sick of non-thyroid disease (with low FT4) TSH ranges are more likely to remain normal (#4). Those dogs who have an elevated level of TgAA should be followed up at 6 and 12 month intervals with an MSU thyroid profile. Good records should be kept on the possibility that a study could be done about this in the future.

Acknowledgements:

The test results were analyzed by James C. Boyd M.D., Associate Professor of Pathology, University of Virginia Health System, Charlottesville, VA 22908. He is a clinical pathologist with a primary interest in informatics and has published extensively in this field. He is the coauthor of a book on Reference Values which is cited. #10

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