

Thyrotropin-Releasing Hormone–Stimulated Plasma Growth Hormone Concentrations for Hypothyroidism Diagnosis

Andrew C. Bugbee, DVM, DACVIM
University of Georgia

In the Literature

Pijnacker T, Kooistra H, Vermeulen C, et al. Use of basal and TRH-stimulated plasma growth hormone concentrations to differentiate between primary hypothyroidism and non-thyroidal illness in dog. *J Vet Intern Med.* 2018;32(4):1319-1324.

FROM THE PAGE ...

Hypothyroidism is a common endocrinopathy in dogs, often clinically manifesting in middle age.¹ Diagnosis is confirmed through demonstration of low total thyroxine (TT₄) and free thyroxine concentrations and elevated thyroid-stimulating hormone (TSH) concentration. Nonthyroidal illness (NTI) can complicate diagnosis by suppressing measurable thyroid hormone levels; in addition, 24% to 38% of overtly hypothyroid dogs reportedly have TSH concentrations in normal reference range.^{2,3} TT₄ response to exogenously administered human-recombinant or bovine TSH can aid in differentiating NTI from hypothyroidism; however, drug cost, accessibility, and concern about anaphylactic reactions may limit clinical utility.^{4,5} The thyrotropin-releasing hormone (TRH) stimulation test has been shown to induce minimal to no increase in circulating TT₄, limiting its utility for hypothyroidism diagnosis.⁶ Furthermore, US commercial availability of an injectable TRH product is questionable following a manufacturer withdrawal in 2002.⁷

Because hypothyroid dogs have been reported to have elevated growth hormone (GH) concentrations, the current article investigated the use of TRH stimulation on GH and TSH concentrations as a novel method to differentiate hypothyroidism from NTI.⁸ Twenty-one dogs were studied and classified as either having hypothyroidism ($n = 11$) or NTI ($n = 10$) based on thyroid scintigraphy. Plasma GH and TSH levels were measured before and 30 and 45 minutes after TRH administration.

Results revealed hypothyroid dogs to have significantly higher basal GH concentrations than dogs with NTI. After TRH stimulation, GH levels increased significantly in hypothyroid dogs, whereas levels in dogs with NTI did not. Using a TRH-stimulated GH concentration cutoff of 1.95 µg/L at 30 minutes or 1.75 µg/L at 45 minutes allowed correct classification of all dogs. Basal TSH concentrations did not differ between groups; however, levels in dogs with NTI increased significantly in response to TRH stimulation, whereas levels in hypothyroid dogs did not. A cutoff at a 57% increase in TSH levels from baseline at 45 minutes poststimulation was used, and all dogs were correctly classified. In addition, the GH:TSH ratio was increased in hypothyroid dogs following TRH stimulation but decreased in dogs with NTI. A GH:TSH ratio cutoff of >4.6 allowed accurate classification of all hypothyroid patients.

No adverse events were noted following a TRH dose of 0.01 mg/kg in the current study, but higher doses (typically ≥0.1 mg/kg) have been associated with cholinergic side effects (eg, vomiting, hypersalivation).⁹

Results revealed hypothyroid dogs to have significantly higher basal growth hormone concentrations than dogs with nonthyroidal illness.

... TO YOUR PATIENTS

Key pearls to put into practice:

- 1** Concurrent illness can confound a diagnosis of canine hypothyroidism. Inconclusive screening tests have been historically confirmed via TSH stimulation test or thyroid scintigraphy.
- 2** Assessment of GH and TSH levels pre- and postTRH stimulation is a novel tool for differentiating hypothyroidism from NTI.
- 3** An injectable TRH product is not currently available in the United States, limiting utility of this testing to patients outside the United States.

References

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