Canine Hypothyroidism

Features

This endocrinopathy is most often associated with primary thyroid dysfunction caused by lymphocytic thyroiditis or idiopathic thyroid atrophy. It is common in dogs, with highest incidence in middle-aged to older dogs. Young adult large and giant-breed dogs are also occasionally affected. Congenital hypothyroidism is extremely rare.

A variety of cutaneous symptoms can be seen. Alopecia on the bridge of the nose occurs in some dogs. The hair coat may be dull, dry, and brittle. Bilaterally symmetrical alopecia that spares the extremities may occur, with easily epilated hairs. Alopecic skin may be hyperpigmented, thickened, or cool to the touch. Thickened and droopy facial skin from dermal mucinosis, chronic seborrhea sicca or oleosa, or ceruminous otitis externa may be present. Seborrheic skin and ears may be secondarily infected with yeast or bacteria. In some dogs, the only symptom is recurrent or antibiotic-resistant pyoderma or adult-onset generalized demodicosis. Pruritus is not a primary feature of hypothyroidism and, if present, reflects secondary pyoderma, *Malassezia* infection, or demodicosis. Noncutaneous symptoms of hypothyroidism are variable and may include aggression, lethargy or mental dullness, exercise intolerance, weight gain or obesity, thermophilia (cold intolerance), bradycardia, vague neuromyopathic or gastrointestinal signs, central nervous system involvement (e.g., head tilt, nystagmus, hemiparesis, cranial nerve dysfunction, hypermetria), and reproductive problems (e.g., decreased libido, prolonged anestrus, infertility). Puppies with congenital hypothyroidism are disproportionate dwarfs with short limbs and neck relative to their body length.

Top Differentials

Differentials include other causes of endocrine alopecia and seborrhea, superficial pyoderma, *Malassezia* dermatitis, and demodicosis.

Diagnosis

1. Rule out other differentials
2. Hemogram and serum biochemistry panel: nonspecific findings may include a mild, nonregenerative anemia, hypercholesterolemia, or elevated creatine kinase
3. Dermatohistopathology: usually, nonspecific endocrine changes or findings consistent with pyoderma, *Malassezia* dermatitis, or seborrhea are seen. If present, dermal mucinosis is highly suggestive of hypothyroidism, but this can be a normal finding in some breeds (e.g., Shar pei)
4. Serum total thyroxine (TT_4), free thyroxine (FT_4) by equilibrium dialysis, and endogenous thyroid-stimulating hormone (TSH) assays: low TT_4, low FT_4, and high TSH are highly suggestive of hypothyroidism, but false-positive and false-negative results can occur, especially with TT_4 and TSH. For example, although TT_4 is a good screening test, it should not be used alone to make a diagnosis because its serum level can be artificially increased or decreased by several factors, such as nonthyroidal illness, autoantibodies, and drug therapy (Table 9-1)

Treatment and Prognosis

1. Any secondary seborrhea, pyoderma, *Malassezia* dermatitis, or demodicosis can be treated with appropriate topical and systemic therapies.

TABLE 9-1

Factors and Drugs That May Affect Total Thyroxine (TT_4) Serum Levels in Dogs

Reduced TT_4 Values	Increased TT_4 Values
Normal hourly fluctuations	Normal hourly fluctuations
Nonthyroidal illness	Recovery phase of illness
Prolonged fasting	Age <3 months
Age >7 years	Obesity
Breed = Greyhounds	Autoantibodies
Autoantibodies	Diestrus, pregnancy
Phenobarbital	Estrogen
Furosemide	Progesterone
Glucocorticoids	Insulin
Sulfonamides	Narcotic analgesics
Nonsteroidal Anti-inflammatories (e.g., Rimadyl, Etogesic)	
Salicylates	
Tricyclic antidepressants	
Phenylbutazone	
Mitotane	
General anesthesia	

NOTE: When hypothyroidism is suspected, both TT_4 (total T_4) and fT_4 (free T_4 [by equilibrium dialysis]) should be measured. Compared with TT_4, fT_4—the small portion of thyroxine that is not protein bound—is less affected by nonthyroidal illness, autoantibodies, and drug therapy; the exception is sulfonamides.

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2. Levothyroxine 0.02 mg/kg PO should be administered every 12 hours until symptoms resolve (approximately 8-16 weeks). Some dogs can then be maintained with 0.02 mg/kg PO every 24 hours; others require lifelong twice-daily dosing to maintain remission.
3. Dogs with concurrent heart disease should be started on levothyroxine more gradually. Treatment should begin with 0.005 mg/kg PO every 12 hours; dosage should be increased by 0.005 mg/kg every 2 weeks until 0.02 mg/kg every 12 hours is being administered.
4. After 2 to 4 months of therapy, the serum TT_4 level should be measured 4 to 6 hours after medication administration and should be in the high normal to supranormal range. If the level is low or within the normal range and minimal clinical improvement has been seen, the dosage of levothyroxine should be increased and the serum TT_4 level checked 2 to 4 weeks later. If the level is >7.5 mg/dL, the levothyroxine dose should be reduced.
5. If signs of thyrotoxicosis from oversupplementation (e.g., anxiety, panting, polydipsia, polyuria) occur, the serum TT_4 level should be evaluated. If the level is markedly elevated, medication should be temporarily stopped until adverse effects abate; it should then be reinstituted at a lower dose or a less frequent dosage schedule.
6. The prognosis is good with lifelong replacement thyroxine therapy, although hypothyroidism-induced neuromuscular abnormalities may not completely resolve.

FIGURE 9-37 Canine Hypothyroidism. An obese Rottweiler with hypothyroidism. Note that the hair coat lacks the bilaterally symmetrical alopecia that is considered characteristic of this disease.

FIGURE 9-38 Canine Hypothyroidism. Generalized truncal alopecia in an adult collie.

FIGURE 9-39 Canine Hypothyroidism. Mild alopecia on the bridge of the nose may be an early lesion of hypothyroidism.

FIGURE 9-40 Canine Hypothyroidism. Alopecia and hyperpigmentation with no evidence of secondary superficial pyoderma on the trunk.