Hypothyroidism in dog: diagnosis and treatment

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Abstract
Hypothyroidism is most common endocrinopathy in canines. A Black colored 11 years male Labrador dog was presented with a history of chronic dermatitis with alopecia. Comprehensive clinical examination revealed brittle and rough skin coat, patchy hair loss especially on tail, dorsum of spine and limbs. Hemato-biochemical investigations were carried out along with thyroid panel. Thyroid panel was suggestive of thyroid dysfunction.

On the basis of history, clinical examination and laboratory findings, the case was diagnosed as hypothyroidism. The dog was treated with Eltroxin (Levothyroxine) @ 0.02 mg/kg b.wt q12hr orally for 15 days along with supportive medications.

Keywords: Canine, Hypothyroidism, Levothyroxin.

Introduction

Canine hypothyroidism is most common endocrine disorder. Hypothyroidism results in deficiency of Thyroxine (TT_4) and Tri-iodothyronine (TT_3) in circulation which may lead to cutaneous manifestations. Two most common causes of canine hypothyroidism in adult are lymphocytic thyroiditis and idiopathic atrophy of thyroid gland.[5] Impaired synthesis and secretion of Thyroid Stimulating Hormone (TSH) may cause hypothyroidism but it is rare in canines.

Thyroid hormone helps in regulation of cornification process for secretion of sebaceous gland along with initiation of anagen hair follicle.[6] Most of hypothyroid dogs show dermatological clinical signs. Dermatological signs in thyroid dysfunction include bilateral symmetric alopecia, rat tail appearance, exercise intolerance, dry brittle hair coat, hyperpigmentation and myxedema.[3] Hyperkeratosis causes scaling of skin and due to persistence of telogen growth phase alopecia develops.[10]

Hypothyroid dogs show considerable difference in concentrations of Triglyceride, Cholesterol and Random Blood Glucose.[2] Treatment of hypothyroidism is focused on supplementation of Levothyroxine with dietary modifications.

Material and Methods

Anamnesis of Case and Diagnosis: A 11 years male Labrador dog was presented to Teaching Veterinary Clinical Complex, Mumbai Veterinary College, Mumbai (Maharashtra) with a history of chronic dermatitis with alopecia, lethargy, exercise intolerance, rough and brittle hair coat and obesity. Clinical examination revealed normal rectal temperature, respiration rate and heart rate. Comprehensive physical examination revealed rat tail appearance, dermatosis at limb and dorsum of spine. Clinical presentation of patient is displayed in fig. 1 and fig. 2. Aseptically blood was collected for hematology and biochemistry in EDTA containing vial and plain vial respectively. Hematological and biochemical results are represented in table 1 which showed reduced levels of thyroid hormones. On the basis of history, clinical findings and laboratory reports, case was diagnosed as hypothyroidism.

Fig. 1: Rat-tail appearance

Fig. 2: Rough skin coat along with patchy alopecia

Table 1
Hemato-biochemical findings

S.N.	Parameter	Result	Reference Range
1	Hemoglobin (gm%)	11.1	10-16
2	Packed Cell Volume (%)	32.4	30-50
3	Total Erythrocyte Count (106/cmm)	5.34	5-8
4	Total Leucocyte Count (103/cmm)	12.25	6.0-16.0
6	Mean Corpuscular Volume (fl)	60	55-75
7	Mean Corpuscular Hemoglobin (pg)	19	19-24
8	Mean Corpuscular Hemoglobin Concentration (%)	31.1	30-36
9	Platelets (lacks/cu mm)	234000	200000-850000
10	Blood Urea Nitrogen (mg/dl)	15.11	8-25
11	Creatinine (mg/dl)	0.85	0.5-1.6
12	Total Bilirubin (mg/dl)	0.5	0-0.6
13	Direct Bilirubin (mg/dl)	0.2	0-0.3
14	Indirect Bilirubin (mg/dl)	0.3	0-0.3
15	Alkaline Phosphatase (U/L)	42.7	10-94
16	Aspartate transaminase (IU/L)	47.3	10-62
17	Alanine transaminase (IU/L)	30.2	25-92
18	Total Protein (gm/dl)	7.8	5.0-7.0
19	Albumin (gm/dl)	2	2.5-4.0
20	Globulin (gm/dl)	5.8	2.3-4.5
21	Serum Cholesterol (mg/dl)	259	110-250
23	Random Blood Glucose (mg/dl)	73	60-100
24	Total Thyroxin (nmol/l)	21.56	30-70
25	Total Tri-iodothyronine (nmol/l)	0.49	1.2-3

Therapeutic Management: The dog was treated with Tab. Eltroxin (Levothyroxine) @ 0.02mg/kg b.wt b.i.d, orally for 15 days with supportive treatment which included Tab. Lixen (Cephalexin) @ 25mg/kg b.wt b.i.d, Syp. Nutricoat (Omega 3 and Omega 6 Fatty Acids) 15 ml twice in a day for 7 days.

Results and Discussion

Thyroid abnormalities (hyperthyroidism and hypothyroidism) result in alteration of metabolism which causes changes in insulin resistance and plasma lipid profile in humans and dogs.[1] Hypothyroidism is a result of inadequate circulating concentrations of the thyroid hormones. Thyroid hormones play an important role in maintenance of dermal health.[4] Thyroid status depends not only on thyroxine secretion but also on normal thyroid hormone metabolism, normal thyroid function, which is essential for normal growth, development and the regulation of energy metabolism within cells and is dependent on a normally functioning thyroid.[8]

Aberrations in thyroid hormone cause changes in dermal health maintenance and result in dermatological manifestations. Published literature recorded clinical signs in patients with suspected hypothyroidism as bilateral alopecia (82.98%), rat-tail appearance (72.34%), dry and lusture less coat (68.08%), puppy like coat (17.02%), obesity (68.08%), exercise intolerance (78.72%), lethargy (74.47%), anaemia (27.60%), dyspnoea at rest (25.53%), pale mucosa (19.25%), corneal lipidosis (10.64%), goitre and lameness (10.64%), cyanosis (10.22%) and myxedema (9.86%)[14]. Many dogs are prone to obesity even without hyperorexia.

Most dogs affected by hypothyroidism have some degree of mental retardation, lethargy, intolerance, or exercise aversion. The appearance of these signs occurs gradually and insidiously.[9,13] Hormonal concentrations of total thyroxine and free thyroxine are reliable markers for the hypothyroidism. Clinical signs found in this were in agreement with earlier published findings of other authors.[7,12]

Conclusion

Diet modification along with slight exercise was advised to effectively control the weight gain. High fiber diet reduces the appetite which supplements the control of weight gain. Increased physical activity is a useful adjunct to dietary therapy; when used in combination with dietary therapy, promotes fat loss.[11]

After 15 days of treatment dog was assessed again with physical and thyroid profile. Physical assessment showed little improvement whereas after thyroid replacement therapy, thyroid panel showed normal findings. Reason behind performing thyroid panel in 15 days was to standardize the dose as well. Owner was advised to keep the dog on thyroid replacement lifelong.

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(Received 31st August 2020, accepted 05th November 2020)