Haryana Vet. (March, 2023) **62(SI),** 102-103

Clinical Article

RECURRENT PYODERMA SECONDARY TO CANINE HYPOTHYROIDISM IN A LABRADOR RETRIVER DOG - A CASE REPORT

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Received: 31.03.2022; Accepted: 05.09.2022

SUMMARY

This report describes recurrent pyoderma in a male Labrador Retriever dog affected with hypothyroidism which had characteristic clinical signs such as rat tail appearance, seborrhea oleosa, myxedema and tragic facial expression. Sterile swab was smeared over dorsal aspect of the trunk and facial region and subjected to bacterial isolation. *Proteus mirabilis* infection was diagnosed by culture and biochemical tests. Skin scraping was negative for mange infestation and fungal culture test showed positive for yeast infection. Hormonal profile of the patient showed severe hypothyroidism. The dog was successfully managed with Levothyroxine and symptomatic as well as supportive therapy.

Keywords: Dog, Hypothyroidism, Pyoderma, *Proteus*, Resistance

How to cite: Yadav, N., Ensha Lomiya M.A., Raguvaran, R., Kumar, A. and Mondal, D.B. (2023). Recurrent pyoderma secondary to canine hypothyroidism in a labrador retriver dog - A case report. *Haryana Vet.* **62(SI)**: 102-103.

Thyroid hormones are very vital for the dermal health and alteration of thyroid hormones level led to metabolic abnormalities and dermatological changes in hypothyroid dogs (Raguvaran *et al.*, 2021). In many hypothyroid cases, it remains unclear that skin conditions are caused by alterations in the cutaneous microbiome or due to alteration of the skin defense system (Zeeuwen *et al.*, 2012). So, it is important to use a combination of clinical assessment with routine and specific endocrine tests in order to make a definitive diagnosis (Laimi *et al.*, 2020). *Proteus* spp. are opportunistic multidrug resistant enterobacteria related with diverse clinical diseases in animals. However, *Proteus* infections in animals are often misdiagnosed or considered as contaminants in microbiology cultures rather than a primary agent of disease (Vanessa *et al.*, 2017). *Proteus* spp. commonly showed resistance against trimethoprim/sulfamethoxazole, novobiocin and azithromycin (Zappa *et al.*, 2017). This present paper describes a rare case report of recurrent pyoderma in a hypothyroidism affected dog.

A six months old male Labrador Retriever dog of weight 32 kg was presented to Referral Veterinary Polyclinic (RVP), Indian Veterinary Research Institute (IVRI) with history of severe pruritus, alopecia and erythematous lesion on the dorsal aspect of the body as well as on the facial region since last one and half months. It was treated empirically with various topical and systemic antimicrobials priviously but there was no obvious recovery. Vaccination and deworming details were up to the mark and the dog was fed with homemade and commercial food. Dog was found to be dull, depressed. Clinical examination revealed rectal temperature of 101.4° F, congested mucous membrane, respiratory rate of 24/minute and heart rate of 58/minute. Examination of skin and coat showed dry and brittle hair, rat tail appearance (Fig. 1) seborrhea oleosa (Fig. 2), myxoedema and tragic facial expression (Fig. 3). Blood samples were collected for hormonal parameters such as free thyroxine (fT_4) and cortisol level in order to ascertain hypothyroidism or hyperadrencorcism. Sterile swab was smeared over multiple areas on the dorsal aspect and facial region of the dog and subjected to bacterial isolation and identification. Nutrient agar was used for culturing the collected purulent material and incubated for 24 hours at 37 °C. Colonies from nutrient agar was subjected to biochemical tests for species

Table 1

Estimation of cortisol level, thyroid profile (fT_4)

Parameters	Values	Reference values (Bovens *et al.*, 2014)
Cortisol	5.14 µg/dl	0.6-12µg/dl
Free T_4	0.36 ng/dl	0.7- 1.9 ng/dl

Table 2

Biochemical characterization of *Proteus mirabilis*

Biochemical tests	Findings
Methyl Red (MR)	Positive
Voges Proskauer (VP)	Negative
Citrate	Positive
Indole	Negative
Gas	Nil
Catalase	Positive
Oxidase	Negative
Urease	Positive
KOH	Positive
TSI (Slant)	Acid
TSI (Buff)	Alkaline
Lysine	Positive
Motility	Positive

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Figs. 1-5. **(1)** Rat tail appearance; **(2)** Seborrhea oleosa; (3) Tragic facial expression; (4) Swarming growth pattern of Proteus on nutrient agar; (5) ABST results of Proteus on MHA

Table 3

Antibiotic Sensitivity Test

Antibiotic	AMP10	CIP5	GEN10	OF5	AMC30	AK30	CAZ30	CAC30/10	COT25	CPM30	IPM10	CXM30
Zone diameter	17 mm	3.4 mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

(AMP 10- Ampicillin 10mcg; CIP5- Ciprofloxacin 5mcg; GEN 10- Gentamicin 10mcg; OF5- Ofloxacin 5mcg; AMC30- Amoxicillin 30mcg; AK30- Amikacin 30mcg; CAZ30- Ceftazidime 30mcg; CAC30/10- Ceftazidime/ Clavulanic acid 30/10 mcg; COT 25- Co-trimoxazole 25 mcg; CPM30- Cefepime 30mcg; IPM 10- Imipenem 10mcg; CXM30- Cefuroxime 30mcg)

identification. Antibiotic susceptibility test was performed as per the standard procedure. Furthermore, skin scraping was subjected to fungal culture using dermatophyte test media (DTM) and mange infestation using 10% KOH.

Whole blood serum biochemistry changes have been presented in Table 1. Hormonal estimation revealed severe hypothyroidism. Bacterial culture showed swarming growth pattern (Fig. 4) and confirmation of colonies was done by biochemical tests (Table 2). Based on colony characters and biochemical test, the culture was confirmed as *Proteus mirabilis* and found to be multidrug resistant (Gentamicin, Ofloxacin, Amoxicillin, Amikacin, Ceftazidime, Ceftazidime/Clavulanic acid, Co- trimoxazole, Cefepime, Imipenem and Cefuroxime in ABST (Fig 5 & Table 3). Skin scraping was negative for mange infestation and fungal culture test showed positive for yeast (*Malassezia pachydermatis*) infection. Based on the history, clinical observation and laboratory investigation, it was confirmed as a case of multiple drug resistant pyoderma secondary to hypothyroidism and the dog was treated accordingly.

The owner was advised to give tab. Levothyroxine (Eltroxin) (@20µg/Kg) BD PO for 45 days. Dog was also treated with anti-allergic drug to alleviate pruritis. Also, daily baths with 3.5% miconazole-chlorhexidine gluconate shampoo was prescribed. Considering the history of the present case and that of series of previous treated cases at IVRI, ampicillin injectable @ 10 mg/kg IM, BD for five days was given and continued with oral administration for another seven days. After 4weeks, the dog was rescheduled for revaluation of fT_4 and the dog showed a considerable improvement in hair regeneration and skin lesions and hyperkeratosis were significantly reduced.

It was concluded that hypothyroidism alters immune system of the body especially skin. Thus it is necessary for dogs present with the signs of recurrent or non responsive pyoderma and/or bacterial otitis are to be tested for hypothyroidism.

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