

# BLOOD-BIOCHEMICAL STUDIES IN SKIN AFFECTIONS IN DOGS

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The canines affected with skin affections were subjected to blood biochemical profile assay. The affections included dermatitis, sarcoptic mange, demodectic mange, eczema, flea allergy dermatitis, skin allergy and bacterial dermatitis. The blood profile of serum iron, triglyceride, cholesterol, uric acid, urea, creatinine, lactate dehydrogenase, and gamma glutamyl transpeptidase were compared with the blood of healthy dogs. The serum iron, urea and creatinine were comparable in both the groups. It was concluded that stress of dermatosis reflected in enzyme (higher in GG T) and lipid profile (higher in triglyceride, cholesterol) of patients, while renal parameters (urea & creatinine) remain unaffected on account of skin ailments.

**Key words:** Blood biochemistry, Canine, Skin diseases.

## Introduction

The mammalian skin supports a varied fauna and flora which interact with the host and one another. The host-parasite interactions influence the defensive capability of the skin. On the skin surface, the interaction between the parasites, other microbes and the host make a stable ecological niche. Dermatological diseases can present in a variety of fashions - scratching, wounds, severe painful disorders, abnormal stratum corneum and epidermis growth, bacterial folliculitis and furunculosis that are frustrating to treat. Inflammation of the skin, or exudative discharge, patchy scaly alopecia, erythema, primarily pigmented comedone, greasy sebum and its accumulation are also reported (Pence *et al.*, 1983). It is apparent that man's meddling in the affairs of nature has interfered with the balance between parasites and the hosts developed during eons of time to the advantage of the parasite. Most affections of the skin will induce no or nonspecific alterations in clinical biochemistry. Fortunately, diagnostic lesions are readily physically discernible. However, the secondary biochemical changes as a cascade eventuality to chronic stress on account of skin pathology is studied biochemically, to prescribe a rational supporting therapy in otherwise frustrating protracted treatment schedule of skin diseases.

## Material and Methods

The clinical cases of dogs brought to the Teaching Veterinary Clinical Complex of College of Veterinary Science, Hisar, were included in investigation. Different skin diseases in dogs were diagnosed on the basis of history, clinical signs, systemic examination, skin scraping examination and other laboratory examinations including cultural examination.

The dogs were subjected to the dermatological examination as per suggested method of approach through ten-point plan suggested by Thoday, 1984 and 52 dogs that were diagnosed were included for a detailed evaluation of various parameters as suggested in step 9 under ten point plan before correlating data for diagnosis. Parameters relating to serum biochemistry, blood picture and skin histopathology were studied. The data generated was compared with values obtained from six apparently healthy dogs. The hematological parameters were studied as per the methods suggested by Jain, 1986. Biochemical assay were done on auto analyzer using Autopak Bayer kits. Serum iron was done by spectrophotometer method using Bathophenanthroline sulphionate (Gowenlock and Bell, 1980). Skin histopathology was done by taking punch samples processed, stained and studied by light microscopy (Kaneko *et al.*, 1984).

## Results and Discussion

The values obtained pertaining to various blood parameters have been presented in Table 1. The Hb, PCV, TEC and TLC of the control dogs were within normal range as quoted by Jain, 1986. Owners reported that animals showed signs of depression, inactivity, anorexia and irritability. There was no significant difference between the Hb, PCV and TEC values of control dogs and skin diseased dogs. This is in agreement with earlier report by Arlian *et al.*, 1995 that, of 36 blood parameters evaluated only ESR deviated significantly from the normal range for dogs. The skin affected dogs had significantly higher TLC ( $p < 0.01$ ), which agreed with the findings of Arlian *et al.*, 1995. Cellular and humoral

responses to inflammation on account of host - parasite interaction is the reported reason (Huntley et al., 1995). Skin affected dogs had significantly higher ( $p < 0.01$ ) eosinophil and neutrophil counts. The biochemical parameters studies in control group dogs were of normal values as reported by Kaneko (Kaneko *et al.*, 2007). The serum concentration in affected canines were lower in uric acid ( $p < 0.05$ ), comparable in LDH, and higher in GGT ( $p < 0.05$ ) and TG ( $p < 0.05$ ), when compared with the serum of normal dogs. Uric acid is end product of purine metabolism in Dalmatian only. None of the patient was from this genetic group. The present findings of decline in UA in

chronic cases of skin inflammation is supported by discussions of Hooper *et al.*, 2000, wherein, UA has been projected as peroxynitrite scavenger with a anti- inflammatory role in mouse model. Reference values for plasma and serum GGT in domestic animals have been documented by Braun *et al.*, 1983 and clinical applications of these parameters are mainly hepato-biliary disturbances. In parasitic diseases, serum GGT is enhanced in rabbits infested with parasites (Hein *et al.*, 2001) in agreement to results of this study. However, Arlian *et al.*, 1995, reported no change in about 35 enzymatic, hematological and electrolyte parameters in scabetic dogs.

**Table 1. Biochemical Changes in skin affected Canine cases**

Parameter	Control	Patients
Hb.g/dL	13.29±0.25	13.18±0.19
PCV%	37.05±0.78	38.15±0.47
TEC x10 <sup>6</sup> /fL	7.25±0.13	7.31±0.11
ILC x10 <sup>3</sup> /fL	11.72±0.29	19.99±0.02*
DLC		
x10 <sup>3</sup> /L	N	18.50±0.05*
	L	3.46±0.02
	E	1.04±0.02*
Fe~	17.32±3.7	15.91±4.2
TGmg/dL	6.89±2.55	10.37±1.05*
Cholesterol mg/dL	59.23±3.5	70.00±4.2**
UAmg/dL	0.19±0.01	0.14±0.01 *
GGTUIL	0.56±0.04	1.61±0.05*
LDHUIL	95.23±21.3	82.66±11.5
URmg/dL	16.99±2.7	11.58±4.3
Creatininemg/dL	0.71±0.18	0.60±0.23

\* $p < 0.05$ ,

\*\* $p < 0.01$

Vegetable fibers are the best source of water-insoluble cellulose, hemicellulose, and lignin. Some hemicelluloses help to lower serum cholesterol levels in most subjects. Whether this is due to their effect on insulin levels (insulin stimulates cholesterol synthesis and export) or other metabolic effects (perhaps caused by the end products of bacterial digestion) is unknown (Nesbitt, 1983). The serum iron, urea and creatinine were comparable in both the groups. The diagnostic profile included the affections usually reported in dry climatic conditions viz., dermatitis, sarcoptic mange, demodectic mange, eczema,

flea allergy dermatitis, skin allergy and bacterial dermatitis (pyoderma). Histopathological results suggested infiltration of neutrophils, eosinophils, parakeratosis, epidermal necrosis and acanthosis. Arlian *et al.*, 1996, experimental scabetic lesions to contain mononuclear cells, neutrophils, plasma cells & mast cells. However, organ histopathology after scabies of 8 weeks was reported to be normal by Arlian *et al.*, 1995.

In this study, the enzyme and lipid profiles of patients were altered reflecting stress, while renal parameters remain unaffected on account of skin ailments.

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