HEMATOLOGICAL AND BIOCHEMICAL STUDIES ON DERMATOSES IN CANINES

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ABSTRACT

Estimation of hemato-biochemical profiles revealed significant (P<0.05) decrease in Hb, PCV and TEC and increase in eosinophils in acariasis. Lymphopenia and neutrophilia were observed in mange and pyoderma. Leucocytosis was recorded in all the etiological groups. There was significant increase (P<0.05) in total proteins and globulins and decrease in albumin and A:G ratio in all the etiological groups except bacterial dermatitis. Hypoglycemia in cases of ectoparasitic dermatitis but hyperglycemia in bacterial dermatitis was recorded. Significant increase (P<0.05) in activity of serum enzymes ALT and AST were observed in mange affected dogs.

KEYWORDS : Canine, Dermatoses, Hematological, Biochemical Profiles

INTRODUCTION

The skin acts as a barrier between the animal and the environment and perform diversified functions. . Besides, it may also reflect pathologic processes from other tissues. Due to these characteristics, dermatological problems are among the most commonly seen disorders in veterinary hospitals. Skin disorders of dogs vary from acute, self-limiting problems to chronic or long-lasting problems requiring life-time treatment. Mites cause variable skin diseases characterized by inflammation, pruritis and erythematous lesions. Sarcoptic mange has public health significance. Lice, fleas and ticks cause restlessness, intense pruritis and alopecia making skin susceptible to secondary bacterial and fungal yeast infections (Attri, 2003). When ectoparasites are vectors or intermediate hosts of bacterial, rickettsial or parasitic diseases, they become even more important. The hematological and biochemical parameters can be used for identifying an underlying problem. The present work was undertaken to investigate into hematobiochemical aspects of infectious dermatoses in canines.

MATERIALS AND METHODS

Dogs presented with dermatoses to Teaching Veterinary Clinical Complex, Pantnagar during the period May 2012 to April 2013 formed the subject of the investigation. Four groups of affected dogs were formed *viz.* Group B (Ticks/Fleas/Lice infested dogs), Group C (mange infested dogs) and, group D (fungal dermatitis affected dogs) and Group E (pyoderma affected dogs) containing 18 dogs each, compared with healthy control (Group A, n=6). For hemato-biochemical studies, about 6 ml of blood sample was collected from each affected dog, and immediately after collection, 2-3 ml of blood was transferred to EDTA vials and remaining blood was kept for harvesting of serum for biochemical estimations.

Haemoglobin concentration (Hb- g/dl), Packed cell volume (PCV- %), Total erythrocytes count (TEC- 10^6 /cumm), Total leukocytes count (TLC- 10^3/cumm) and Differential leukocyte count (DLC- %) were determined as per the standard procedures described by Jain (1986) within 2 hours of blood collection. Estimation of blood glucose, serum total protein (g/l), albumin (g/l), globulin (g/l), albumin globulin ratio (A/G ratio) and activity of enzymes alanine amino transferase (ALT- IU/l) and aspartate amino transferase (AST- IU/l) were carried out by routine standard methods in use .

RESULTS AND DISCUSSION

The hematological values are presented in Table 1. The mean values of Hb and TEC, were significantly lower (P<0.05) in ticks/fleas/lice infestation, mange infestation and bacterial dermatitis affected dogs as compared to healthy control. The decrease in Hb in the affected animals was probably due to decrease in total erythrocytes as a result of blood loss due to blood sucking behavior of ectoparasites causing anaemia in the affected host. This was in accordance with Jani *et al.* (2004) who reported canine cases of parasitic dermatitis had significantly (P<0.05) lower Hb and TEC. Nair and Nauriyal (2007) documented significantly lower average Hb and TEC in pyoderma, demodicosis and arthropod reaction. Uysal (2001) found significant variation in erythrocyte counts in mange affected dogs. Sharma (2002) reported that there was no difference in values of TEC in fungal dermatitis affected dogs and healthy dogs.

Table 1 Hemogram (Mean±SE) of healthy and dermatotic dogs

Parameters		Healthy control (A) (n=6)	Ticks/Fleas/Lice infestation (B) (n=18)	Mange ((n=18
Hb (g/dl)		15.034±0.39	10.52±0.37*	9.26±0.
PCV (%)		45±1.73	29.23±1.32*	30.78±0
TEC(10^6/cumm)		7.94 ±0.42	5.59±0.20*	5.47±0.
TLC (10^3/cumm)		11.23±0.88	16.93±0.29*	19.71±0
DLC (%)	N (%)	70.17±2.69	66.84±0.95^{ns}	78.94±0
	E (%)	4.84±0.31	10.28±0.34*	10±0.3
	L (%)	20.5±2.78	16.34±1.0^{ns}	8.89±0.
	B (%)	0.5±0.23	0.62±0.12^{ns}	0.33±0.
	M (%)	4±0.25	3.95±0.34^{ns}	1.83±0.

* : Significant (P<0.05)

ns : Non significant (P<0.05)

The mean values of TLC (thousands/µl) increased (P<0.05) significantly in all the dermatoses affected groups in comparison with healthy control. The leucocytosis may be explained as an allergic reaction caused by the mites and their products, inflammatory reactions or stress of parasitism in affected dogs (Shah, 1994). In case of pyoderma, neutrophilia (Jain, 1986) and in ectoparasite infestation, eosinophilia might have contributed to leucocytosis. Stress may also be a possible reason (Scott and Paradis, 1990). Biswas and Roy (2005) also documented significant higher TLC in mange affected dogs. Nair and Nauriyal (2007) observed statistically significant leukocytosis in pyoderma.

Determination of DLC revealed neutrophilia (P<0.05) in mange and bacterial dermatitis affected dogs, and a non significant alteration in ticks/fleas/lice infestation and mycotic dermatitis affected dogs as compared with healthy control. Neutrophilia could have been produced to combat infection

(Jain, 1986). In cases of mange, secondary bacterial infection might have accounted for the increased neutrophil count. Further, eosinophilia (P<0.05) was observed in ticks/fleas/lice infestation and mange. Large number of mites representing a highly significant antigen concentration and the consequent antigen antibody reaction may account for the eosinophilia (Sharma, 2002). Lymphopenia (P<0.05) was observed in mange and bacterial dermatitis affected dogs. There could have been infiltration of lymphocytes between the crust and the underlying malphigian layer of the skin in dermatoses and this might have possibly lead to reduction in circulating lymphocytes. Patel *et al.* (2005) reported demodicoses affected dogs showed leukocytosis accompanied by neutrophilia, eosinophilia and lymphopenia. Nair and Nauriyal (2007) found neutrophilia in cases of pyoderma and eosinophilia in scabies, demodicosis and arthropod reaction

Table 2 Biochemical Profiles (Mean±SE) of healthy and dermatotic dogs

Parameters	Healthy control (A) (n=6)	Ticks/Fleas/Lice infestation (B) (n=18)	Mange (C) (n=18)	Mycotic dermatitis (D) (n=18)	Bacterial dermatitis (E) (n=18)
Glucose (mg/dl)	91.83±4.53	79.72±2.65*	55.56±2.30*	95.94±2.57^{ns}	113.89±2.37*
Total Protein (g/l)	67.25±0.47	72.69±0.67*	79.48±1.23*	80.19±0.52*	68.84±0.57^{ns}
Albumin (g/l)	33.64±0.59	26.34±0.67*	26.45±0.58*	25.19±0.25*	33.72±0.46^{ns}
Globulin (g/l)	33.61±0.95	46.35±1.02*	53.02±1.51*	55.00±0.64*	35.11±0.40^{ns}
A:G ratio	1.07±0.04	0.57±0.02*	0.51±0.03*	0.46±0.01*	0.96±0.02^{ns}
ALT (IU/l)	58.66±5.25	62.55±2.09^{ns}	98.83±2.03*	63±2.49^{ns}	63.28±3.61^{ns}
AST (IU/l)	47±2.62	43.11±1.98^{ns}	78.44±2.47*	42.11±1.79^{ns}	53.94±1.89^{ns}

* : Significant (P<0.05)

ns : Non significant (P<0.05)

No significant difference (P<0.05) could be observed in basophil per cent. The monocyte showed non significant differences (P<0.05) in cases of ticks/fleas/lice infestation, dermatomycoses and bacterial dermatitis. There was significant decrease in monocyte count in mange affected dogs which may be due to the need for the removal of tissue debris brought about by the activity of mites.

Significantly lower (P<0.05) values of PCV in ticks/fleas/lice infestation and mange affected dogs might be due to decrease in TEC. In dermatomycoses and bacterial dermatitis, the values were non significantly different. The mean values of biochemical parameters are presented in Table 2. The dogs suffering from ticks/fleas/lice infestation and mange revealed significantly reduced (P<0.05) glucose levels which is in accordance with the reports by Jani *et al.* (2004). The serum glucose was found to be significantly higher (P<0.05) in bacterial dermatitis.

Mean values of serum total protein and globulin increased significantly (P<0.05) in all the etiological groups except pyoderma affected group. The increase in globulins might be due to stimulating effects of the products of tissue breakdown and/or superimposed infections, which are very commonly encountered in the skin infections (Sharma, 2002). Beta globulins increases in case of chronic skin infections, whereas gamma globulins reflect the response of reticulo endothelial system to various antigens (Benjamin, 2010). Gupta and Prasad (2001) reported a significant increase in total proteins in both mange and scabies. Udayasree *et al.* (2006) reported no significant difference

in total protein in healthy and pyoderma affected dogs.

Albumin and A:G ratio reduced significantly (P<0.05) in acariasis and fungal dermatitis affected dogs. The decrease in albumin may be due to increased protein catabolism due to stress conditions caused by various infections. Patel *et al*. (2005) also found significantly reduced serum albumin in demodicosis affected dogs. A:G ratio could usually alter by a decrease in albumin and/or an increase in globulins.

The activity of serum enzymes ALT and AST was significantly elevated (P<0.05) in mange affected dogs however non significant increase in ALT activity was observed in all groups. The increased liver specific enzymes were attributed to the hepatic damage caused by the toxic by products of tissue breakdown. However, no significant alteration could be observed in serum AST enzyme acitiviy in groups B (ticks/fleas/lice infestation) and group D animals. Mycotic and bacterial dermatitis affected groups. Patel *et al.* (2005) found that in dogs affected with generalized demodicosis, alanine aminotransferase values were significantly higher. This enzyme is specific for hepatocellular damage in the dog.

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