Prevalence of Canine Dermatomycosis: Haemato-Biochemical Changes in Infected Dogs

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Abstract:

A study was conducted to find out the changes in haematolgical and biochemical parameters of dogs infected with dermatomycosis. Low level of haemoglobulin was recorded in infected animals. Clinical illness and discomfort in dermatomycosis infection lead to reduced food intake which caused low level of haemoglobin content. Mean values of albumin, globulin and A/G ratio of infected group were significantly higher (P<0.01) from that of control group. This increased serum protein may be due to inflammatory response produced by dermatophyte infection.

Key words: *Hematology, Biochemical, Dermatomycosis and Dogs*

Introduction

Dermatomycosis is a common disease of dog caused by keratinophilic, filamentous fungi belonging to the genera Microsporum, Trichophyton and Epidermophyton. This study reports the changes in haematological and biochemical parameters of dogs infected with dermatomycosis. These parameters of dermatophyte infected animals were evaluated statistically by comparing with that of healthy control animals.

Materials and Methods

From April 2003 to March 2004, dogs presented to University Veterinary Hospitals, COVAS, Kerala with the skin infection suggestive of dermatomycosis formed the experimental animals for the study. Skin scrapings were collected from the experimental animals for direct examination of arthrospores. Hairs were plucked from the periphery of the lesions aseptically after cleaningthe area with 70 per cent alcohol and drying as described by Muller and Kirk (1969) and Quinn *et al*. (1994). Totally 94 dogs were positive for arthrospores during the period of one year. From the positive animals three ml of blood was collected from cephalic or saphenous vein in a clean dry sterile vial with 3 mg of EDTA for the estimation of Haemoglobin, total RBC, total WBC and PCV. A drop of blood was placed on a clean glass slide and a thin smear was drawn for differential leucocytes count (Benjamin, 2001). For the blood glucose estimation, three ml of blood was collected in a vial containing sodium fluoride (10 mg per ml of blood) and plasma was separated from RBCs as soon as possible.

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Three ml of blood was collected in a clean dry syringe for separating serum for biochemical analysis. Sera collected were stored at - 200 c until further use. Blood, blood smear and sera were also collected from the healthy 9 control animals.

Haemoglobin was estimated using acid hematin method as described by Platt (1979). Packed cell volume of the sample was read by Wintrobe method and total leucocyte counting was done by using Hemocytometer and Thomas fluid (Benjamin, 2001). Erythrocytes were counted using Hemocytometer and Hayem's fluid as detailed by Wintrobe *et al.* (1981). Differential count was carried out by the method described by Meinkoth and Clinkenbeard (2000).

All biochemical estimations were done by Spectrophotometry in Merck 200 Spectrophometer. Reagents and standards of Agappe's Diagnostics, Maharashtra, were used. Blood glucose was estimated by using glucose oxidase method in Agappe's kit as described by Sacks (2001). Cholesterol oxidase peroxidase method was utilised for cholesterol estimation in enzymatic colorimetric method (Bruss, 1997). Creatinine was estimated by using Jaffe method of analysis by (Newman and Price, 2001). The total protein concentration of the sera was determined by direct Biuret method (Gormall *et al.*, 1949). Albumin concentration of the sera was determined by Bromocresol green method (Doumas *et al.,* 1971). Globulin concentration was derived from known total protein and albumin values. The A/G *r*atio was calculated.

Results and Discussion

The results of haematological parameters of dermatophyte infected group with that of control group is given in Table.1.

Table-1 Haematological parameters of dermatophyte infected group with that of control group

Haematological Parameters	Mean values+ SD		t values
	Infected group n = 94	Control group n = 9	
Haemoglobin (g/dl)	11.986 + 0.725	13.356 + 0.639	5.4646**
Packed cell volume (Per cent)	35.979 + 2.342	36.889 + 1.269	5.1465NS
Total Erythrocyte count (106 /mm3)	5.977 + 0.609	6.244 + 0.461	0.2026NS
Total leucocyte count (103/mm3)	12.841 + 0.633	14.367 + 0.464	7.0414**
Neutrophils (Per cent)	62.979 + 6.411	62.333 + 1.871	0.7107NS
Lymphocytes (Per cent)	26.181 + 5.935	28.333 + 3.742	1.0651NS
Eosinophils (Per cent)	6.660 + 1.992	5.778 + 1.563	1.2883NS
Monocytes (Per cent)	4.128 + 1.497	3.333 + 2.121	0.1465NS

n =Number of animals in each group
** - Significant variation (P<0.01)
NS - Non significant variation

Infected group had significantly lower mean values of haemoglobin content and leucocyte count (11.986 + 0.725 g/dl and 12.841 + 0.633 103/mm3, respectively) when compared to the respective mean values of control animals (13.356 + 0.639 g/dl and 14.367 + 0.464 103/mm3 respectively), whereas not much variation was noted in other haematological parameters such as total erythrocyte count, packed cell volume and differential count from that of control group and values of both the groups were within the normal range. These findings correlate well with findings of Wilkinson (1979), Ibrahim *et al.* (1984) and Remi *et al* . (2012). Wilkinson (1979) revealed that moderate hypochromic microcytic anaemia and mild leucopenia were evident with multiple dermatophyte infections in dogs. Ibrahim *et al.* (1984) stated that ringworm infected animals had significantly low haemoglobin level. Remi *et al.* (2012) reported that no significant difference occur in the mean PCV, total RBCs and , neutrophils. So in this present study, the reason attributed for leucopaenia and low haemoglobin could be due to less food intake caused by clinical illness and discomfort in mycotic infections. On the other hand, Koshla *et al*. (1989) reported no significant changes in total erythrocyte count, packed cell volume and differential count in experimental *M. canis* infection. Biochemical parameters of infected and control groups are presented in Table 2.

Table-2 Biochemical parameters of dermatophyte infected group with that of control group

Biochemical parameters	Mean values+ SD		t values
	Infected group n = 94	Control group n = 9	
Blood glucose (mg/dl)	101.106 +19.378	105.222 + 11.032	0.6257 NS
Cholesterol (mg/dl)	82.138 + 10.552	78.00 + 8.216	1.1419NS
Creatinine (mg/dl)	0.981 + 0.227	0.944 + 0.167	0.4754NS
Total protein (g/dl)	10.842 + 1.161	6.633 + 0.568	16.6901**
Albumin (g/dl)	4.777 + 0.776	3.167 + 0.245	14.0790**
Globulin (g/dl)	6.066 + 0.995	3.467 + 0.442	14.4816**
A/G ratio	0.796 + 0.111	0.925 + 0.126	3.2996**

n=Number of animals in each group
**- Significant variation (P<0.01)
NS – Non significant variation

Infected group had low mean blood glucose level and creatinine compared to the mean value of control group, but mean value of cholesterol of infected group was slightly higher than that of control group. However, statistical analysis showed that no significant variation (P>0.05) in blood glucose, creatinine and cholesterol

between the two groups. Mean values of albumin, globulin and A/G ratio of infected group were significantly higher ($P<0.01$) from that of control group. Higher albumin and globulin contents of infected group themselves indicated a higher content of total protein in infected animal (10.842 + 1.161 g/dl) which was significant ($P<0.01$) from the total protein content of control group (6.633 + 0.568 g/ dl). Similar findings recorded by Shakir *et al.* (1996) and Aujla *et al.* (1999) where globulin content was higher in skin disorders and mycotic infection. This increased serum protein may be due to inflammatory response produced by dermatophyte infection. The antigens were trapped in epidermis by Langerhan's cells, which were the prominent antigen presenting cells of the skin immune system and presented the antigens to T-lymphocytes. Gudding and Lund, (1995) stated that migration of antigen presenting cells was initiated by cytokines and this leads to dense infiltration of inflammatory cells in infected area and subsequent increase in serum protein content. The serum biochemistry estimation was only used for identifying an underlying problem, which might be a contributing factor in the development of disease, and not for the diagnosis of disease.

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