DIAGNOSTIC SIGNIFICANCE OF HAEMATOBIOCHEMICAL CHANGES IN CANINE DERMATITIS

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Cutaneous bacterial infection is one of the most common causes of skin diseases in dogs. Dermatological disorders constitute a majority of cases (Scott and Paradis, 1990). Diagnosis of bacterial pyoderma is often confusing because the condition can be secondary to other integumentary conditions such as atopy, flea bite allergy, mites infestation, nutritional and hormonal imbalances as well as other systemic disorders. The haematological, serum biochemical and serum mineral status of affected dogs may be valuable attributes to identify underlying problems which might be contributing factors in the development of the disease. The present study was undertaken to record the haematobiochemical changes in cutaneous bacterial dermatitis in dogs.

Materials and Methods

The present study was carried out in the Department of Veterinary Medicine Ethics and Jurisprudence, Faculty of Veterinary and Animal Sciences. The dogs presented to Teaching Veterinary Clinical Complex, Dog Ward, (Belgachia) with the clinical signs suggestive of bacterial dermatitis were included in the study. Blood samples from these dogs as well as from five apparently healthy dogs for control study were collected for haemato biochemical studies processed. Haematological examination of the Blood samples for different parameters viz. haemoglobin, packed cell volume, total erythrocyte count, erythrocytic sedimentation rate, total leukocyte count, neutrophil, lymphocytes, monocytes and eosinophils studies as per standard method (Schalm *et al*.,1986 and Jain, 1993). Biochemical estimation of serum globulin, total protein, albumin, cholesterol and blood glucose was carried out using available kit. Serum calcium, iron, copper, zinc was estimated using atomic spectrophotometer. The average value of each parameter in the infected case of dermatitis was compared with the corresponding mean of control healthy dogs. The statistical analysis of data was done as per the standard methods (Snedecor and Cochran, 1994).

Results and Discussion

The mean values of the haemoglobin (Hb), packed cell volume (PCV) and total erythrocytes count (TEC)were 12.12 ± 0.022 g%, 34.89 ± 0.116 % and 5.87 ± 0.054 × $10^6/mm^3$, respectively which were significantly lower as compared to mean values of healthy control group of corresponding values Hb(13.49 ± 0.022 g%), PCV(36.54 ± 0.026 percent) and TEC(6.22 ± 0.008 × $10^6/mm^3$) as depicted in Table no.1.These findings collaborated with the findings of Prathiba(2000).

Table 1.Mean values of haematological parameters in infected and control group dogs:

Haematological parameters	Mean values ± SE	
	Control (n=5)	Infected (n=15)
Haemoglobin (g%)	13.49 ± 0.022	12.12 ± 0.022

Packed cell volume (%)	36.54 ± 0.026	34.89 ± 0.116
Total erythrocyte count ($10^6/mm^3$)	6.22 ± 0.008	5.87 ± 0.054
Erythrocytic sedimentation rate	5.25 ± 0.048	7.23 ± 0.081
Total leukocyte count ($10^3/mm^3$)	14.34 ± 0.010	16.14 ± 0.079
Neutrophil (%)	62.49 ± 0.174	71.33 ± 0.274
Lymphocytes (%)	28.00 ± 0.447	24.46 ± 0.306
Monocytes (%)	3.93 ± 0.084	1.19 ± 0.153
Eosinophils (%)	5.57 ± 0.375	3.00 ± 0.254

Present findings indicated anaemia in diseased dogs and could be explained with significantly lower copper values in infected animals obtained in serum mineral estimation (Maynard *et al*., 1979). The significantly lowered haemoglobin value noticed in Pyoderma cases observed in the present study concur with the findings of Pal(1991).

Mean value of total leukocyte count (16.14 ± 0.079 × $10^3/mm^3$) significantly increased in infected group as compared to mean value (14.34 ± 0.010 × $10^3/mm^3$) of healthy animals. Significantly higher average of total leukocyte count value in the present study is in close agreement of earlier report of Larsson *et al*. (1996) and Aujla *et al*. (1997). Stress of dermatitis and bacterial toxins have been suggested as possible reasons to cause mark reduction of total leukocyte count (Aujla *et al*. (1997).

The mean value of erythrocyte sedimentation rate of dogs showing bacterial dermatitis had significantly increased (7.23 ± 0.081) compared to healthy control (5.25 ± 0.048) animals. This finding is corroborated with the findings of Sreegeetha Nair and Nauriyal, (2007). Higher erythrocyte sedimentation rate value may be due to inflammatory and necrotic changes associated with the condition. Such changes result in alteration of surface protein induced changes in RBC that cause them to aggregate and settled more rapidly than normal RBCs (Fischback,1984).

The mean value of neutrophils count was significantly higher in infected group (71.33 ± 0.274 %) as compared to healthy animals (62.49 ± 0.174 %). The Statistically significant neutrophillia in certain bacterial dermatitis has been recorded by Pal *et al*. (1991) and Soni (1991). This may be attributed to the cell injury which in term causes release of substances such as leukotoxins and leucocytosis promoting factors from blood into the injured area resulting in release of more neutrophils in the blood stream. The pyoderma causes stressful stimuli to the animals which in turn may cause decreased lymphocyte count along with neutrophillia.

In the present study blood glucose level was significantly low in infected animals (88.14 ± 0.387 mg/dl) as compared to healthy control animals (104.25 ± 0.020 mg/dl) and the cholesterol level was significantly high in infected animals (92.35 ± 0.348 mg/dl) as compared to healthy control animals (78.00 ± 0.143 mg/dl) as depicted in Table -2 . The findings are in agreement with Gowda *et al*.(1982) and Shyma and Vijaykumar, (2011) who also observed hypercholesterolaemia and hypoglycaemia in bacterial infection in dog.

Table 2. Mean value of biochemical parameters in infected and control group dogs.

Biochemical parameters	**Mean values ± SE**	
	Control (n=5)	**Infected (n=15)**
Blood glucose (mg/dl)	104.25 ± 0.020	88.14 ± 0.387

Cholesterol (mg/dl)	78.00 ± 0.143	92.35 ± 0.348
Total protein (g/dl)	6.54 ± 0.031	7.82 ± 0.071
Albumin (g/dl)	4.36 ± 0.019	3.19 ± 0.032
Globulin (g/dl)	2.18 ± 0.011	4.63 ± 0.032

Mean values of serum iron, copper, zinc, and calcium are depicted in Table – 3. The mean value of Iron, Copper, Zinc, and Calcium were 232 ± 3.473 µg/dl, 58 ± 1.084 µg/dl, 242 ± 4.537µg/dl and 12.10 ± 0.111 mg/dl respectively in infected group.

Table 3. Serum mineral status of infected and control group dogs.

Minerals	Mean values ± SE	
	Control (n=5)	Infected (n=15)
Calcium (mg/dl)	10.13 ± 0.041	12.10 ± 0.111
Iron (µg/dl)	106. ± 0.349	232 ± 3.473
Copper (µg/dl)	114 ± 1.017	58 ± 1.084
Zinc (µg/dl)	51 ± 0.612	242 ± 4.537

The mean value of calcium was substantially high in infected group as compared to control group. The mean value of iron 232 ± 3.473 µg/dl was significantly high in infected groups compared to control group value 106 ± 0.349 mg/dl. Mean value of copper in infected and control group was 58 ± 1.084 µg/dl and 114 ± 1.017 µg/dl respectively which indicate the significant decrease of copper level in infected group. These finding were in accordance of Pal *et al*. (1995), Mathews (1999), Udayasree (2004), Shyma and Vijaykumar (2011).

Mean value of zinc in infected group 242 ± 4.537 µg/dl was significantly higher than the control groups 51 ± 0.612 µg/dl. The mineral status of dermatitis dogs in the present study indicates higher level of zinc and iron levels which in turn interfere the absorption process of copper (Underwood, 1981) in the body and as a result of such the levels of copper decreased significantly in the present study. The decrease of copper may be associated with lower level of Haemoglobin.

Mean values of total protein, albumin and globulin in infected animals were 7.82 ± 0.071, 3.19 ± 0.032 and 4.63 ± 0.032 which significantly changed as compared to healthy animals values of 6.54 ± 0.031, 4.36 ± 0.019 and 2.18 ± 0.011 g/dl respectively. The values of albumin were significantly lower and the total protein, globulin were higher than the healthy animals which is in agreement with Mason (1991), Shyma and Vijayakumar (2011). They also reported hypergammaglobulinaemia and hypoalbuminaemia in dogs affected with bacterial dermatitis. A mild increase in total protein value in the present investigation might be due to increased inflammatory response assorted with bacterial infections. This finding corroborated with the findings of Shyma and Vijayakumar (2011).

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