HAEMATOBIOCHEMICAL CHANGES ASSOCIATED WITH CUTANEOUS VASCULITIS IN DOGS

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Abstract

The present study documents the haematological and serum biochemical parameters in cutaneous vasculitis in dogs. Cutaneous vasculitis is the inflammation of blood vessels of dermis and subcutaneous tissue. Blood samples were collected from the ten cutaneous vasculitis positive animals and subjected for haematobiochemical estimations. Haematological parameters revealed anaemia, granulocytosis and increased erythrocyte sedimentationrate.Serumbiochemistryrevealed hypoalbuminaemia, hyperglobulinaemia with normal total protein concentration.

Key words: *Vasculitis, Cutaneous vasculitis, anaemia, hypoalbuminaemia, hyperglobulinaemia.*

Vasculitis is the inflammation within the vessel wall resulting in destruction of architecture of blood vessel leading to altered blood flow and ischemic injury to the recipient tissues (Morris and Beale, 1999). It can be either primary process or secondary to the other pathological conditions like infection and malignancies (Takeuchi and Abe, 2002) Inflammation of the blood vessels of dermis and subcutaneous tissue was called cutaneous vasculitis (Gota and Calabrese, 2013).

Cutaneous vasculitis is a type of small vessel vasculitis. Dermatological manifestations of cutaneous vasculitis are urticaria, pupura, haemorrhagic vesicles, nodules, ulcers, infarcts, erythema and punched out ulcers (Carlson, 2010). Diagnosis of vasculitis is difficult. Histopathology is the confirmatory diagnostic technique for cutaneous vasculitis. The present paperdocuments the haematological and serum biochemical alterations in cutaneous vasculitis in dogs.

Materials and methods:

Blood samples collected from 10 histopathologically confirmed cases of cutaneous vasculitis in dogs and from ten apparently healthy dogs formed the material for the study.

About 2 millilitre of blood was collected by using ethylene diamine tetra-acetic acid coated vacutiners for estimation of haemoglobin (g/dl), volume of packed red cells (%), total erythrocyte count (10^6/µl), total leukocyte count (10^3/µl), platelet count (10^3/µl), differential leukocyte

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count (%) with the help of automatic animal blood cell counter using standard techniques as described by Schalm *et al.* (1975).Erythrocyte sedimentation rate (mm/hr) was estimated by Wintrobe method as described by Schalm *et al.* (1975)

About four millilitre of blood was collected in a clot activator vacutiner and centrifuged to 3000rpm for 15 minutes. Serum was separated for estimation oftotal protein, albumin, globulin and albumin:globulin ratio using semiautomatic biochemical analyserErba Mannheim Chem-5 Plus V_2, Transasia Biomedicals Ltd, Mumbai

The data obtained were analysed by using computer software SPSS version 24.0 Comparison between diseased and control group was done by independent sample t- test (Kaps and Lamberson, 2009).

Results and Discussion:

Mean values of haematological and serum biochemical parameters of diseased and control group are presented in Table 1 and Table 2 respectively.

Important haematological changes noticed were low haemoglobin concentration and low total erythrocyte count, granulocytosis and increased erythrocyte sedimentation rate in diseased group compared to apparently healthy dogs. Anaemia observed in the present study agrees with the findings of Hayes *et al*. (1989), Dahlberg *et al.* (1989) and Cuellar and Espinoza (2000) who observed normochromic normocytic anaemia in patients with vasculitis. Anaemia in vasculitis might be due to underlying diseases and also due to vessel damage as suggested by Affolter(2004).

All the cutaneous vasculitis positive dogs showed elevated erythrocyte sedimentation rate compared to apparently healthy animals. These findings were in accordance with Sanchez *et al.* (1982) reported increased erythrocyte sedimentation rate in patients with urticarial vasculitis. Dahlberg *et al.* (1989) reported increased level of erythrocyte sedimentation rate in human patients with systemic necrotising vasculitis.

Table 1. Haematological parameters in dogs suffering from cutaneous vasculitis

Sl. No.	Parameters	Diseased group n = 10	Apparently healthy group n = 10	*p*– value
1	Haemoglobin (g/dl)	9.26±0.88	12.56±0.26	0.002**
2	Volume of packed red cells (%)	26.27±2.02	31.37±0.75	0.03
3	Total erythrocyte count ($\times10^6$/µl)	4.29±0.27	5.44±0.13	0.002**
4	Total leukocyte count ($\times10^3$/µl)	17.62±2.54	13.93±0.67	0.17
5	Lymphocytes (%)	20.78±1.96	25.32±0.88	0.05
6	Monocyte (%)	6.21±0.35	7.38±0.72	0.16
7	Granulocyte (%)	73.01±2.10	65.84±1.38	0.01**
8	Platelet count ($\times10^3$/µl)	322.50±63.729	244.00±19.04	0.2
9	Erythrocyte sedimentation rate (mm/hr)	21.20±3.58	4.5±0.543	00**

** Significant at 1% level

Table 2. Serum biochemical parameters in dogs suffering from cutaneous vasculitis

Sl. No.	Parameters	Diseased group n = 10	Apparently healthy group n = 10	*p* – value
1	Total protein (g/dl)	6.20±0.13	5.7±0.13	0.2
2	Albumin (g/dl)	2.73±0.244	2.99±0.13	0.3
3	Globulin (g/dl)	3.47±0.30	2.77±0.28	0.1
4	A:G ratio	0.89±0.16	1.77±0.13	0.2

Total leukocyte count was higher in diseased animals when compared to apparently healthy animals, though the difference was not statistically significant. Granulocyte percentage was higher compared to apparently healthy group with statistically significant difference. This agrees the findings of Brooks (1984), who reported an elevated leukocyte count in dogs with vasculitis.Gaisbuer *et al*. (2014) also observed moderate leukocytosis in cat with immunological deep dermal vasculitis. This elevated leukocyte count might to due to infection with other underlying disease conditions.

Total protein, albumin, globulin and albumin:globulin ratio of diseased and apparently healthy group are presented in Table 2. Though there was no statistically significant difference for these biochemical parameters between two groups, albumin concentration was low and globulin concentration was high in diseased group. Hypoalbuminaemia and hyperglobulinaemia were reported in cutaneous vasculitis by Brooks (1984), Hayes *et al.* (1989) and Gaisbuer *et al.* (2014). The authors reported that hypoalbuminaemia might be due to dermal vascular inflammation along with anorexia and loss of protein from the skin.

The haematobiochemical changes in the cutaneous vasculitis in dogs were anaemia, granulocytosis,increased erythrocyte sedimentation rate, hypoalbuminaemia and hyperglobulinaemia compared to healthy control animals.

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