HAEMATO-BIOCHEMICAL CHANGES IN SHEEP SUFFERING FROM GASTROINTESTINAL PARASITISM

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ABSTRACT

Present study was carried out to assess the effect of gastrointestinal parasitism on haematological and biochemical parameters in sheep. Faecal samples from 68 sheep were collected, out of which 30 samples were found positive and 20 negative, which were used as control for the study. Results indicated that there was decrease in haemoglobin, packed cell volume, total erythrocyte counts, total serum protein, albumin and albumin-globulin ratio. However,the level of neutrophils, total eosinophil count, total leucocyte count, lymphocytes, and globulin increased significantly in the infected sheep. Nonetheless, monocytes, eosinophils, basophils, cholesterol, creatinine were not significantly different between the control and infected animals.

KEYWORDS : Gastrointestinal parasitism (GIN), haematological, biochemical, sheep, leucocyte.

INTRODUCTION

GIN is a major threat and a primary constraint to sheep productivity, it endangers animal welfare worldwide (Tariq *et al.,* 2010).The production system enables animal infection by endoparasites, which is the main obstacles for the development of industry and is responsible for considerable economic losses (Manoel *etal.,* 2014). Serum biochemistry and haematological analysis have been found to be important and reliable means for assessing an animal's health status and might give an indication of the degree of damage to host tissue as well as severity of infection (Otesile *et al*., 1991).Haematological profiles respond to parasite infection as a direct result of parasite-induced blood and energy losses, up-regulation of host immunity in response to infection, and even the repair of collateral damage caused by host immune mediators (Colditz, 2008). The present investigation was to evaluate the effect of gastrointestinal parasitism of nematodes on haemato-biochemical profile in sheep.

MATERIALS AND METHODS

In a herd of 68 sheep with an average age of 2-4 years, 37 positive cases for gastrointestinal parasitism was recorded, among them 30 animals were selected for the study, served as infected (group 2), the 20 apparently healthy animals were used as control (group 1). Blood samples from both the groups were collected in a dry vacutainer, in morning hours before the animals were fed and watered and was immediately processed for serum separation. For biochemical analysis the clear serum was separated and kept at -20^{0}C. The blood samples were subjected for examination as per the methods described by Jain (1986) and total eosinophil count by method of Darnody and Davenport (1958). Biochemical analysis of serum samples was done to estimate total serum protein, albumin, albumin-globulin ratio and total serum cholesterol by using a Semi-Auto Chemistry Analyzer: model BA 88A (manufactured by Shenzhen Mindray Biomedical Electronics Ltd., China. Suppliers-Hospimed Diagnostics, Bangalore). The data obtained were analyzed statistically (Snedecor and Cochran, 1986).

RESULTS AND DISCUSSION

From the results of the present study it is revealed that there was significant reduction in Hb and PCV % and non significant decrease was noted in TEC and TLC whereas there was a significant increase in total eosinophil count during gastrointestinal parasitism as compared to healthy sheep. Helminthes is the main cause for this decrease in haemoglobin. The significant reduction of RBCs and Hb content might be attributed to the haemorrhagic enteritis associated with coccidiosis**.**The reduction in PCV may be caused due to the acute loss of blood by sucking activity and haemorrhages caused by various parasites (Soulsby, 1986).The decrease in Total Erythrocyte Count could be due to loss of whole blood by the sucking activity of gastrointestinal parasites. Bordoloi *et al*. (2012) studied changes in the haemato-biochemical pattern due to experimentally induced haemonchosis in Sahabadi sheep and results show decrease in Hb concentration, PCV, TEC and serum protein.

Table 1: Haemato-biochemical values in sheep suffering from gastrointestinal parasitism and apparently healthy sheep

Parameter		Apparently healthy sheep (Group 1)	Infected sheep (Group 2)
		Mean ± SE	Mean ± SE
Haematological parameters	Hb (g %)	13.56 ± 0.28	7.87*± 0.64
	PCV (%)	45.20 ± 2.15	38.72*± 1.28
	TEC (million/cmm)	8.67 ± 0.28	6.92 ± 0.52
	TLC (thousands/cmm)	9.72 + 0.83	7.88 + 0.49
DLC	Neutrophils (%)	50.85 + 1.40	52.29 + 0.35
	Lympocytes (%)	44.89 ± 0.53	49.81 ± 0.56
	Monocytes (%)	2.24 ± 0.62	2.87 ± 0.56
	Eosinophils (%)	2.38 ± 0.16	3.21 ± 0.97
	Basophils (%)	0.43 ± 0.49	0.6 ± 0.53
	Total eosinophil count (/µl)	261.5 ± 16.57	483.34*± 15.44
Biochemical analytes	Total serum protein (g/dl)	6.97 + 0.39	6.49 + 0.13
	Albumin (g/dl)	3.78 + 0.24	3.12 + 0.42
	Globulin (g/dl)	3.09 ± 0.12	3.37 ± 0.09
	A:G ratio	1.18 ± 0.23	0.71 ± 0.14
	Total serum cholesterol (mg/dl)	54.37 ± 12.55	55.84 ± 14.63
	Creatinine (mg/dl)	0.89 ± 0.04	1.02 ± 0.07

*Significantly different from base value in group 2 (P?0.05).

NS-Non Significant (P?0.05).

In the present study, the increase in TLC is caused due to an increase in local immune response by eosinophils and also may be due to presence of secondary bacterial infection.The main function of leucocyte is defending the body against microbes and foreign particles. The increase in neutrophils, monocytes and eosinophils are caused due to the phagocytic activity of the cell digesting the particulate matter and debris of parasites as an effect of cell mediated immune responses. Increase in level of lymphocytes is associated with an increase in cell-mediated immunity and antibody-mediated immunity. Leukocytosis and eosinophilia detected in the present study were similar to those previously reported by Ahmed *et al.* (2006).The increase in mean value of total eosinophil count is caused due to increased levels of IgE which mediates degranulation of mast cells and stimulating the release of eosinophil chemotactic factor for anaphylaxis.

The reduction in total protein and albumin and elevated level of globulin might be attributed to the diversion of amino-N and energy from muscle, bone and collagen fiber. This in turn increases the endogenous losses of protein through urinary and faecal excretion. Present results are in conformity with the findings of Pathak and Tiwari(2012), who reported that sheep and kids offered a higher plane of nutrition, able to withstand the pathological effects of nematode infection. Globulin levels increase when there is low blood albumin to counter balance the osmotic pressure. So it is imperative to get high globulin levels in GIN infected animals due to inflammation (Rumosa *et al.,* 2010).

The serum cholesterol concentration and creatinine levels did not differ significantly among groups and was within the normal physiological range for sheep (Boyd, 1984). Present results clearly pointed out that *H. contortus* infection in sheep does not interfere with the normal process of kidney during the experimental period.

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