HAEMATOBIOCHEMICAL CHANGES IN SHEEP AND GOATS DURING NATURAL INFECTION OF *HAEMONCHUS CONTORTUS*

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ABSTRACT

Various haemato-biochemical parameters were estimated during natural haemonchosis in sheep and goats . Significant decrease in the values of haemoglobin percentage, total erythrocyte counts, packed cell volume, lymphocyte percentage, blood glucose and total serum protein values were observed in infected animals; whereas erythrocyte sedimentation rate, total leucocytic counts, neutrophil and eosinophil percentages were increased significantly both in case of infected sheep and goats. Significant rise was also observed in the values of SGOT and SGPT during haemonchosis in both animals.

KEY WORDS : Haemonchosis , Sheep, Goats, Haemato- Biochemical

INTRODUCTION

Haemonchus contortus is highly pathogenic parasite, causes anaemia, hypoproteinemia, oedema, stunted growth and death in small ruminants. Both adult and the fourth stage larvae of *H. contortus* in sheep and goats suck blood of the host and leaving haemorrhagic wound in the abomasal mucosa (Soulsby, 1982). Infected animals also lose a large quantity of serum protein into the gut. *H. contortus* in the abomasums causes interference with digestion and absorption of proteins and other minerals (Sood, 1981) and also altered the activity of certain enzymes. Therefore, present study was conducted to evaluate various haematobiochemical alterations during natural infection of *H. contortus* in sheep and goats.

MATERIALS AND METHODS

In the present study 10 sheep(five infected with *Haemonchus contortus* and five infection free) and 10 goats (five infected with *Haemonchus contortus* and five infection free) were included . Infection free animals served as control .15 ml of blood was collected aseptically from jugular veins of each sheep and goats with the help of separate sterilized disposable syringe. Each blood sample was divided into two equal parts, one part was utilized as whole blood with anticoagulant for estimation of blood glucose and haematological values as per standard methods in routine whereas serum was separated from remaining half of the sample for the estimation of total Serum Protein, Bilirubin, SGOT/AST and SGPT/ALT by standard methods in use .

RESULTS AND DISCUSSION

The mean values of haematological parameters are presented in Table-1. The results on haematological and biochemical observations showed similar trend of variation in most of the values both in sheep and goats during natural infection of *H. contortus*. Statistical analysis of data revealed that there was significant ($P<0.05$) decline in mean values of haemoglobin, Packed cell volume, TEC and lymphocyte percentage of infected groups of animals in comparison to the mean values of healthy control groups. Whereas, there was significant ($P<0.05$) rise in ESR, TLC, neutrophil and eosinophil counts in infected group of sheep and goats as compared to helathy control ones. Value of monocyte count was slightly higher in infected group but the difference was found statistically non-significant. Ghulam *et al.* (1995) also observed similar haematological disturbances with

haemonchosis. Further estimates of basophil and monocyte percentage remained constant with advancement in severity of infection. Present findings are also in close resemblance with the reports of Sharma *et al.* (2000), Rajguru *et al.* (2002) and Lakra *et al.* (2007). Gretillat (1976) observed severe neutrophilia, lymphopenia, monocytosis along with anaemia during gastrointestinal parasitism in Maradi goats of Nigeria.

Table1. Mean ± S.E. of haematological changes in sheep and goat during natural haemonchosis

Parameters	Sheep		Goat	
	Control	Infected	Control	Infected
	Mean ± S.E.	Mean ± S.E.	Mean ± S.E.	Mean ± S.E.
Haemoglobin percentage (gm %)	$11.78^{a} \pm 0.45$	$6.29^{b} \pm 0.31$	$11.08^{a} \pm 0.25$	$6.24^{b} \pm 0.36$
Packed cell volume (%)	$38.00^{a} \pm 1.07$	$19.59^{b} \pm 0.59$	$35.43^{a} \pm 1.17$	$18.86^{b} \pm 0.88$
Erythrocyte sedimentation rate (mm/hrs.)	$0.00^{a} \pm 0.00$	$3.10^{b} \pm 0.26$	$0.00^{a} \pm 0.00$	$3.20^{b} \pm 0.21$
Total erythrocyte count (10^6/mm^3)	$10.14^{a} \pm 0.29$	$7.73^{b} \pm 0.23$	$10.78^{a} \pm 0.06$	$7.17^{b} \pm 0.25$
Total leucocyte count (10^3/mm^3)	$7.37^{a} \pm 0.31$	$15.54^{b} \pm 0.54$	$7.09^{a} \pm 0.28$	$16.88^{b} \pm 0.55$
Lymphocytes(%)	$49.60^{a} \pm 0.76$ (58%)	$26.53^{b} \pm 0.83$ (20%)	$54.59^{a} \pm 0.68$ (66.4%)	$33.32^{b} \pm 0.67$ (30.2%)
Neutrophils (%)	$37.57^{a} \pm 0.74$ (37.2%)	$49.60^{b} \pm 0.52$ (58%)	$32.68^{a} \pm 0.95$ (29.2%)	$45.46^{b} \pm 0.49$ (50.8%)
Eosinophils (%)	$10.88^{a} \pm 0.59$ (3.6%)	$26.97^{b} \pm 0.66$ (20.6%)	$10.51^{a} \pm 0.81$ (3.4%)	$24.93^{b} \pm 0.65$ (17.8%)
Monocytes (%)	$5.55^{a} \pm 1.49$ (1.2%)	$6.70^{b} \pm 0.59$ (1.4%)	$4.40^{a} \pm 1.85$ (1.0%)	$5.55^{b} \pm 1.49$ (1.2%)

Means having different superscripts (row wise) differ significantly (P<0.05)

Figure in parenthesis indicates percentages of original values before Arcsin transformation.

The mean values of the various biochemical studies on the infected sheep and goats with *Haemonchus contortus* have been depicted in Table-2. Analysis of data revealed that significant (P<0.05) reduction in blood glucose level and total serum proteins, whereas significant (P<0.05)

increase in the level of bilirubin, SGOT/AST and SGPT/ALT enzymes were recorded in the infected sheep and goats with *H. contortus.* Reduction in food intake and reduced absorption through injured gut might be responsible for fall in blood glucose level in the present study. Arora *et al.* (2001) and Rajguru *et al.* (2002) also reported hypoglycemia during haemonchosis in small ruminants. Rapid consumption of sugar by parasites at their developing phase and exhaustion of the glycogen reserves of the host body due to worm-load may be responsible for decreased blood sugar level in present study.Significant decline in total serum protein level was evident in both sheep and goats during natural *H. contortus* infection in present study and are also similar with the finding of Brar *et al.* (1991). The present finding also corroborates with the reports of Arora *et al.* (2001) and Rajguru *et al.* (2002), as significant decrease in total serum protein resulting into hypoproteinemia in clinical cases of bursate worm infection in sheep and goats.

Table 2. Mean ± S.E. of biochemical changes in sheep and goat during natural haemonchosis

Biochemical parameters	Sheep		Goat	
	Control	Infected	Control	Infected
	Mean ± S.E.	Mean ± S.E.	Mean ± S.E.	Mean ± S.E.
Blood glucose (mg/ml)	$56.28^{a} \pm 1.49$	$32.32^{b} \pm 2.05$	$57.45^{a} \pm 1.25$	$36.53^{b} \pm 1.50$
Total serum protein (gm/dl)	$6.94^{a} \pm 0.19$	$4.85^{b} \pm 0.29$	$6.95^{a} \pm 0.20$	$4.99^{b} \pm 0.27$
Bilirubin (mg/100ml)	$0.35^{a} \pm 0.05$	$1.08^{b} \pm 0.15$	$0.16^{a} \pm 0.01$	$0.71^{b} \pm 0.14$
SGOT/AST (IU/L)	$72.3^{a} \pm 2.84$	$147.63^{b} \pm 5.34$	$21.36^{a} \pm 1.10$	$100.39^{b} \pm 4.07$
SGPT/ALT (IU/L)	$24.66^{a} \pm 1.17$	$42.26^{b} \pm 2.55$	$21.15^{a} \pm 1.39$	$42.12^{b} \pm 2.42$

Means having different superscripts (row wise) differ significantly ($p<0.05$)

Significant rise in the level of serum enzymes such as SGOT, SGPT and bilirubin during haemonchosis in sheep and goats were also observed in present study. It may be attributed that infestation of parasites usually associated with necrosis in the abomasal mucosa during their blood sucking activity and may be responsible for release of some toxin due to degeneration. The effect of toxemia may be possible reason for mal-function of liver cells. Sharma *et al.* (2001) also analyzed significant increase in SGOT and SGPT in Barbari goats during haemonchosis.

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