

Effect of *Haemonchus contortus* on Haematological Profile and Eye Colour in Sheep

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ABSTRACT

The influence of *Haemonchus contortus* on hematological profile and ocular mucus membrane colour of sheep was studied from March 2005 to December 2005 under controlled condition. Eight local sheep used for the experiment were divided in two groups. Group 1st animals were kept as uninfected control and group 2nd animals were infected orally by L₃ larvae of *Haemonchus contortus*. After the establishment of infection the faecal samples were regularly screened for *Haemonchus contortus* eggs and eyes were examined for mucous membrane colour. Blood samples were collected from both the groups of animals for haematological studies. Low haematocrit values and pale colour of eyes was observed in infected sheep compared to control. Raised ESR, decreased RBC count and Hb values were observed in infected animals corresponding to control.

Key words: Haematocrit; ESR, eye, colour, nematodes

INTRODUCTION

The nematode parasites of the digestive tract of domestic ruminants are having major economic importance. The nematode worms which parasitize the sheep belong to 2 main families (Trichostrongylidae and Strongylidae).

The domestic ruminants are usually parasitized by several species which occupy the different parts of the digestive tract. Among the worms found in sheep *Haemonchus contortus* is blood feeding parasite commonly called Barber poleworm. Haemonchosis is an important cosmopolitan disease of small domestic ruminants caused by *Haemonchus contortus*. *Haemonchus contortus*, a parasitic nematode inhabits abomasae of sheep and goats, causes significant economic losses world wide due to its blood feeding and wandering behaviour (Stoll *et al.*, 1943). Losses occur due to subclinical parasitism through mortalities, reduced production and decreased weight (Ploeger *et al.*, 1990a, b; Ploeger and Kloosterman 1993) decreased milk production (Gross *et al.* 1999) and fertility (Ankers *et al.*, 1998). The worm inhabits in the abomasum of the sheep. Depending on several factors (number of parasites and age of host) the presence of *Haemonchus contortus* worms could lead to clinical diseases characterized by a digestive or an anaemic syndrome which in heavy infections, could sometimes end by the death of host. However, this nematode infection is usually associated with subclinical parasitism including major consequences on animal production. The economic losses due to the parasites have been largely documented in sheep, goats and cattle. Moreover, serious effects on the host reproduction

are also suspected. Several works have well documents the haemtobiochemical changes in small ruminants due to helminth parasites (Kadhim 1976; McGregor *et al.*, 1940 Ayesha *et al.*, 1990 and McDogall *et al.*, 1991). Nematode infection is usually associated with anemia and alteration in other haematobiochemical parameters (Ansari and Ahmad 1989). The state of health of any organism can be expressed by a set of numerical values of its variables. The haematobiochemical parameters in a normal range play a vital role in sustaining life and maintaining good health.

This work was designed to contribute to the understanding of potential alterations at sub-clinical level by observing changes in Hb, PCV, TLC, Total RBC count and ESR.

MATERIAL AND METHODS

Eight local sheep aged below 6 months used for this study were allocated into groups Group 1 served as uninfected control and group 2nd were orally inoculated by infective L₃ larvae of *Haemonchus contortus*. Faecal samples were regularly screened in both the groups. After establishment of infection ocular mucus membrane was investigated in both the groups and blood was collected from each group for haematological analysis. Part of blood was used to make smear on grease free slides without adding an anticoagulant. The DLC slides were stained with Leishman's stain and then observed under microscope. For determining haematocrit, Hb levels, RBC counts and WBC counts, techniques recommended by Blaxhall and Daisley (1973) were employed.

RESULTS

No remarkable differences in haematological parameters were observed in control group whereas decreased haematological values (except ERS) were observed in infected group. Lowest haemoglobin concentration was observed in at 31st day of infection. Statistical analysis showed a significant decrease ($p < 0.05$) of haemoglobin in infected group compared to control. Significant reduction in haematocrit was observed in infected group corresponding to the control being lowest at 31st day of infection. Reduction in haematocrit value observed due to infection was statistically significant ($P < 0.01$). Total serum protein levels observed in infected and uninfected control groups were 4.9 ± 0.6 and $6.7 \pm .52$ respectively. Though the value of total serum protein in infected group was lowest at 29th day of infection. Marked decrease in the total leucocyte count was observed at 27th day of experiment in infected group in comparison to the same day of the control group. Increase in the lymphocytes and eosinophils whereas decrease in neutrophil and monocyte count was observed in infected group over the control. Significant fall in the total RBC count and raised ESR as observed in the present study which coincided with the 4th week of infection. The colour of ocular mucus membrane observed in the infected animals was comparatively paler than uninfected control animals. The results of the various haematological parameters observed during the present study are given in Table 1.

Table 1. Mean and standard deviation of sheep experimentally infected with *Haemonchus contortus*

Haematological values	Uninfected(control)	Infected
Hb(mg)	14.4±2.3	11.75±3.4
PCV(%)	36.6± 3.24	30.3± 4.1
Total serum protein (g/l)	6.7 ± 0.52	4.9± .6
ESR/hr	2.0±.22	8±.63
TLC (10 ³ /mm ³)	9.42±1.6	7.82±1.84
RBC count(10 ⁶ /mm ³)	12.24±2.1	8.95±2.4

DISCUSSION

The present experiment revealed a marked reduction in haematocrit, haemoglobin and RBC count which confirmed the observations of early workers (Misra *et al.*, 1996) who observed decreased values of haematocrit, haemoglobin and RBC counts in lambs in relation to nematode and Paramoistomum infection. The reduced RBC counts, Hb and PCV values in infected group may be attributed to the weekly bleeding of abomasums due to injuries caused by the parasites similar to that described by Abdel (1992) and Ansari and Ahmed (1989). However, marked blood loss in the infected animals is to be attributed to the blood sucking activities of *Haemonchus contortus*. Decreased leucocyte count observed in the present study might be due to the blood loss. Eosinophilia and increased lymphocyte count observed in present investigation is in agreement with the findings of (Ackerman *et al.*, 1981; Baker 1962; Bhat and Sharma 1990) who concluded that Eosinophilia is associated with antigenic stimulation or parasitic burden. Increased lymphocyte count might be due to proliferation of lymphocytes due to excretory secretory product of *Haemonchus contortus*. Decline in total serum proteins in infected animals opposed to control animals was similar to (Kuttler and Marble 1960; Knox *et al.*, 1993) and Raisinghani *et al.*, 1971) who described decrease in the total serum protein values in sheep haemonchosis in lambs. Decrease in total serum proteins observed in the present study may be attributed to haemodilution, a compensatory mechanism for the abomassal haemorrhages caused by the invading larvae, and later on due to loss of large quantities of serum proteins into gut and consequent increased fractional catabolic rate of albumin

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