STUDY ON TICKS AND HAEMOPARASITIC DISEASES OF LOCAL CATTLE IN MALAKAND AGENCY

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ABSTRACT

Ticks infestation and piroplasmosis are serious problems of domestic cattle. The present study was conducted to find out the prevalent species of' ticks and the piroplasms transmitted by these ticks in Malakand Agency (NWFP) Pakistan. The effect of ticks and blood parasites on various blood parameters was also studied. The parameters included: RBC count, WBC count, Haemoglobin (Hb) estimation, erythrocytic sedimentation rate (ESR) and differential leukocytic count (DLC). A total of 80 cattle were selected. Each type was divided into four groups i.e. A. B, C and D. The cattle of group-A were free from any infestation/infection. The animals of group- B were only ticks infested. Animals of group-C were only piroplasm infected and the animals of group-D were infested with ticks and the piroplasms. Each group consisted of 20 animals. Haemotological examination revealed a significant decrease ($P<0.05$**)** in TEC, Hb and TLC in group-B, C and D as compared to group-A. The lymphocytes were decreased from normal in all test groups, significantly. However, neutrophils and eosinophils were increased significantly in test groups as compared to control group (A). The values of erythrocytic sedimentation rate (ESR) showed a significant increase in groups B.C and D as compared to the control group (A). The overall results showed that the effect of mixed infection on haematology was greater than the single infection of ticks or piroplasm.

Key words: Haemoparasitic diseases, pisoplasmosis, Haemoglobin, Erythrocytic sedimentation ratio (ESR), differential lenkocytic count.

INTRODUCTION

There are a number of bacterial, viral, mycotic and parasitic diseases that cause severe damage to the general health and productivity of cattle and result into great economic losses to this industry. Parasitism is one of the major problems adversely affecting the health and productivity of these animals. Parasitic diseases though may not be apparently very serious but losses due to their effects are prominent. Parasitic infestation especially those of ectoparasitic origin *are* the major problems in most countries of the world. Among the parasitic species, ticks are important in human and veterinary medicine. Most of the species of the ticks may act as a vector of serious protozoan infections such as Babesia, Theileria and Anaplasma species.

Ticks occur almost in every country of the world and the losses caused by these ectoparasites to mankind and animals have been known since 400 B.C. In a report published in 1965, it was suggested by U.S.D.A., that the annual losses for cattle production due to tick infestation were estimated as 60 millions dollars (Azmath, 1990).

Malakand Agency is the area of N.W.F.P (Pakistan), where there is a large population of cattle and the ticks remain present on these animals throughout the year. These are not only sucking the blood of these animals but are also responsible for the transmission of various heamoparasitic diseases.

Keeping in view the importance and losses occurring due to ticks and protozoan infections transmitted in cattle, the present project was designed to study the incidence of ticks in local cattle and haemoparasitic diseases transmitted by these ticks.

MATERIALS AND METHODS

The study was conducted to find out the prevalence and taxonomy of ticks and piroplasm. The study population originated from the animals brought to Veterinary Hospitals Batkhela and Jalala and other clinics in Malakand Agency. The animals were brought to the clinics for treatment and Artificial Insemination purposes.

From the study population, a total of 80 cattle were selected (60 infected and 20 healthy). The animals grouped as A, B, C and D. The animals of group-A were free from ticks and piroplasms (control group). The animals of group-B were positive for ticks only. Animals of group-C were positive for piroplasms. The animals of group-D were positive both for the ticks and the piroplasms.

Collection of ticks: While collecting the tick specimens all parts of the body of the host were carefully examined. The ticks were detached from the body of the host with the help of fine and smooth forceps taking all necessary precaution to avoid any damage to the mouth parts of ticks and skin of the *host.* The ticks thus collected were

dropped in glass bottles containing 5% formalin for preservation. These glass bottles were labelled. Information regarding breed, sex and condition of the animal were recorded separately. The specimens were examined and identified in the laboratory.

To record the effect of prevalent species of ticks on haematology of local cattle and effect of haemoparasitic diseases the following parameters were studied.

1. Total erythrocyte count (TEC) (millions per µl).
2. Total leukocyte count (TLC) (thousands per µl).
3. Haemoglobin level (mg/l00 ml).
4. Differential leukocytes count (DLC) (%).
5. Erythrocyte sedimentation rate (ESR).

Blood smear, stock solution of Gemsa's STAIN and staining of blood Smear were made by the method described by Benjamin (1978). A drop of cedar wood oil was placed on the smear and the slide was examined under oil immersion lens of microscope for the presence of piroplasm species and morphology of red blood cells.

Morphological characters of piroplasm of cattle as described by Soulsby (1982) were followed to identify the piroplasm.

RESULTS AND DISCUSSION

The result of the prevalence of tick, piroplasm species transmitted by the ticks and their effect on haemotology as revealed by the study are presented and discussed in the following paragraph.

A total of 794 cases were examined, Out of that 228 cases were found positive for *Rhipicephalus appendiculatus* and *Boophilus inicroplus.* Monthwise prevalence of ticks was recorded. In June, 46 out of 250 (18.4%), in July 64 out of 240 (26.6%) and in August 118 out of 304 (38.8%) cattle were infested by the ticks. Monthwise prevalence for local cattle was 18.2% in June, 26.8% in July and 38.8% in August. The infestation rate was increased with the progress of rainy season. These finding are supported by the finding of Soulsby (1982). The tick species found were *Boophilus microplus* and *Rhepicephalus appendiculatus.*

A total of 794 animals were examined, only 42 (5.2%) were found positive for piroplasm *(Babesia bigemina).* In June the cattle were infected as 1.2%, in July 4.16% and in August 9.5%. The findings of the present study are in line with the findings of study of Mahmood (1994).

Effect of ticks and babesia on haematology: The total erythrocytes count for local cattle were $8.9 \times 10^6 \pm 0.4$, $6.8 \times 10^6 \pm 0.33$, $6.1 \times 10^6 \pm 0.22$ and $5.6 \times 10^6 \pm 0.23$ and $5 \times 10^6 \pm 0.16$ recorded for group A, B, C and D, respectively. The results revealed a significant decrease in the number of RBC in group B, C and D as compared to group-A. There was also a significant difference between group B-C, C-D and B-D ($P<0.05$). Similar observations were made by Breitschwerdt et al. (1983), Harvey et al. (1988), Mahmood (1994) and Haseeb (2001) who diagnosed thrombocytopenia due to piroplasmosis and tick infestation. Our findings correlates with the findings of the above mentioned workers. The reduction in the RBC counts occurred due to blood sucking by the ticks as well as due to destruction of RBC's by the Babesia.

The total leukocytic count for local cattle were $7.2x10^3 \pm 0.32$/cmm, $6.4x10^3 \pm 0.4$/cmm, $5.7x10^6 \pm 0.21$/cmm and $5x10^3 \pm 0.32$/cmm for group A, B, C and D, respectively (Table-2). It was observed that the TLC had a significant difference among the four group ($P < 0.05$). Similar observations were made by Sharma (1979) and Mahmood (1994) and Sultana (1996). They noted a significant decrease in TLC. The results of the above mentioned workers correlate with the findings of the present study (Table-2).

Haemoglobin estimation in local cattle for group, A, B, C and D were recorded as 9.8±0.36 g%, 8.2±0.29 g%, 7.2±0.13 g% and 5.8±0.29 g%, respectively (Table-2). It was observed that a significant difference ($P<0.05$) was present among the groups. Similar results were observed in tick infested and piroplasm positive animals by Harvey et al (1988) and Haseeb (2001). The findings of these workers are in agreement with the present findings.

Erythrocytic sedimentation rate recorded in group A, B, C and D were 2.3±0.3 mm/hr, 5.1±1.6 mm/hr, 8.5±1.2 mm/hr and 13.0±1.5 mm/hr, respectively (Table-2). A significant difference among the groups was noted. Similar observations have been recorded by Benjamin (1978) and Haseeb (2001).

Differential leukocytic count: The details of DLC are given in Table-1. The lymphocytes %age was decreased significantly among the groups (A, B, C and D). The neutrophils showed increase in %age amongst the groups. The eosinophil increased significantly among the groups. There was significant difference ($P<0.05$) from A to all groups and also in between B-C, B-D and C-D.

Similarly basophil were having non-significant difference amongst the groups of cattle.

Table-1: Effect of piroplasm and ticks on mean values of different blood parameters

Groups	Lymphocytes	Neutrophils	Elosinophils	Monocytes	Basophiles
A	62.9±1.3	28.6±1.7	4.9±0.6	2.7±0.7	1.0±0.0
B	59.5±2.6	80.7±3.0	7.1±0.8	1.9±0.3	1.0±0.0
C	51.8±2.0	41.6±2.0	5.6±0.5	1.0±0.0	0.0±0.0
D	54.1±1.5	36.0±1.9	6.9±0.7	1.9±0.3	1.0±0.0

Each group contained 20 animals
Group-A = Non infected, non infested cattle.
Group-B = Tick positive piroplasm -ve cattle.
Group-C = Piroplasm positive ticks negative cattle
Group-D = Ticks positive piroplasm +ev cattle

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