INCIDENCE OF THEILERIOSIS AND ESTIMATION OF PACKED CELL VOLUME, TOTAL ERYTHROCYTE COUNT AND HEMOGLOBIN IN BUFFALOES

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ABSTRACT

A total of 600 animals were selected on the basis of the clinical findings (emaciation, anemia, difficulty in walking, shrinking of neck muscles, difficulty in rising up, sunken eyes, infertility, skin eczema) & presence of ticks on the body. The blood examination of these animals revealed 107 as positive (17.8%) cases of theileriosis. The overall incidence recorded in July 2003 was 15.5%, while in August and September 2003 it was 20.5 and 17.5%, respectively. In Jia Bagga village 18% incidence was recorded in July 2003 while in August and September 2003 the incidence was 22.7 and 19.4. In Jhadoo village the incidence recorded was 14.9% in July 2003 whereas in the months of August and September 2003 the incidence recorded were 18.18 and 16.4 respectively. The incidence in Ghang Sharif village were 13.4%, 21.2% and 16.4% during July, August and September 2003 respectively. A study of hematological parameters showed that in Jia Bagga the mean values of PCV, total erythrocyte count and hemoglobin concentration were 0.18 l/l, 4 $X10^{12}$ and 65 gm/l, respectively. In Jhadoo these values were 0.16 l/l, 3.5 $X10^{12}$ and 69.5 gm/l, respectively and in Ghang Sharif the values were 0.20 l/l, 3.5 $X10^{12}$ and 72.5 gm/l, respectively. The overall mean value of the three hematological parameters namely PCV, total erythrocyte count and hemoglobin concentration were 0.15 l/l, 3 $X10^{12}$ and 64.5 gm/l respectively. Comparison of these recorded values and normal values in buffalo showed that there was marked decrease in the PCV, total erythrocyte count and hemoglobin concentration in buffaloes suffering from theileriosis in union council Jia Bagga District Lahore. The difference between normal and infected animal blood parameter values were found to be statistically significant.

Key words: Theileriosis, packed cell volume, total erythrocyte count, hemoglobin, buffalo.

INTRODUCTION

The role of livestock in rural economy may be realized from the fact that 30-35 million rural population is engaged in livestock raising, having household holdings of 2-3 cattle/buffalo and 5-6 sheep/goat per family which helps them to derive 30-40 percent of their income from it. The animal population of Pakistan in the year 2004-05 consisted of 24.2 million cattle, 26.3 million buffaloes, 24.9 million sheep and 56.7 million goats. Over 70 percent of the population in Punjab is rural and 70 percent of all farms are less than 12 acres in size. The share of Punjab province in livestock population is 46% for cattle, 67% for buffalo, 26% for sheep and 37% for goat.(Livestock Census, 1996).The net foreign exchange earnings from the livestock sector is Rs.53 billion.(Minfal,2005-06). Livestock production is an integrated part of agriculture in Pakistan, playing an important role in the mixed farming system, providing an important part of the dietary protein for the population and contributing substantially to export earnings. Livestock contributes almost 50% to the value addition in agriculture sector and about 11.4percent of the Pakistan's GDP which is higher than the contribution made bt crop sector (47.4 % in griculture and 10.3% in GDP). The livestock production includes milk, beef, mutton, poultry meat, wool, hair, bones, fats. Blood, eggs, hides and skins. According to Ministry of Food, Agriculture and Livestock (Livestock wing) the production of milk was 29438.0, of beef 1115.0 and of mutton was 739.0 thousand tones in year 2004-05. The share of Punjab province in livestock production is 65% for milk, 46% for beef, 33% for mutton. While draft power and dung are indispensable in the Pakistan Farming system, providing a large part of the cultivation, fertilizer and cooking fuel, they are not often included in the monetary accountings. A large number of diseases have been incriminated to affect the production and reproduction potentials of the animal. Protozoan diseases particularly Theileriosis imposes considerable restraints on the buffalo production. Theileriosis in buffalo causes both population and economic losses .Keeping in view the incidence of Theileriosis in union council Jia Bagga, District Lahore an attempt is made to study hematological parameters like packed cell volume, total erythrocyte count and hemoglobin concentration in buffaloes infected with theileriosis for proper understanding of the diseases and to find better methods of diagnosis and control.

MATERIALS AND METHODS

A total numbers of 600 buffaloes of all ages and sexes, 200 each during the months of July, August and September from Jia Bagga, Jhadoo and Ghang Sharif of

union council Jia Bagga, District Lahore during the year 2003. The animals were examined on the basis of clinical signs for the confirmation of theileriosis. Samples were collected from ear vein, after considering normal disinfecting procedures. The samples were processed at Department of Clinical Medicine and Surgery, University of Veterinary and Animal Sciences, Lahore. The smears were made from freshly drawn blood to which no anticoagulant were added, adopting standard technique (James, 1986) and adopting blood smear examination technique (Adam *et al* 1971). The blood films were fixed in the methyl alcohol for ten minutes. They were then stained with Giemsa stain for 30 minutes. (Roy and Kraclce, 1938).The incidence rate was calculated as follows:

Total number of new cases of disease in the area during specified time period.

Total number of buffaloes in the specified population at risk of occurrence of disease over the same period of time.

To analyze the data statistical analysis was done according to the methods of Fisher & Frank (1984).

RESULTS AND DISCUSSION

Two hundred animals each from Jia Bagga, Jhadoo and Ghang Sharif of union council Jia Bagga, District, Lahore were selected on the basis of clinical signs (emaciation, anemia, difficulty in walking, shrinking of neck muscles, difficulty in rising up, sunken eyes, infertility, skin eczema) & the presence of ticks on the body. The clinical picture of diseased animals was not exactly the same as mentioned by Faye *et al* (2001). According to them fever and swelling of lymph nodes are the main clinical findings in bovine theileriosis. Belot *et al* (2001) also mentioned similar findings. Zoli *et al* (2001) studied bovine theleriosis as under recognized disease in cattle. Confirmation of positive samples were carried out after blood examination. A total of 600 samples of blood were taken from buffaloes during the months of July 2003 to September 2003 out of which 107 samples of blood proved to be positive by staining with Giemsa stain method. The overall incidence percentage were calculated as 15.5% in the month of July 2003, 20.5% in the month of August 2003 while in September 2003, it was estimated to be 17.5% on overall basis.

The incidence of infected cases of theleriosis were estimated to be 17.8%. The month wise incidence of cases in village Jia Bagga on the basis of direct blood examination were calculated as 18% in July 2003, 22.7% in August 2003 and 19.4 % in September 2003. Similarly the mean hematological values of packed cell volume, total erythrocyte count and hemoglobin concentration of these positive cases were recorded as 0.18, 4 and 65 respectively.

The month wise incidence of cases in village Jhadoo, on the basis of direct blood examination were calculated as 14.9% in July 2003, 18.18% in August 2003 and 16.4 % in September 2003. Similarly the mean hematological values of packed cell volume, total erythrocyte count and hemoglobin concentration of these positive cases were recorded as 0.16, 3.5 and 69.5 respectively.

The month wise incidence of cases in village Ghang Sharif, on the basis of direct blood examination were calculated as 13.4% in July 2003, 21.2% in August 2003 and 16.4 % in September 2003. Similarly the mean hematological values of packed cell volume, total erythrocyte count and hemoglobin estimation of these positive cases were recorded as 0.20, 3.5 and 72.5 respectively.

The results showed that in July 2003 highest incidence of disease was in the village of Jia Bagga followed by Jhadoo and least in Ghang sharif. During the month of August 2003 the picture changes. The incidence was highest in Jia Bagga, it was lesser in Ghang Sharif and least in Jhadoo. In September 2003 the incidence was still highest in Jia Bagga while it remained same in Jhadoo and Ghang Sharif.

Comparison of overall mean values of PCV, Total erythrocyte count and hemoglobin concentration showed that the values greatly reduced in the infected animals as compared to normal values. These observations were in accordance with those of Geerts *et al* (2001), Madder and Taeymans (2001). According to them the extensive hemorrhages, abdominal ulcers and persistence of parasitic stages in erythrocytes lead to lower hematological values. Madzingira *et al* (2001) studied protein antigen of *Theileria parva* macro-Schizont, immune precipitation with blood picture of diseased cattle. According to them the total erythrocytic count markedly reduced in the animals having the infection. Marcotty *et al* (2001) studied immunization of tropical theileriosis by using infected and experimental methods. They observed that the animals suffered from theileriosis showed anemia and schizogony takes place in the lymphocytes and erythrocytes of the diseased animal.

It may be concluded from the above discussion that Theileriosis prevails in three villages of union council Jia Bagga. The disease was directly associated with the tick infestation. The hematological parameters greatly decreased in the diseased animals. Similar observations were recorded by Speybroeck *et al* (2001). They conducted survey on the prevalence of *Theileria parva* and distribution of *Rephicephalus appendiculatus* during one year period from 1995-1996 in Zambia. They were also of the view that ticks were only source of transmission of infection and linked to vectors. Friedhoff *et al* (2001) reported general anemia and gradual fall in total erythrocyte count, packed cell volume and hemoglobin concentration, a significant increase in total

leukocyte count and enlargement of lymph nodes (the first sign of infection) in cross bred calves infected with Theileriosis in Kenya. In all calves there were lacrimal and nasal secretions. Initially animals were constipated and had mucus covered feaces, this was followed by diarrhoea which resulted in emaciation and weakness. In the last stage of the disease, calves showed laboured respiration, recumbency and depression and all infected animals died. Arshad (2000) reported *Theileria annulata* infection in cross bred animals at Faisalabad with clinical signs of enlarged lymph nodes and spleen, edema of lungs and hemorrhages in the abomasums. Devos *et al* (2002) reported clinical picture in theileriosis. He observed that theileriosis is characterized by a marked anemia. Mahoney and Saal (2004) also observed anaemia in experimentally induced *Theileria annulata* infection of calves in Sudan. According to them red blood cells count, packed cell volume and haemoglobin concentration fall gradually until the chronic phase of the disease indicating clinical anaemia. The absence of haemoglobinuria and the fact that the maximum fall in red blood cells count, packed cell volume and haemoglobin values occurred after peak parasitaemia led to conclude that a factor other than parasitic destruction of the erythrocytes was responsible for anaemia. Blood smears contained many reticulocytes and confirmed the existence of macrocytes, hypochromic anaemia. Goddeeris *et al*., (2004) recorded red blood cells count, total leukocyte count, hemoglobin concentration, packed cell volume and differential leukocyte count for calves carrying *Theileria annulata* infection in Kenya and reported that there were significant differences in total leukocyte count, red blood cell count, hemoglobin concentration and packed cell volume.

The present study revealed a statistical difference between the means of normal values (PCV, Total Erythrocyte count and Haemoglobin) and those of infected animals. There is need for effective chemotherapeutics and chemoprophylactive measures in the control of bovine Theileriosis that is emerging as a prominent infection not only in the project area but also in other parts of district Lahore.

Table 1: Comparison of normal values of PCV, total erythrocyte count and hemoglobin concentration with present findings in buffaloes.

Hematological Parameters.	Normal *		Theileriosis	
	Range	Mean	Range	Mean
PCV (l/l)	0.24 - 0.46	**0.35**	0.10 - 0.20	**0.15**
Total Erythrocyte count($X10^{12}$/l)	5-10	**7.5**	2-4	**3.0**
Hemoglobin (gm/l)	80-150	**115**	29-100	**64.5**

Normal Values* Dorner, J.L. and Hoffman, W.E. (1978).J.Am.Anim.Hosp.Assoc.14,219.

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