

Hematological Data of Healthy and Natural *Trypanosoma evansi* Infected Camels (*Camelus dromedarius*) in Sokoto, Nigeria

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ABSTRACT

Presence of trypanosomes were determined using thick and thin blood smears, and differential centrifugation by the microhematocrit technique. Some hematological parameters were obtained by capillary microhematocrit centrifugation, Sahli and hemocytometer methods in blood samples collected from 100 camels in Sokoto, Nigeria. Fourteen percent of camels were infected with *Trypanosoma evansi*. The mean values for packed cell volume, concentration of hemoglobin and total red blood cell count were relatively lower in *T. evansi*-infected camels, even though these were not statistically significant. A slightly higher but not significant white blood cell counts were observed in the *T. evansi*-infected camels. The mean corpuscular hemoglobin concentration was significantly lower in *T. evansi*-infected camels. However, there was no significant variation in the mean cell volume between the groups.

INTRODUCTION

Trypanosomosis is the most important protozoan disease of camels, caused by *Trypanosoma evansi* (Luckins 1992). The disease is most widespread and serious, occurring in areas where camels are found (Mukasa-Mugerwa 1981; Itard 1989;

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Luckins 1992). Camelid trypanosomosis can be acute, but its usually chronic. It mainly results in wasting, anemia, edema and abortions. Mortality is high in untreated cases (Itard 1981; Luckins 1992).

Blood parameters are important indicators of health status in animals and they are invaluable in diagnosis, treatment or prognosis of many diseases. The packed cell volume (PCV) is most frequently used test to determine the functional state of erythrocytes (Coles 1986). Other tests such as the red blood cell count (RBC) and concentration of hemoglobin (Hb) give the number of circulating erythrocytes and their oxygen carrying capacity respectively. The forementioned parameters are used to calculate the mean cell volume (MCV), mean corpuscular hemoglobin concentration (MCHC) and mean corpuscular hemoglobin (MCH). These are indices for morphological classification of anemia which occur in several disease conditions (Coles 1986).

Camels form part of the livestock resources of Nigeria and occur in the Sudano-Sahel zone. This paper relates the prevalence of trypanosome infection to some hematological parameters of camel in Sokoto, Nigeria.

MATERIALS AND METHODS

Blood samples:

Blood samples were obtained from 100 healthy adult camels reared in Sokoto and environs. These were placed in sample bottle containing ethylene diamine tetra acetic acid (EDTA) and conveyed to the laboratory for immediate examination.

Blood parasitic examination:

Each sample was examined by thick blood smear made from drops of blood on clean glass slides, this was spread, air dried and stained with dilute Giemsa. Thin blood smears on glass slides were made, fixed in methylalcohol and stained with Giemsa. The differential centrifugation microhematocrit (buffy coat) technique (Itard 1989) was used for blood examination. The slide preparations were examined microscopically, and trypanosomes were identified as described elsewhere (Soulsby 1982; Itard 1989).

Hematology:

The PCV was determined by capillary microhematocrit centrifugation for 5

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min and readings taken on a Hawksley microhematocrit reader (Hawksley, England). Hb was measured by Shli method (W.H.O. 1980). The RBC and WBC were determined by the hemocytometer method. Calculations of MCV, MCH and MCHC were made using standard formulae (Swenson 1984; Coles 1986).

Statistical analysis:

Standard deviation of the means for the respective values were determined, and the differences in means and prevalence between the groups were obtained by Chi square (Phillips 1978).

RESULTS AND DISCUSSION

Parasitological findings:

Out of the 100 blood samples examined, 14 were positive for *T. evansi* as the only blood parasite encountered. All the techniques used in blood examination revealed trypanosomes in the positive samples.

Hematology:

The mean blood parameters of *T. evansi*-infected camels are shown in Table 1. The range for PCV was 13 to 41%, Hb was 4.4 to 10.0 g/dl, RBC was 6.81×10^6 to $14.10 \times 10^6/\text{mm}^3$ and WBC was 11.1×10^3 to $22.0 \times 10^3/\text{mm}^3$. In negative camels, the PCV showed a range of 6.82×10^6 to $14.34 \times 10^6/\text{mm}^3$ and WBC was 11.15×10^3 to $18.55 \times 10^3/\text{mm}^3$.

Table 1. Hematological parameters of *Trypanosoma evansi*-infected camel in Sokoto.

Parameters	Positive (Mean±SD)	Negative (Mean±SD)
PCV (%)	25.60±9.87	27.94±5.67
Hb (g/dl)	7.62±2.77	11.69±2.92
RBC ($\times 10^6/\text{mm}^3$)	9.59±9.66	10.73±1.98
WBC ($\times 10^3/\text{mm}^3$)	16.99±5.16	15.18±3.76
MCV (fl)	27.39±11.64	27.32±9.11
MCH (pg)	8.11±2.52	10.53±9.75
MCHC (g/dl)	31.16±6.51	41.50±3.74

The mean values for PCV, Hb and RBC were relatively lower in the infected camels, although these were not statistically significant ($p > 0.05$). However, the WBC

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was higher in infected group but this was not significant. The MCHC was significantly lower in infected camels. Also MCH was observed a relatively lower but not significant in the same group. However, MCV did not show difference between the infected and non-infected camels.

The prevalence of *T. evansi* recorded in this study agrees with 15 to 17% observed elsewhere (Richard 1976; Diallo et al. 1987) even though a 44% infection has been reported from one herd of camels (Srivastava et al. 1984). This shows that close association among camels enhances spread to the parasite and the mechanical mode of transmission of *T. evansi* (Soulsby 1982; Itard 1989) could account for this reason.

Values of hematological parameters obtained from *T. evansi*-negative camels is in accord with normal values earlier reported (Soni and Aggarwala 1961; Banerjee et al. 1962; Bokori 1974; Schlam et al. 1978). The relatively lower, although non-significant mean PCV, Hb and RBC in *T. evansi*-infected camels show a low grade anemia, which is a main feature of camel trypanosomosis (Soulsby 1982; Itard 1989; Luckins 1992). The relative leukocytosis observed in this study has been reported to occur from increase in lymphocytes, neutrophils, eosinophils and monocytes (Luckins 1992).

In camelid trypanosomosis, the anemia that occur is typically macrocytic (Rainsanghani et al. 1981). However, this study showed no significant variations in the size of erythrocytes between infected and non-infected camels, as depicted by the respective MCV values. The severity of infection may be responsible, since the animals in this study did not show signs of disease. Nevertheless the Hb based on the MCHC values was significantly reduced in infected camels. Coles (1986) gave hemoprotozoan infections among the causes of hypochronic anemia.

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