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SHORT COMMUNICATION

Gastrointestinal parasites infection in one-humped camels (*Camelus dromedarius*) of Nigeria

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Abstract

One hundred and five (105) Camels were investigated at the Maiduguri abattoir, Nigeria using floatation and sedimentation techniques for helminth parasites and haematological indices with the microhaematocrit reader. Overall, prevalence of infection was 92.4% [(*Coccidia* (8.5%), *Strongyloides* (8.5%), *Trichuris* (11.4%), Ciliates (6.7%), *Ascaris sp*. (3.8%), *Moniezia sp*. (1.9%), *Amphistome sp*. (0.9%) and *Balantidium sp*. (0.9%)]. There was no significant difference between infected and non-infected camels for blood parameters. There is need to regularly deworm camels and further study the impact of helminthes in the camel especially with respect to its zoonotic potentials in countries with significant population of camels.

Introduction

Camel is an ancient animal well known in the history of human civilization. It belongs to the class mammalia; the order Artiodactyla; sub-order Tylopoda; and family Camelidae.[1] It has been domesticated for transportation, meat, clothing and milk over 4000 years ago.[2] The meat is of good quality especially in areas where other meat animals find it difficult to thrive[3] and the milk quality is of comparable quality to cattle and it provides milk for longer duration compared to other similarly domesticated animals.[4] There are two known species of camels:

1. *Camelus bactrianus* (the two humped camel)
2. *Camelus dromedarius* (the one humped camel) which is also called the trade camel or Arabian camel.[5]

Population of dromedary camels in the world is estimated to be 20 million.[6] In Nigeria, most camels are concentrated around arid zone areas and their population is put at 87000. Maiduguri, Borno state which is located in the north eastern part of Nigeria (11° 50' 42" N and 13° 9' 36" E) is a semi-arid region with an annual slaughter figure of 11000 camels which are mostly brought in from North Africa via Chad and Niger republics where they serve useful purposes of transportation, milk and meat production, the textile industry raw materials, recreation and prestige.[7]

Camel is known to tolerate a lot of parasitic infections of economic importance among many animals with minimal economic losses [8] but it is also known to be infected with various helminth parasites which can cause diarrhoea and other clinical signs and lead to a decrease in productivity of the Camels.[9] Some of these helminth parasites also have zoonotic implication for those who work closely with camels.[10]

This research was carried out to elucidate the prevalence of helminth parasites in camels arriving for slaughter at the Maiduguri, Nigeria abattoir and its implications on the general health of the camels and public especially in countries with significant camel populations.

Materials and Methods

Faecal samples were collected from 105 Camels at the Maiduguri abattoir, Nigeria for a period of 1 month during the rainy season (June to September). Standard procedures were followed using long established techniques.[11,12]

After collecting the samples a direct smear was first made using tap water and coverslip was applied and it was examined under the light microscope at ×40.

Floatation Technique. This technique is used easily for the identification of eggs of nematodes and cestodes. Briefly, faeces were comminuted in saturated salt solution, faecal debris were discarded. The fluid was poured into a straight-sided tube until a convex meniscus appeared at the top of the tube and a coverslip was applied immediately. The preparation was allowed to stand on level surface for fifteen minutes, the coverslip was removed and applied to the glass slide and examined.[11]

Sedimentation Technique. This technique is good for trematodes eggs because they are heavier and so sediment down to the bottom of the container. The supernatant from the floatation technique was poured off and a small quantity of the sediment collected with a pipette/dropper and it was put on a glass microscope slide, coverslip was applied and examined.[11]

Haematology. The blood was collected directly from the camels at the abattoir when the jugular veins and arteries were severed during slaughter. The blood was collected into vials containing sodium ethylenediamine tetracetic acid (Na2 EDTA) sufficient for 5 mL of blood to prevent coagulation. The tubes were gently rotated to ensure proper mixing of the blood with the anticoagulant without damaging the integrity of the cells and were transported to the laboratory.

Red cell indices packed cell volume (PCV). The blood collected in special anticoagulant bottles were used to determine the PCV of each sample using micro-capillary tubes, which were filled by capillary action and centrifuged at 3000 rpm for 5 minutes after sealing the end of the tube. After the centrifugation the PCV in percentage was read in a special haematocrit reader and the results were recorded.

Red blood cell count (RBC). Blood was drawn in to a special red cell pipette, which gave a dilution of 1 to 200 when the blood was drawn to the 0.5 mark and diluted to form the 101 mark. After been drawn and well mixed the dilution was discharged onto hematocytometer counting chamber and was allowed to settle for few minutes. The high dry objective of the microscope was used to evaluate the total erythrocyte count. The total number of cells in five squares in the center of the counting chamber was determined and multiplied by 10,000.This value represented the total number of erythrocytes per cm^3 of blood.

Haemoglobin concentration (Hb). 0.1 Normal hydrochloric acid was added to whole blood using the acid hematin method, which depends on conversion of hemoglobin to acid hematin. Color of the blood in a test tube after addition of the 0.1 normal HCL was observed with serial dilution with HCL until color matched a standard. The reading was reported in g/100 mL.

White Blood cell indices (WBC). The hemocytometer method was used. The dilution factor was 1:100 and the total leucocytes were determined by counting all of the cells in the entire ruled area of a hemocytometer. The total count was calculated using the following formula:

Total cells in 9 squares + 10% of total cells × 100 =WBC/CU.mm. Using the counting chamber the tip of the pipette was used to introduce blood into the counting chamber and after focusing; all the cells in the 19 squares were counted within the larger ruled area in the corner and recorded. Each of the three squares was counted accordingly and the number of cells in each square was recorded. These four values were counted and calculated as follows.[12]

$$\frac{\text{Total leucocytes in 4sq.mm} \times 20 \times 10}{4} = \text{Leucocytes/CU.mm}$$

Or

Total leucocytes in 4 squares mm × 50 = Leucocytes/ CU.mm.

Differences in haematological values between various genders, and infected and parasite-free animals were statistically analysed using the student's t-test, while variation in prevalence of infection rates were tested for significance using the chi-square analysis. Differences were regarded as significant at the 95% level of confidence.[13]

Results

Ninety-seven camels (92.4%) out of 105 examined camels by floatation and sedimentation techniques were positive for a range of helminths and with the nematode *strongyle sp*. showing the highest prevalence. Other genera included: *Coccidia*, *Strongyloides*, *Trichuris*, Ciliates, *Ascaris sp*., *Moniezia sp*., *Amphistome sp*. and *Balantidium sp*. (Table 1). From table 2 the difference between the blood parameters for the helminth infected and non-infected samples was not significant for all parameters (PCV, t = 0.347, $P > 0.05$; Hb, t =.797, $P > 0.05$; RBC, t = 0.069, $P > 0.05$; WBC, t = 1.546, $P > 0.05$). There was no significant difference ($P > 0.05$) between helminth infection in the male and female (Table 3).

Table 1. Summary of helminth parasites prevalence

Identified helminthes	Prevalence (%)
Strongyle sp.	88.5
Coccidia	8.5
Strongyloides	8.5
Trichuris	11.4
Ciliates	6.7
Ascaris sp	3.8
Moniezia sp	1.9
Amphistome sp	0.9
Balantidium sp	0.9
Total	92.7

Table 2. Blood parameters for helminth positive or negative animals

	No. of Animals	PCV (%)	Hb (g/100mL)	RBC(×10⁶/mm³)	WBC(×10³/mm³)
Positive	97	27.52 ± 6.09	10.27 ± 2.09	14.42 ± 5.50	20.20 ± 7.82
Negative	8	26.88 ± 4.91	10.85 ± 1.97	14.60 ± 7.12	17.14 ± 4.93

Table 3. Helminth infection between male and female camels.

	Infected	Non-infected	Total
Male	34(32.4%)	2(1.9%)	36(34.3%)
Female	63(60%)	6(5.7%)	69(65.7%)
Total	97(92.4%)	8(7.6%)	105(100%)

Discussion

The high prevalence of helminths reported in this study was due to the fact that the study was carried out during the rainy season (August) and worm burdens are known to be high during this period.[14] Similar reports have been documented in Camels of Zaria,[15] and Maiduguri, Nigeria.[16,17] The high prevalence rate for *strongyle sp* is consistent with previous findings of other workers.[16,18] This study supports previous findings that nematodes are the commonest helminths in camels.[15,16,18] In this study, though blood indices like Hb and RBC were lower in infected camels compared to that in non-infected ones, there was no statistically significant difference seen, may be because more devastating helminths like *haemonchus sp*. and *fasciola sp.*[19] were not found in examined camels.[20] The WBC count was higher in the infected camels compared to that in the non-infected[17] which may be early signs of infection in the camels.[20, 21] It was important that the PCV for the infected camels was slightly higher than that for the non-infected but this was not significant statistically. This may be as a result of other complications of animals such as biological factors or metabolic disorders/deficiencies. However, it is worth noting that PCV can be affected by a lot of factors such as excitement of the animal as the blood samples were collected at slaughter, age of the animal and time between sampling and analysis.[22] This study shows that Camels can be infected with a range of helminth Parasites without obvious changes in blood parameters. The potential effect of these parasites on the health of the camel and the public health needs to be studied further.

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