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Clinical parameters of donkeys before and after *Trypanosoma vivax* infection

KYEWALABYE KAGGWA (E.), KWARI (H. D.), AJAYI (M. O.), SHINGGU (P.). Paramètres cliniques chez les ânes avant et après infection à *Trypanosoma vivax*. *Revue Elev. Méd. vét. Pays trop.*, 1988, **41** (3) : 265-269.

Au cours d'une enquête effectuée autour de Zaria (Nigeria), vingt ânes âgés de 1 à 2 ans ont fait l'objet d'examens cliniques (température rectale, rythmes respiratoire et cardiaque, hématocrite) et parasitologiques (recherche de parasites sanguins et intestinaux). En outre, six ânes, mis dans un enclos, à l'abri des insectes, ont, après déparasitage intestinal et cutané, subi les mêmes examens cliniques pendant 4 semaines. Puis trois d'entre eux ont été inoculés avec un stabilat de *T. vivax*, les trois autres servant de témoins. La recherche des parasites sanguins et les examens cliniques ont été poursuivis, chez ces six animaux, pendant un mois après l'infection. Aucun des vingt ânes examinés au cours de l'enquête n'a présenté de protozoaire sanguin. Deux avaient des microfilaires. Onze n'avaient ni microfilaire, ni oeuf d'helminthes dans les selles. Chez les trois ânes inoculés expérimentalement par *T. vivax*, l'infection a toujours été légère et les paramètres cliniques n'ont pas montré de différence très significative par rapport aux animaux sains. *Mots clés* : Âne - Trypanosomose - *Trypanosoma vivax* - Examen clinique - Nigeria.

INTRODUCTION

Donkeys (domesticated asses - *Equus asinus*) in Nigeria, estimated at about 700,000 (3) are owned mainly by low income earners and peasant farmers. They provide transport for settled farmers and for those involved in transhumance, moving together with cattle.

These animals, however, seem to receive relatively little veterinary care. This is supported by records from the large animal unit of the Veterinary Teaching Hospital, Ahmadu Bello University, Zaria, Nigeria, where in two years, 1985 and 1986, only one donkey was received, in an area where there are many donkeys. However, the normal clinical parameters necessary in determination of an abnormal status, are reported from donkey breeds in South Africa and America (9). These parameters may or may not coincide with those of the Nigerian breeds, which are not documented.

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Among the common animal diseases in Nigeria is trypanosomiasis. Donkeys are reported to be susceptible to *Trypanosoma brucei, T. congolense, T. vivax, T. evansi* and *T. equiperdum* (7). *T. vivax*, however, is the most important cause of trypanosomiasis in cattle in West Africa. Considering the economic effects of *T. vivax* in ruminants (2, 7), the co-existence between ruminants and donkeys, especially the Fulani herds in Northern Nigeria, and the high infection rate of *T. vivax* in the *Glossina spp.* (tsetse flies) (12), an attempt is made to studv *T. vivax* in donkeys.

So far there is no detailed description of the clinical parameters in donkeys following *T. vivax* infection, although it is reported that such infections are not uncommon (5, 7). Donkeys, being equines, could be expected to react comparably to horses, but the reports of *T. vivax* symptoms in the horse are not completely agreeable either. Some believed that the infection is generally mild and chronic (6, 10), others, based on field observations, thought that *T. vivax* is non-pathogenic (1) ; yet pathogenicity was implied when it was reported that horses suffering from trypanosomiasis (*T. vivax*) had complete recovery after treatment with tartar emitic (4). Further still, one report (11) talked of a highly pathogenic disease course in one horse using freshly isolated *T. vivax* in Nigeria.

The aims of this work, therefore, were to survey donkeys around Zaria, as to find the prevalence of protozoan parasites and correlate them to clinical parameters observed ; secondly, to find the clinical manifestations of proved *Trypanosoma vivax* stock in donkeys after an experimental infection.

MATERIALS AND METHODS

Animals

Local donkeys, between 1-2 years old, belonging to the common breed (Fig. 1) around Zaria were used. Twenty field donkeys were sampled, while six were kept experimentally inside fly proof pens, without grazing, being fed *ad libitum*. Prior to infection, fecal samples were examined for internal parasites; all the donkeys were dewormed using Perbendazole™,

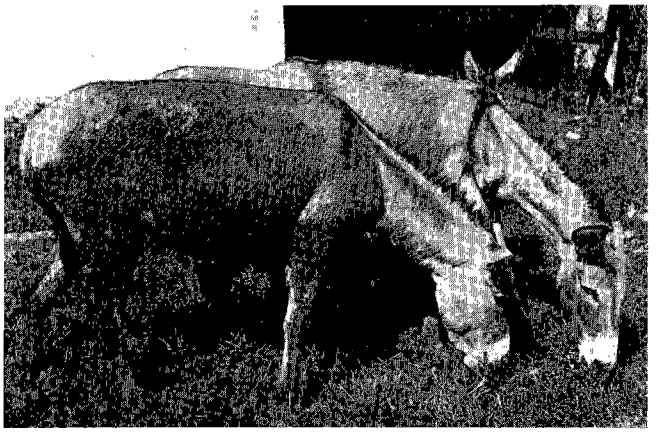

Fig. 1 : Donkeys most prevalent in Zaria, a town in Northern Nigeria. These had carried T. vivax *infection for 1 month.*

20 mg/100 kg, and they were sprayed for ectoparasites using an organophosphate (Pfizona™ : Pfizer Co., Ltd.).

Mice (white albino laboratory bred) were used for subinoculation for detection of trypanosomiasis in donkeys.

Parasite

A *Trypanosoma vivax* stock, Kabam/84/NITR/7.4, obtained from the Nigerian Institute for Trypanosomiasis Research, Vom, was further proved to be *T. vivax* using the morphological characteristics, its non infectivity in dogs and in mice.

Procedure

The 20 donkeys were from 20 different homesteads, and they were examined once. Their temperatures, pulse and respiratory rates were taken and blood for estimation of packed cell volume (PCV) and for detection of parasites using thick and thin blood smears, haematocrit centrifuge technique (HCT) and inoculation of mice which were checked for trypanosomes for 20 days.

The 6 experimental donkeys were kept for 4 weeks before 3 of them were infected with 4×10^7 *T. vivax* each, contained in sheep's blood. The remaining 3 were left as control donkeys, kept separately from the infected ones. Parameters taken were rectal temperatures, pulse and respiratory rates, PCV and parasitaemia using HCT and thick and thin blood smears. The 6 donkeys were observed for another month after infection.

RESULTS

Of the 20 surveyed donkeys there were 2 cases of microfilaria, no other blood parasites were detected.

Eight donkeys had a low grade intestinal parasite burden (strongyle eggs). Eleven donkeys were free of both intestinal and haemoparasites. They had no skin lesions and no ectoparasites. The lungs and heart were normal on auscultation. Their mean temperature was 38.5 (38-39), mean respiratory rate 19/min. (16-26) while their mean PCV was 32.2 (26-37) (Fig. 2).

The 3 experimental control donkeys had a mean temperature of 37.1 ± 0.75 for the period of observation. Their mean PCV percentage was 31.3 ± 3.1 while their mean pulse rate was 50.1 ± 5.58 and mean respiratory rate was 19.8 ± 4.7 for the period of observation.

The prepatent period in the infected donkeys was between 4-5 days p.i. by the HCT method. The parasitaemia for a month, was periodically detectable, most frequently by the HCT method, followed by the thick blood smears and the thin blood smears were least sensitive (Table I). In the microcapillary centrifuge tube, it was always less than 5 trypanosomes detected at a time.

The highest temperature recorded during the disease course was 38.2, while in the control donkeys the highest was 38.5. The mean temperature for the infected group after infection patency was 37.2 ± 0.6 (n = 33). The daily mean temperatures for the two groups are shown in Fig. 2a.

The mean values for the PCV percentages are shown in Fig. 2b. After infection time, the lowest mean value in the infected group was 26.3 at day 17 p.i. while in the control group the lowest was 29.3 at day 25 p.i. In the infected group the mean PCV values before infection and during prepatent periods was 32.8 ± 3.4, and during the patent periods it was 29.9 ± 3.8 (n = 33).

The mean pulse rate for the infected group was 50.9 ± 5.0 (n = 36) while the mean respiratory rate was 25.8 ± 5 (n = 36) for the period of observation.

The donkeys never looked sick for this period, and no changes were detected in their integuments, musculoskeletal systems, digestive systems, urinary systems, neurological systems, external genitalia, their superficial lymphnodes, and their demeanor remained constant.

TABLEAU I Parasitaemia in 3 infected donkeys as detected by the 3 methods : thin and thick blood smears, and haematocrit centrifuge technique (HCT).

Method	HCT			Thick Blood Smears			Thin Blood Smears		
Donkey No.	3 286	3 287	3 288	3 286	3 287	3 288	3 286	3 287	3 288
Day p.i.									
− 7	−	−	−	−	−	−	−	−	−
0	−	−	−	−	−	−	−	−	−
3	−	−	−	−	−	−	−	−	−
4	−	−	+	−	−	0-1	−	−	−
5	+	+	+	0-1	−	−	−	−	−
6	−	+	−	−	−	−			
7	−	+	−	−	0-1	−	−	−	−
10	−	+	+	0-1	0-1	0-1	−	−	−
12	+	+	+	0-1	0-1	−	−	−	−
13	+	+	+	0-1	−	0-1	−	−	+
14	+	+	+	0-1	−	0-1	+	−	−
17	+	+	+	−	0-1	−	−	+	−
20	−	−	+	−	−	0-1	−	−	−
25	+	+	−	−	−	−	−	−	−
31	+	−	−	−	0-1	−	−	+	−
40	+	−	+	−	−	0-1			

p.i. = post infection.
− = No parasites seen.
+ = Less than 10 trypanosomes seen.
0-1 = Number of trypanosomes seen per microscopic field.

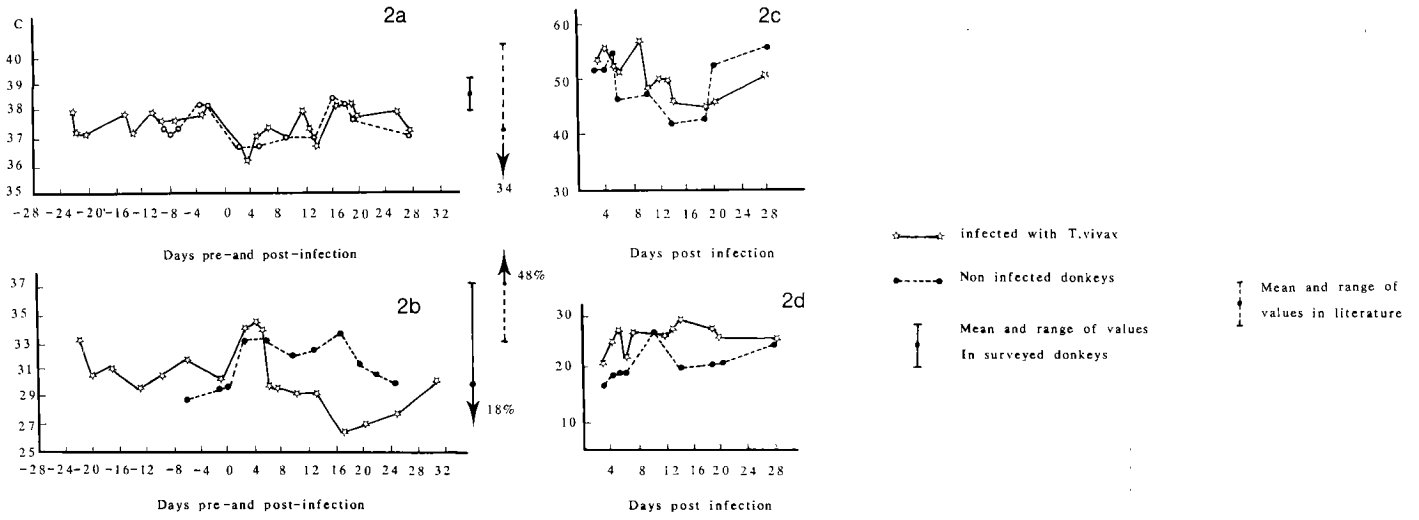

Fig. 2 : Clinical parameters in non infected donkeys and those infected with Trypanosoma vivax.

2a : Mean temperature in °C.

2b : Mean packed cell volume percentage.

2c : Mean pulse rate/min.

2d : Mean respiratory rate/min.

DISCUSSION

Donkey species and breeds in Nigeria are not documented. The one sampled in this study may be a breed of either the Nubian ass, *Equus asinus africanus*, or it might be a breed of the donkey, *Equus asinus asinus*. It is more likely to be *Equus asinus asinus* or a mixture.

The low veterinary attention for this animal species was also indicated during the survey, when all the donkeys sampled were said never to have been treated by any veterinarian or his representative. Reasons for this could be either negligence of the owners, or availability of native herbs, or, more likely too, relative tolerance of these animal species to the common diseases and parasitic infections.

The clinical parameters in surveyed donkeys could be influenced either by infections, or by management. Therefore the values of the « parasite free » donkeys were considered and compared with those of the experimental control donkeys. The values for the same parameters (temperature, packed cell volume, respiratory rate) in the two groups did not differ significantly, indicating that these findings are within normal range for this donkey breed in this environment. In fact they fall within ranges obtained in other parts (8, 9, 13).

Donkeys infected with a proved *T. vivax* stock developed a patent infection after a short incubation period. The periodically detected parasitaemia, however, never increased beyond detection level, and of the parameters used, only PCV indicated a mild disease process by a slight drop in the values which remained within normal range, and started picking up after some days. The temperature, pulse and respiratory rates did not change even when parasitaemia was detectable in individual donkeys. This indicates that the clinical parameters commonly used to detect disease are not very reliable in detecting short term *T. vivax* infections in donkeys. The infection could be described as being mild, and given good care and absence of intercurrent infections, it can pass unnoticed at least for the first month of infections.

It would be appropriate to investigate the long term effects of the parasite in donkeys, and whether the animal can act as a natural reservoir of *T. vivax*.

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KYEWALABYE KAGGWA (E.), KWARI (H. D.), AJAYI (M. O.), SHINGGU (P.). Clinical parameters of donkeys before and after *Trypanosoma vivax* infection. *Revue Elev. Méd. vét. Pays trop.*, 1988, **41** (3) : 265-269.

In a survey, 20 local donkeys were examined once. Experimentally, 3 local donkeys were kept as uninfected controls and 3 were infected with *Trypanosoma vivax*. The 6 donkeys were observed for one month before and one month after infection. Parameters observed were rectal temperatures, pulserates, respiratory rates, packed cell volume and demeanor. Parasites were checked using thin and thick blood smears, haematocrit centrifuge technique, mice inoculation and faecal examination. On the surveyed donkeys 11 were free of both microfilaria and helminthic eggs, while none had any protozoan parasite. The experimental *T. vivax* infection was mild and subclinical during the month of observation. *Key words* : Donkey - Trypanosomiasis - *Trypanosoma vivax* - Clinical survey - Nigeria.

KYEWALABYE KAGGWA (E.), KWARI (H. D.), AJAYI (M. O.), SHINGGU (P.). Parámetros clínicos en los asnos antes y después de la infección a *Trypanosoma vivax*. *Revue Elev. Méd. vét. Pays trop.*, 1988, **41** (3) : 265-269.

Durante una encuesta efectuada alrededor de Zaria (Nigeria), se hicieron examenes clinicos (temperatura rectal, ritmos respiratorio y cardiaco, hematocrita) y parasitologicos (búsqueda de parásitos sanguineos e intestinales). Además, se realizaron los mismos examenes clinicos durante 4 semanas en seis asnos, puestos en un cercado, protegidos contra los insectos, después de un desparasitaje intestinal y cutáneo. Luego, se inocularon con un estabilato de *T. vivax* tres otros animales utilizados como testigo. Se prosiguieron la búsqueda de los parásitos sanguineos y los examenes clinicos en estos seis animales durante un mes después de la infección. Ningún de los veinte asnos examinados durante esta encuesta tenia protozoarios sanguineos. Dos tenían microfilarias, once tenían ni microfilaria, ni huevo de helmintos en la deposición. En los tres asnos inoculados experimentalmente por *T. vivax*, la infección siempre fué poco importante y los parámetros clinicos no mostraron diferencia muy significativa respecto a los animales sanos. *Palabras claves* : Asno - Tripanosomosis - *Trypanosoma vivax* - Examen clinico - Nigeria.

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