Short Communication

Prevalence of trypanosoma species found in cattle slaughtered in Tudun Wada abattoir Kaduna Nigeria

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Abstract

Animal trypanosomosis is a major pathological constraint to livestock production in Africa including Nigeria thus causing serious economic loss. To determine the prevalence of Trypanosoma species in slaughtered cattle in Tudun Wada abattoir, Kaduna, a total of 96 blood samples were parasitologically examined using standard Trypanosome detection technique (STD) and concentration methods (HCT and BCM) for parasite detection. The Packed Cell Volume was also determined. The prevalence of Trypanosoma species was 15.6%. The packed cell volume (PCV) varied between 12% and 56% with a mean PCV of 32.04%. There was multi-species detection of Trypanosomes in the samples examined. The statistical association ($\chi^2 = 6.18; df=2; p=0.0455$) between prevalence of Trypanosoma species and PCV was marginally significant. There was statistical association ($\chi^2 = 11.92; df=2; p=0.0026$) between prevalence of blood parasites and PCV. The result of this study shows that trypanosomosis is still an important constraint in livestock production. This is of public health significance.

Key words: prevalence, trypanosome species, cattle

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Introduction

Animal trypanosomosis is a complex disease which is caused by a protozoan of the genus Trypanosoma which develops cyclically in the vector, the tsetse-fly. It is ranked the fourth most important disease of cattle in Nigeria after rinderpest, contagious bovine pleuropneumonia (CBPP) and dermatophilosis (streptothricosis) (Ademosun, 1973). Over 20 species and 33 sub species of the tsetse fly are responsible for the transmission of African trypanosomosis. According to WHO, 1998, 60 million people are likely to contract this disease as 48 million cattle are also at risk of the same disease (Kristjanson et al, 1999). Some of the species of trypanosomes of economic importance in cattle include Trypanosoma congoense, Trypanosoma vivax and Trypanosoma Brucei. Tsetse borne African trypanosomosis is a serious threat to livestock production in sub-Saharan Africa (FAO 2001, 2003). In spite of the long attempts to control the disease it continues to be a menace to livestock production. It is estimated that 55,000 deaths in humans and 3 million deaths in animals are caused by African trypanosomosis. (Abenga et al., 2002; Samdi et al., 2010). This reduces the work efficiency of draft animals thus, hampers mixed farming. The disease is endemic in many areas in Nigeria. Surveys of North central Nigeria conducted between 1989-1990, showed a disease prevalence of 4.3% in cattle while later studies (1993-1996) showed an increased prevalence of 10.6% (Onyiah, 1997). In the southern guinea/derived savannah regions, prevalences of 6.7% and 2.7% were recorded in Bendel and Ogun states (Ikede et al., 1987).

Other prevalence is 1.5% for the montane vegetation (Anene and Ezekwe, 1995) and 44% recorded among imported Friesian cattle breeds in the forest zone (Jibike et al., 1995). A lower rate
of 5% was obtained on the high plateaux of Jos, Mambilla and Obudu, areas previously reported to be tsetse-free (Anene et al., 1991, Anosa, et al., 1993, Dede et al., 1996).

**Methodology**

Sample collection: Five millilitres of jugular blood was collected randomly at the point of slaughter in bottles containing one milligram powder Ethylene Diamine Tetra Acetic Acid (EDTA) per millimetre of blood.

Parasitological analysis: Parasitological examination was done in the Laboratory using the haematocrit centrifugation technique, HCT (Woo, 1971), Buffy Coat Method (BCM) (Murry and McInter, 1997) and Giemsa stained thin films made after BCM examination. The Packed Cell Volume (PCV) of each animal was also determined (as haematological index for anaemic conditions) through capillary centrifugation of blood with centrifuge and haematocrit read. Trypanosome species were identified based on their motility using the BCM and morphological features from Giemsa stained films.

Microscopy: The slides were viewed using oil immersion at x 100 objective for the presence of trypanosomes.

Data analysis: Analysis of data was carried out using the Statistical Package for Social Science (SPSS Inc., Chicago, Illinois, USA). The chi-square test was used to test for association between the prevalence of Trypanosomes and the different sites. \( P \leq 0.05 \) was defined as significant.

**Result**

The Prevalence of Trypanosoma species collected from cattle in Tudun Wada abattoir is presented in Table 4.1. Table 4.2 shows Multi- Trypanosoma species infection of cattle in fifteen positive blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria. Table 4.3 presents the relationship between Trypanosoma species and packed cell volume of blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria. Table 4.4 shows the relationship between blood parasites and packed cell volume of blood samples collected from cattle in Kwata abattoir, Kaduna State, Nigeria. Blood film showing Trypanosoma brucei from the sample collected at the Tudun Wada Abattoir is presented in figure 1. Blood film showing Trypanosoma congolense from the sample collected at the Tudun Wada Abattoir is presented in figure II.

**Table 4.1:** The Prevalence of Trypanosoma species collected from cattle in Tudun Wada abattoir

<table>
<thead>
<tr>
<th>Parasites</th>
<th>Positive samples</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trypanosoma spp.</td>
<td>15</td>
<td>15.6</td>
</tr>
<tr>
<td>Microfilaria</td>
<td>4</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>19.8</td>
</tr>
</tbody>
</table>

**Table 4.2:** Multi- Trypanosoma species infection of cattle in fifteen positive blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria

<table>
<thead>
<tr>
<th>Parasites</th>
<th>Positive samples</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. brucei</td>
<td>5</td>
<td>33.3</td>
</tr>
<tr>
<td>T. congolense</td>
<td>7</td>
<td>46.7</td>
</tr>
<tr>
<td>T. congo+MF</td>
<td>1</td>
<td>6.7</td>
</tr>
<tr>
<td>T. congo+T. brucei+MF</td>
<td>1</td>
<td>6.7</td>
</tr>
<tr>
<td>T. congo+T. brucei</td>
<td>1</td>
<td>6.7</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>15.6</td>
</tr>
</tbody>
</table>

**Table 4.3:** Relationship between Trypanosoma species and packed cell volume of blood samples collected from cattle in Tudun Wada abattoir, Kaduna State, Nigeria

<table>
<thead>
<tr>
<th>PCV (%)</th>
<th>Number examined</th>
<th>Number positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-20</td>
<td>11</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td>21-40</td>
<td>71</td>
<td>11</td>
<td>15.5</td>
</tr>
<tr>
<td>41-60</td>
<td>14</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>15</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Chi square (\( \chi^2 \)) = 6.18; \( P \) value = 0.0455; \( df = 2 \)

**Table 4.4:** Relationship between blood parasites and packed cell volume of blood samples collected from cattle in Kwata abattoir, Kaduna State, Nigeria

<table>
<thead>
<tr>
<th>PCV (%)</th>
<th>Number examined</th>
<th>Number positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-20</td>
<td>11</td>
<td>6</td>
<td>54.5</td>
</tr>
<tr>
<td>21-40</td>
<td>71</td>
<td>13</td>
<td>18.3</td>
</tr>
<tr>
<td>41-60</td>
<td>14</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>19</td>
<td>19.8</td>
</tr>
</tbody>
</table>

Chi square (\( \chi^2 \)) = 11.92; \( P \) value = 0.0026; \( df = 2 \)
Of the eleven blood samples within PCV range of 1-20, 6 (54.5%) were positive for blood parasites, while 13 (18.3%) out of the 71 samples examined within PCV range of 21-40 were positive. However, none was positive out of the 14 samples within PCV range of 41-60. There was statistical association ($\chi^2 = 11.92; df=2; p=0.0026$) between prevalence of blood parasites and PCV (Table 4.4).

**Discussion**

The prevalence of 15.6% of Trypanosome species in this study is relatively high compared to the 2.2% by Abenga et al. (2004) in Lere Local government Area (LGA) Kaduna, 3.7% by Ohaeri, (2010) in Abia, 3.8% by Enwezor et al. (2012) in Benue, but lower than the 46.8% reported by Majekodunmi et al., 2013 in Jos Plateau, 21.5% by Ahmad in Kaura LGA of Kaduna State. The differences may be attributed to differences in geographic regions and the sensitivity of the methods used, especially in low parasitaemic conditions. Also, the samples in this study were collected from cattle at slaughter rather than in farms and this may have contributed to the differences in prevalences that were recorded. Though a similar abattoir survey recored a lower prevalence of 2.2% (Samdi et al., 2011) as compared to the 15.6% in this study.

The prevalence in this study in cattle at slaughter in Kaduna is different from the national trypanosomiasis prevalence rate in cattle obtained by the EEC-Trypanosomiasis control project between 1989 and 1991 (Onyiah, 1997). Surveys conducted between 1989 and 1991 in Northern Nigeria, where two thirds of Nigeria's livestock resources are concentrated showed a prevalence rate of 4.3% in cattle. A higher prevalence rate of 10.0% was obtained in a wider survey of all agro ecological zones between 1993 and 1996 (Onyiah, 1997; Samdi et al., 2011). More recent studies in the region have revealed prevalence ranging from 5.5 to 17.8% to over 50% (Qadeer et al., 2009).

Indications from the results showed that there were mixed infections caused by $T$. congolense and $T$. brucei in the animals sampled, with $T$. congolense having the highest prevalence. The findings depict a contrary view to that reported by (Enwezor et al., 2012) where it was said that $T$. vivax was more prevalent in northern Nigeria and elsewhere but is similar to the observations of Akinboade, (1982) who reported that a mixed infection due to $T$. congolense and $T$. brucei was most prevalent in cattle. Samdi et al. (2011) also reported a higher prevalence in $T$. congolense than the other species in Kaduna, northern Nigeria. Different Trypanosome species have been reported to have the highest prevalence rates. In a study conducted in Sokoto Fajinnmi et al., (2011) recorded more prevalence of $T$. vivax than $T$. brucei or $T$. congolense. Likewise a study by Enwezor et al. (2012) in Benue showed $T$. vivax to be more prevalent than the others. Ohaeri, (2010) also demonstrated in his study in Abia that $T$. vivax was more prevalent than $T$. brucei or $T$. congolense. The differences in species reported may be that since this is an abattor - based study, the animals may have been brought from areas that have $T$. congolense infections more than $T$. vivax or $T$. brucei and since no $T$. vivax was
detected, it may also mean that the cattle sampled were from a far and different geographic region other than Kaduna and surrounding states.

The finding of higher infection rate in the lower PCV range may be connected to the fact that mean PCV values are reduced in trypanosome-positive cattle. This may be as a result of the effect of the parasites on blood cells. Trypanosomiasis main symptom is anaemia which manifests by drop in PCV value (Esievo et al., 1985). The low PCV may also be attributable to other blood parasites like microfilaria.

**Conclusion**

The result of this study signifies that trypanosomiasis is still an important constraint in livestock production and productivity as signified by the 15.6% recorded in this study. This can reduce meat quality and result in serious economic losses. There were mixed infections with T. congolense (46.7%) more prevalent than T. brucei infection (33.3%).

Packed Cell Volume was markedly low in blood samples that were positive for Trypanosome species.

**References**


