

# Presentation of Trypanosomiasis in Nkhotakota

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## Abstract

In 2002, we identified 28 people in Nkhotakota District who were suffering from Human African Trypanosomiasis (HAT). Sixteen of these were identified when they presented to the District Hospital with a febrile illness. The remaining twelve were identified through a rural cross-sectional survey, in which 500 people were visited in their homes, persons found to be febrile, were examined by blood film microscopy.

Of the 28 people, 50% (14) presented within a month of the onset of symptoms. Sixteen (57%) had splenomegaly, and 24 were anaemic ([Hb] <12 g/dl). Four patients died (14%), of which two were in the late stage of the disease.

None of the patients recall having a chancre that could be attributed to the bite of tsetse flies. 9 out of 28 (32%) reported illness longer than 90 days. Of the 9 patients 6 (66%) of them remained in the early stage after reporting illness of 180 days. This study reports on the prevalence and clinical features of *Trypanosoma brucei rhodesiense* infection in a endemic district in Malawi.

## Introduction

Human African trypanosomiasis (HAT) has two modes of presentations. Acute presentation usually associated with *Trypanosoma brucei rhodesiense* (*T. b. rhodesiense*) infection found in East and Southern Africa and chronic presentation usually associated with *Trypanosoma brucei gambiense* (*T. b. gambiense*) mainly found in West and Central Africa.

There is limited information concerning the prevalence of HAT in Malawian districts that are known to have this disease. The Central Health Sciences Unit (CHSU) maintains annual records of all positive cases in the country. Previous studies have shown that Nkhotakota District Hospital recorded over 200 cases in 1990 and a steady decline of cases has been observed since<sup>1</sup>. The reason for this is currently unknown. The HAT found in Malawi is mainly transmitted by *Glossina morsitans* group of tsetse flies<sup>2</sup>. Following inoculation of infective organisms by the fly bite, parasites proliferate at the site of inoculation. This causes a local inflammation (chancre) which appears 5 to 15 days at the site of tsetse bite and persists for 2 to 3 weeks<sup>3</sup>. After that regional lymph node swelling may follow which often involves the cervical lymph glands (Winterbottom's sign), but could occur at any other site. The next stage is invasion of the haemolymphatic system. This is called the early stage of the disease. A majority of patients present with symptoms similar to malaria with headaches, pains in the neck, shoulders, and calves, irregular fever with shivering, sweating and increased pulse rate<sup>4</sup>. This stage is characterised by hepatosplenomegaly and important complications may occur such as myocarditis and pericardial effusions, in particular in *T. rhodesiense* infection. After that the parasites may invade the central nervous system. This causes the meningoencephalic, or late, stage of the disease;

this is characterized by the presence of trypanosomes and a moderately raised white cell count in the cerebral spinal fluid. Patients may develop a spectrum of neurological abnormalities such as sleep disturbance, cranial nerve palsies, tremors, ataxia and mental disturbance. Without treatment the disease progresses to coma and death.

We attempted to assess the prevalence of HAT in one of the hospitals in the endemic area and report clinical features in related to outcome.

## Material and Methods

### Subjects

Patients with HAT were recruited in Nkhotakota, Central Malawi, in 2002, either by community surveillance (active case finding), or by passive case finding among those who presented directly at Nkhotakota District Hospital. The community surveillance was part of the on-going trypanosomiasis control programme organized by CHSU. The surveillance was organized as a follow up of cases that were diagnosed passively. The number of people screened varied from village to village but on average about 100 people were screened at anyone time. At the end of the year about 500 people were screened. The process was on-going but the highest numbers of people were screened in the rainy season when the disease is generally most prevalent. The people that had symptoms similar to malaria were screened and family contacts regardless of the symptoms were included in the screening process. Blood films were air dried and stained on the spot and microscopic examinations were conducted at Nkhotakota district hospital laboratory. There were 3 independent technicians who looked at each blood film. A minimum of 4 microscopic screening attempts were made before the sample could be classified as negative. The positive cases were admitted to the hospital for staging and treatment and no attempt was made to follow up the people that had negative results.

Diagnosis of HAT was by microscopic detection of trypanosomes in wet blood films. The film was made by collecting a drop of capillary blood on a slide and spreading it evenly on an area 15-20 mm in diameter. The smear was allowed to completely dry and was stained using Field's rapid technique for thick blood film or Giemsa-stained thick blood films. The preparation was allowed to dry and a drop of immersion oil was spread on the film and the film was examined microscopically using the 100X. The buffy coat fraction, an upper layer of serum collected after microhematocrit centrifugation, was also examined to increase the chances of detecting the parasites<sup>5</sup>. Staging of the disease was determined by microscopic examination of cerebrospinal fluid (CSF) after lumbar puncture<sup>6</sup>. Patients with no trypanosomes in the CSF and white count of less than or equal to 5 cells/mm<sup>3</sup> were classified as having early stage disease (no CNS involvement). On the other hand the patients that had trypanosomes in the CSF and/or white count of greater than 5 cells/mm<sup>3</sup> were classified as having late-stage disease. Early stage infections were treated with suramin and late stage infections were treated with melarsoprol<sup>7</sup>. Haemoglobin was estimated using Hemocue

(Hemocue Ltd, Dronfield, Derbyshire, UK) according to manufacturer's instructions. Stool and urine samples were routinely collected for microscope analysis to rule out hookworms and other protozoa that can easily be identified by microscopy. The same thick film was concurrently examined for malaria parasites.

For statistical analysis, Excel for XP and multinomial logistic model were used. The study was approved by the College of Medicine Research and Ethics Committee.

## Results

A total of 28 patients (16 males [57%], 12 females [43%]) were diagnosed with HAT, by active (n=12) and passive (n=16) case finding. The median age was 23 years (range 2-55 years) see table 1. None had concomitant malaria, but most patients reported repeated treatment for 'malaria' before diagnosis. None of the patients could recall having a chancre that could be attributed to the bite of tsetse flies.

The majority of the patients (26) presented with early disease (median duration of symptoms 30 days); only 2 patients presented with late stage disease (in the 5th month of illness) see table 2. 50% of all cases presented within 1 month of becoming ill while 32% reported illness longer than 90 days; 6 of these remained in the early stage after reporting illness of 180 days.

24 patients had Hemoglobin [Hb] levels below 12 g/dL (mean Hb =  $8.96 \pm 3.07$  g/dl) while 4 had normal haemoglobin levels (Hb =  $12.17 \pm 1.35$  g/dl). There was no correlation between presence and degree of anaemia and duration of illness. Hepatosplenomegaly was found in 16 patients; those with longer duration were more likely to have hepatosplenomegaly. 4 patients died, two with early disease died (cause unknown) and two who had late stage disease; they were both very anaemic with hepatosplenomegaly.

Parasitological examination of stool and urine did not reveal any abnormality in any of the patients.

## Discussion

This study shows that only 28 patients were diagnosed with HAT in Nkhotakota in 2002 while in contrast to the 200 cases that were seen annually in the 1990s. Trypanosomiasis is a neglected disease without any active funding in Malawi. Disease control, management and surveillance training has been through the East Africa Network for Trypanosomiasis (EANET).

There are several features in our patients that are remarkable. The duration of illness is longer than expected in *T. rhodesiense* infection. No patients reported a chancre; while a chancre can be absent in *T. rhodesiense* this has been well described in *T. Gambiense* infection. Anaemia was common and could not be explained by concurrent malaria or helminthic infections; hepatosplenomegaly was also more common than reported in the literature. However no comparison could be made with patients without HAT from the same community. As HIV is endemic in Malawi it may be speculated that HIV related illness as well as malaria may have contributed to these clinical features.

It may be hypothesized that in Malawi a more mild form of

Table 1 Trypanosomiasis patients.

Gender (Males:Females)	16:12
Median age (yr) (Range)	23 (2-55)
No of Subjects in late stage (% of total)	2 (7.1)
No of subjects with chancre (% of total)	0 (0)
Median duration of disease (days) (interquartile range)	30 (142)

Table 2. The mode of clinical presentation of Trypanosomiasis patients at Nkhotakota District hospital.

Duration of illness (months)	Total number of cases	Cases with Anaemia	Hepatosplenomegaly	Deaths
>1	14	85.7 % (12)	42.9 % (6)	7.1% (1)
1-2	5	100.0 % (5)	80.0 % (4)	10.5% (1)
3-4	2	50.0 % (1)	0 (0) %	0 % (0)
5-6	5	100.0 % (5)	100.0 % (5)	40% (2)
< 6	2	50.0 % (1)	50.0 % (1)	0 %
Total Numbers	28	24	16	4

*T. b. rhodesiense* occurs that has already been reported in the past in Zambia<sup>8</sup>. One can then speculate that people of Bantu descent may have greater tolerance to trypanosome infection, because their ancestors are likely to have been exposed to human infective trypanosome for several thousands of years. Apart from Malawi and Zambia, *T. b. rhodesiense* infection found in other places usually causes a very acute disease<sup>3</sup>. It is postulated that people of Nilotic descent, who are found in other areas where *T.b. rhodesiense* is prevalent, have less tolerance to the disease as their ancestors migrated into East African region from tsetse free areas to the North over the past 2,000 years. There is a need for isolation and genotyping of the parasites found in Malawi to confirm the assumption that HAT in Malawi is caused by *T. rhodesiense*.

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