

## Applied Microbiology 2019: Rhodesian human African Trypanosomiasis (rHAT) in Kafue national park, Zambia- David Squarre- Zambia Hokkaido University

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Human African trypanosomiasis (HAT) is a neglected tropical disease caused by *Trypanosoma brucei rhodesiense* (Eastern and Southern Africa) or *Trypanosoma brucei gambiense* (West and Central Africa) and transmitted via the bite of infected tsetse fly (*Glossina* species). Tsetse flies are contaminated by humans or animals carrying human pathogenic parasites. The disease is common in tropical and subtropical Africa, affecting low-income communities. *T. b. Rhodesiense* causes acute HAT, *T. b. Gambiense* causes a more chronic illness. Although HAT has re-emerged with *T.* in most of the old foci in sub-Saharan Africa since the 1970s, *b. Gambiense* accounts for more than 98% of confirmed cases, according to the latest World Health Organization (WHO) study, the number of new cases has been decreased. In 2009, following continued control efforts, the number of reported HAT cases dropped below 10,000 (9,878) for the first time in 50 years. This decrease in the number of cases continued with 6,314 new cases reported in 2012. Nevertheless, the total number of confirmed cases is about 20,000 and the overall population at risk is 65 million. Given this development, only a fraction of the population at risk of contracting HAT in sub-Saharan Africa is under surveillance and very few cases are reported annually. In particular, there is considerable under-diagnosis of *rhodesiense* HAT in sub-Saharan Africa, including Zambia, mainly due to lack of HAT surveillance and control programmes.

A 47-year-old man was hospitalized at the Treatment for Business Medical Center and Hospital in Lusaka, Zambia, with initial concerns of repeated episodes of headache, nausea, dizziness, body malaise and erythematous skin rashes. Quick diagnostic tests for malaria (Immuno Chromatographic Test and Blood Slide), typhoid (IgG / IgM) and tick fever (Weil Felix) were all negative. The patient's history revealed that he owned a wildlife safari lodge in KNP, some 16 kilometers from the Itumbi Safari Camp.

The patient had just returned from the park after an enhanced visit to the tourist peak during the festive holidays. Together with his colleagues, he was involved in a two-day search of a wounded wild animal that had been shot by poachers and needed veterinary attention. This search led the team to be exposed to deep forest and remote areas within the KNP. The patient reported being bitten several times by tsetse flies and other biting arthropods.

Given the historical presence of HAT by KNP, no new cases have been registered for more than 50 years. It can be attributed to a variety of causes, including lack of HAT monitoring in the

region and undetected HAT mortality due to misdiagnosis with other febrile conditions, such as malaria, tuberculosis and HIV / AIDS. While most cases of recurrence of HAT in Zambia are reported mainly from the Luangwa River Valley and to a lesser extent from the Zambezi River Valley, the patient identified here had no history of travel to either of these places, but was only bitten by tsetse flies from within the KNP, strongly suggesting that he had contracted the disease from that location. The patient's area of operation is just 16 kilometers from the Itumbi Safari Camp (old focus) which was closed in 1959 due to extreme cases of HAT. This further illustrates the continuous danger for park rangers, hunters, visitors, tourism facility operators, and the local community who might become contaminated, as wildlife in this protected area are niches for HAT. The infections at this stage are probably the result of an ecological disturbance that forces an encounter between an infected fly and humans.

Human clinical case diagnosis will begin with the identification of the endemic presence of the disease in the area or ecoregion. The presence of HAT in the environment has been shown in this situation. It is therefore recommended that all febrile conditions with a clinical picture resembling septicemia or malaria should have HAT at the top of their differential diagnostic list. This is important because early detection and treatment are key to case management. HAT progresses through distinct clinical stages, which eventually lead to death if left untreated. In the present case, while there was no invasion of the central nervous system, the confirmed HAT was diagnosed late due to the rapid development of the disease due to lack of historical occurrence or recognized / established presence of the disease in the region. This is further illustrated by the shortage of prescription medications and the occurrence reported by the local health care facility. It was, however, diagnosed by considering travel history and the recollection of multiple tsetse fly bites. This report further underlines the importance of accurate diagnosis in the management of HAT. Therefore, while the patient had progressed to a comatose condition with assisted ventilation, Suramin Therapeutic Intervention offered a complete cure for the disease.

HAT is re-emerging in Zambia's old foci, primarily in Luangwa and, to a lesser degree, in the Zambezi River Valleys, as is the case with other sub-Saharan African countries. This article reports on the HAT case of KNP about 50 years after the last case of the disease was reported in that old HAT case. This study is a further reminder of the need for continuous surveillance of HAT. It is envisaged that this study would

encourage more work to examine the prevalence of human-infective trypanosome species in Tsetse flies and probably KNP wildlife using user-friendly, precise and sensitive tests, such as LAMP, to assess the related risks of contracting HAT by local residents, park rangers, visitors and hunters. In addition, we

recommend the use of a micro-satellite analysis to determine the T-relatedness. b. Rhodesiense species from KNP to other HAT foci in Zambia where re-emerging cases of disease are recorded.