

DEDICATION

To my teachers in all fields throughout my life

With great

Appreciation

I dedicate this work

Abdallami

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ABSTRACT

The present study was designed to investigate the susceptibility of rats and donkeys to different stocks of *Trypanosoma evansi* infection in the Sudan. Two geographically different stocks of *T.evansi* were isolated from the two selected Eastern and Western camel zones of the country.

Both of these strains were found to be highly pathogenic with 100% fatality rate for both rats (10 individuals) and donkeys (4 head). However, parasitological, pathological, haematological as well as clinical differences between the two geographically different stocks were reported in this study.

Based on wet preparation diagnostic technique, parasitaemia was detectable in the blood of both kinds of infected animals within 4 days post inoculation. The course of the infection was quite variable as regards to species. It was 22 to 93 days in rats and 55 to 153 days in donkeys.

In addition to the statistically significant ($p < 0.05$) decrease in the red blood cells count (-38.1% to -69.2% or -58.7% to -75.5%), packed cell volume (-29.5% to -42.3% or -63%) and haemoglobin concentration (-38.5% upto -42.9%) of the infected rats or donkeys, one particular mechanism of anaemia known as erythrocyte osmotic fragility was also found to be progressively increased-particularly in the donkeys infected with *T.evansi* (Showak stock)-compared with the control group and the preinfection values. Moreover, some visual and microscopical blood disorders-such as erythrocyte granulation, rouleau formation and Methemoglobinaemia as well as lymphocytosis and excessive accumulation of fat granules were observed in these infected animals.

Fever (41°C) was observed at the onset of the disease in the infected donkeys. However, respiratory and heart rates were the most and continuously affected, fluctuating throughout the duration of the disease. This was clearly explained by the obvious gross pathological lesions found in these vital organs at necropsy (pigmentation and white spots in lung, tracheal collapse and white spots in heart).

It was concluded that both strains of *T.evansi* were highly pathogenic to rats and the donkeys. Thus the donkey may not only act as a reservoir when naturally infected with

T.evansi in the Sudan but it may die of the infection. In addition, the eastern strain (Showak-84) was more severe and more evident in the blood stream compared with the western one (Abu-Zabad-1), which was found to be hidden in the microvascular system of the tissue organs as well as other body fluids rather than blood.

ملخص

صمم هذا البحث لدراسة قابلية الحمير وفئران التجارب للإصابة التجريبيه بالطفيلي *T.evansi* المسبب لمرض الجفار في الإبل بالسودان. تم عزل عينه لهذا الطفيلي من جمل مصاب بمنطقة الشوك في شرق السودان و عينه أخرى من جمل آخر مصاب بمنطقة أبوزيد في غرب البلاد. أظهرت العينتان امراضيه عاليه في الحيوانات المحقونه بالطفيلي بمعدل وفاه 100% مع وجود فرق في بعض الخواص الطفيليه والمرضيه والتغيرات الدمويه بين المجموعات المحقونه بكل عينه على حده. وتموت الفئران المصابه خلال 1 إلى 3 شهور بعد الحقن بينما تموت الحمير المصابه خلال 2 إلى 5 شهور.

عند فحص مسحة دم سائله بسيطه فان فترة الحضانه لهذه الطفيليات تراوحت بين 2 إلى 4 أيام بعد حقن الحمير والفئران في الوريد أو الغشاء البريتوني على الترتيب أما عند فحص دم مركز بالطرد المركزي لأنابيب شعيريه فان فترة الحضانه لا تتجاوز 3 أيام بعد الحقن.

في الحمير تظهر الحمى ($41^{\circ}C$) في بداية المرض فقط بينما يستمر معدل التنفس ومعدل النبض في التآثر بحيث ترتفع ثم تنخفض لتعود إلى الطبيعي في شكل أمواج متكرره حتى نهاية الدراسه.

تحدثت الاصابه نقصان واضح في عدد كريات الدم الحمراء والنسبه المئويه لتراكم هذه الكريات ($PCV\%$) وتركيز الهيموغلوبين في الدم كما لوحظت زيادة واضحه في هشاشة كريات الدم الحمراء. كل هذا من دلالات فقر الدم في الحيوانات المصابه. أضف إلى ذلك تغيرات مجهرية وعيانيه في دم الحيوانات المصابه منها تراص كريات الدم الحمراء على شكل عمله حديديه مرصوصه (rouleau formation) وتحبب هذه الكريات (erythrocyte granulation) وتغير لون الدم إلى اللون البني (Methemoglobinaemia) أحيانا بالاضافه إلى زيادة تواجد حبيبات الدهن في الدم.

هذا وقد خلصت هذه الدراسه إلى أن عينتي الطفيل المستخدم في هذا البحث ممرضه جدا وقاتله للحمير والفئران وعليه فان الحمير قد لا تكون مجرد خازن للإصابه الطبيعيه بطفيلي *T.evansi* بل قد تكون الاصابه قاتله مما يلعب دور كبير في وبائية مرض الجفار خاصة وأن الحمير غالبا ما ترافق مرحات الإبل في السودان. كما وأن العترة الشرقيه (84-Showak) أكثر ضراوة وتواجدا في الدم المحيطي مقارنة بالعتره الغربيه (*Abu-Zabad-1*) التي تتواجد بكثافه داخل الأنسجه العضويه وغيرها من سوائل الجسم المختلفه.

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