DEDICATION

To my teachers in all fields throughout my life

With great

Appreciation

I dedicate this work

Abdallami
ACKNOWLEDGEMENT

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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 Methemoglobinemia 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 bloodstream 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 التجربة للأصابع التجريبية بالطفيلي T.evansi لمرض الجفار في الإبل بالسودان. تم عزل عينة لهذا الطفيلي من جمل مصاب بمنطقة الشوك في شرق السودان وعينة أخرى من جمل آخر مصاب بمنطقة أبو زبيد في غرب البلاد.

أظهرت العينات امراضية عالية في الحيوانات المصابات بالطفيلي بمعدل وفاء 100% مع وجود فرق في بعض الخصائص الطفيلي والمرضية والتغيرات الدموية بين المجموعات المصابه بكل عينة على حده. وتمت العينات المصابة خلال 1 إلى 3 شهور بعد الحقن بينما نمت الامراض على مدى 2 إلى 5 شهور.

عند فحص مسحة دم سائلها بسيطه فإن فترة الحضانة لهذه الطفيلييات تراوحت بين 2 إلى 4 أيام بعد حقن الحمير والفئران في الوريد أو الغشاء البريتوني على الترتيب أما عند فحص دم مركز بالطريق المركزي لأنابيب شعيرية فإن فترة الحضانة لا تتجاوز 3 أيام بعد الحقن.

في الحمير تظهر الحمى (41°C) في بداية المرض فقط بينما يستمر معدل التنفس ومعدل النبض في التأثر بحيث تتفوق تتكشف لتعود إلى الطبيعي في شكل أمور متكررة حتى نهاية الدراسة.

تحدث الأصابات في عدد كريات الدم الحمراء والنسبة المنوية تزامن هذه الكريات وتركيز الهيموغلوبين في الدم كما لوحظت زيادة واضحة في هشاشة كريات الدم الحمراء. كل هذا من دلالات قفر الدم في الحيوانات المصابة. أضف إلى ذلك تغييرات مجهريه وعينية في دم الحيوانات المصابة منها تراص كريات الدم الحمراء على شكل عبود حديدية (erythocyte granulation) وتحبيث هذه الكريات (rouleau formation) وتغيير لون الدم إلى اللون البني (Methemoglobinemia) وتحتاج الإضافات إلى زيادة تواجد حبيبات الدهن في الدم.

هذا وقد خلصت هذه الدراسة إلى أن عينة الطفيلي المستخدم في هذا البحث مرضه جداً وقائله T.evansi للحمير والفئران وعليه فإن الحمير قد لا تكون مجرد حارس للأصابع الطبيعية بطفيلي بل قد تكون الأصابع قاتلة مما يلعب دور كبير في وبائية مرض الجفار خاصة وأن الحمير غالبا ما ترافق مراحل الإبل في السودان. كما وأن العذرة الشرقية (Showak-84) أكثر ضراوة وتواجد في الدم المحيطي مقاومة بالعذرة الغربيه (Abu-Zabad-1) التي تتواجد بكثافه داخل الأنسجة العضوية وغيرها من سوائل الجسم المختلفه.
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