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Testicular/ Epididymal Morphometry of Rabbit Bucks Experimentally Infected with *Trypanosoma Brucei Brucei.*

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Abstract

The effects of experimental infection with *Trypanosoma brucei brucei* on testicular/epididymal morphometry of 20 adult male rabbits (bucks) were determined over a 12 weeks study period. Ten rabbit bucks were infected with 1 ml of the parasites containing 1 X 10^6 trypanosomes, while the other 10 bucks served as control post-infection. At the end of the experiment, two bucks from each of the groups were sacrificed and their testes were harvested for the determination of testicular/epididymal morphometry. The mean paired testicular weights for the control and the infected rabbit bucks were 1.81 ± 0.11 g and 1.82 ± 0.05 g. The mean paired epididymal weights of the control and the infected rabbit bucks were 3.19 ± 0.03 g and 2.83 ± 0.18 g, respectively. The mean paired testicular lengths for the control rabbit bucks were 8.09 ± 0.56 g, while the mean paired testicular lengths for the infected rabbit bucks were 7.79 ± 0.71 g respectively. This study has shown that *T. brucei brucei* is pathogenic to rabbit bucks causing serious reproductive disorders thereby exerting a negative effect on rabbit production and the socio-economic wellbeing of the tsetse endemic areas in the country and that the animals could serve as reservoirs of infection to other animals.

Keywords: Rabbit bucks, Infection, *Trypanosoma brucei brucei*, Testis, Epididymis

Introduction

African animal trypanosomes cause diseases in livestock, having an important economic impact on a lot of African countries causing a lot of deaths rating about 55,000 human and 3 million livestock deaths on an annual basis with over 60 million persons and 48-55 million livestock at risk of the disease (6, 4, 12). Trypanosomosis usually causes debilitating symptoms which manifest as anemia and a persistent febrile condition causing a reduction in production, with general weakness of affected animals which may eventually lead to death (4). Reproductive inefficiency is the most limiting constraint to efficient rabbit production in the tropics (2). The efficiency of sperm production, libido, and quality of spermatozoa tend to remain uniform throughout the reproductive life of an animal but may be significantly altered by age, nutrition, environment, health status, drugs, and chemicals (11). Rabbit is now becoming a very important cheap source of meat coupled with its low venture starting capital, high nutritional value, and high multiplication rate, it is necessary to evaluate the gonadal and extragonadal dimensions of rabbit bucks infected with *Trypanosoma brucei brucei*.

Materials and Methods

Experimental Rabbits and Housing

Twenty (20) domesticated adult rabbit bucks with an average weight of 2.0 ± 0.8 kg were acquired from a rabbitry within Zaria metropolis of Kaduna State. The rabbit bucks were kept in individual fly-proof cages and fed with grower's mash and water was provided *ad libitum*. The rabbit bucks were allowed to acclimatize for 14 days thereafter; they were examined, screened, dewormed with Levamisole Hcl (0.1% injection subcutaneously), and treated for other diseases such as *Eimeria staedia* with Embazine ® forte (1g/5kg) before the commencement of the experiment. The rabbit bucks were randomly assigned into two groups; control and infected consisting of ten rabbit bucks respectively.

Experimental Infection of the Animals

Stabilates of *T. brucei brucei* were acquired from the Department of Parasitology and Entomology of the Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria. Before infecting the rabbits, the trypanosomes were maintained by serial syringe passages in white rats, and periodically checked for the viability of the parasite. Blood was obtained from the passaged rats by tail bleeding into normal saline and the parasitaemia was adjusted to 1 x 10^6 trypanosomes per milliliter (ml) by the method of (3). Each rabbit in Group B was inoculated intraperitoneally with 1ml of saline-diluted blood containing 1 x 10^6 trypanosomes *T. brucei brucei*, while Group A rabbits served as uninfected control.

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Testicular/Epididymal Morphometry

The testis and epididymis of each of the rabbit bucks were carefully harvested. The epididymis was carefully separated from the testis with a scalpel and the lengths and weights of the caput, corpus and cauda portions were determined using a measuring tape and a digital weight balance (essae®) respectively. The length and weight of the testis was determined using a measuring tape and the digital weight balance.

Statistical Analysis

All data obtained were expressed as mean ± standard error of the mean (SEM) and unpaired student t-test was used to test for differences between groups using Graph pad prism version 5.0. Values of $P < 0.05$ were considered statistically significant.

Results and Discussion

Rabbit bucks showed no significant differences ($P > 0.05$) between the control and infected group as shown in Table 1. There was decrease in the right testicular weights, right caput weight, left corpus weight and right cauda weight while there were increases in values for the left testicular weight, right and left epididymal weights, right corpus and left cauda weights of the testicles and epididymides of the infected bucks compared to the control. This corroborates the work of (1), who reported a decreased weight and length of deer mice (*Peromyscus maniculata*) experimentally infected with *T. brucei brucei*, and agrees with the work of Obi *et al*., (2013) who had an increase in testicular weights, epididymal weights of dogs infected with trypanosoma *brucei brucei*. The change in values can be attributed to the degenerative changes observed in the testis during the study. The findings of this study corroborate the findings obtained from buck, boar, bull, rats and rams (8, 10, 9, 7, 5).

Table 1. Mean (±SEM) Testicular/Epididymal Lengths and Weights of infected and non-infected rabbit bucks post infection.

Variables	Control n=4 Mean ± SEM	Infected n=4 Mean ± SEM
Right Testis weight (g)	1.91 ± 0.20	1.87 ± 0.20
Left Testis Weight (g)	1.70 ± 0.19	1.77 ± 0.17
Right epididymal weight (g)	3.01 ± 0.30	3.16 ± 0.34
Left epididymal weight (g)	2.65 ± 0.22	3.22 ± 0.45
Right caput weight (g)	0.87 ± 0.22	0.70 ± 0.23
Left caput weight (g)	0.96 ± 0.29	0.84 ± 0.31
Right corpus weight (g)	0.12 ± 0.05	0.14 ± 0.32
Left corpus weight (g)	0.13 ± 0.07	0.04 ± 0.00
Right cauda weight (g)	0.99 ± 0.21	0.95 ± 0.23
Left cauda weight (g)	0.71 ± 0.04	0.78 ± 0.06
Right Testis length (cm)	7.08 ± 0.53	7.53 ± 0.41
Left Testis length (cm)	8.50 ± 0.08	8.65 ± 0.30
Paired Testicular weight	1.81 ± 0.11	1.82 ± 0.05
Paired epididymal weight	3.19 ± 0.03	2.83 ± 0.18
Paired Testicular length	8.09 ± 0.56	7.79 ± 0.71

Conclusion

This study showed a need of considering trypanosomosis as a differential diagnosis when previously productive rabbit bucks suddenly have a low libido and develop serious reproductive anomalies in tsetse endemic areas, hence there is a serious need for control of the tsetse fly vector and or housing of rabbits in fly proof cages in order to reduce the devastating effect of trypanosomosis. The study suggests that further studies be carried out to ascertain if chemotherapy can limit the infection and enhance early recovery from reproductive organ damages and which of the chemotherapeutic agent is more potent and safest in the treatment of the infection in rabbit bucks.

Conflicts of interest

The authors declare that there is no conflict of interest.

Ethical approval

All applicable international, national and/or insditutional guidelines for the care and use of animals were followed. Approval for this study was sought and gotten from the Ahmadu Bello University Committee for animal use and care.

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