

A Serological Study on Equine Brucellosis in Darfur, Western Sudan.

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ملخص البحث

أجريت دراسة مصلية لتقصي مرض البروسيلا في 346 حصاناً و28 حماراً باستخدام إختبارات الـروز بنغال الصحي (RBPT) والتراص المصلي (SAT) والمثبت المكمل (CFT). أعطى 17 (4.9%) حصان وحمار واحد (3.6%) تفاعلات موجبة للمرض، كما إن أربعة خيول أظهرت أعراضاً مرضية تلائم مرض البروسيلا وهي صلابة في العضلات وناسور الغارب (fistulous withers) وصعوبة حركة الرجلين الخلفيتين وخمول. أجهضت فرس موجبة للبروسيلا في الشهر الرابع من الحمل، لكن لم يتم التأكد من سبب الإجهاض. كما تراوح عيار الضد لإختبار التراص المصلي في الحيوانات الموجبة للبروسيلا بين 41 و 264 وحدة عالمية /مل. أقرحت بعض التوصيات المناسبة للسيطرة على المرض في الأبقار والعوائل الأساسية الأخرى والحيوانات المريضة ولتحسين إدارة تربية الخيول في دارفور.

Summary

Three hundred and forty-six horses and 28 donkeys were subjected to a serological study for brucellosis using Rose Bengal Plate (RBPT), Serum Agglutination (SAT) and Complement Fixation (CFT) Tests. Seventeen (4.9%) out of the 346 horses and one (3.6%) out of the 28 donkeys were positive for the disease. Four (3.5%) out of the 17 positive horses had clinical signs pertinent to brucellosis. These were muscular stiffness, fistulous withers, difficulty of moving hindquarters, and lethargy. A serologically brucellosis-positive mare had aborted at the fourth month of pregnancy but the exact cause of abortion could not be confirmed. SAT antibody titres of the positive equines ranged from 41 to 264 i.u/ml. Recommendations are made for control of the disease in cattle. Reservoir of the disease in Darfur, and other primary hosts and infected animals, and for improvement of equine management in the region.

Introduction

Darfur, including North, South and West Darfur States, is the main animal breeding area in the Sudan. Local veterinary authorities estimated cattle population in the three states to be 11 million head. The principal method of husbandry in western Sudan is pastoral nomadism with mixed breeding of domestic animals. Almost every nomad or a resident in rural areas owns, at least, a horse and/or a donkey. Thus, the total population of the two species was estimated to be over two million head. Equines have a multipurpose use, especially for looking after cattle under nomadic conditions, agricultural practices, transport and cart pulling. Under nomadic conditions, equines are grazed, watered and kept in close contact with cattle

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and other domestic animal species. Under sedentary conditions they are fed on hay collected from common fields.

In Darfur, Brucellosis occurs in cattle, sheep, goats, camels, and in some species of wildlife and birds (Musa, 1995). This investigator also indicated that cattle were the main reservoir of the disease. Earlier, Musa *et al.* (1990) reported a prevalence of the disease that ranged between 14.9% and 26.5% in cattle in different localities of western Sudan. Ingestion of forage and water contaminated by infected genital discharge is believed to be the most common route of *Brucella* infection. Horses are susceptible to the disease and *Brucella abortus* (*B. abortus*) was isolated from over nine domestic animal species including the horse (Nielsen and Duncan, 1990).

This work investigates into the prevalence of brucellosis in horses and donkeys in Darfur, western Sudan.

Materials and Methods

Three hundred and seventy-four single serum samples were collected from 346 horses and 28 donkeys in the three states of Darfur for serological diagnosis of brucellosis. The equines bled were in direct or indirect contact with cattle that were infected with brucellosis as diagnosed by serological methods and isolation of *B. abortus* from different pathological specimens (Musa, 1995). Information about clinical signs relevant to brucellosis, sex, age and localities of the equines sampled were recorded. The serum samples collected were transported in ice-boxes to Nyala Veterinary Research Laboratory and stored at -20°C till needed for examination by the RBPT, SAT and CFT using standard techniques (Morgan *et al.*, 1978). Analysis of the serological results of the test serum samples was made.

Results

Out of 346 horses and 28 donkeys examined, 17(4.9%) of the formers and 1 (3.6%) of the latters were positive for brucellosis. One of the positive horses was used for pulling a cart to transport meat from Kass abattoir in South Darfur State to the butcher house in the town. Another positive horse was kept with nomadic cattle infected with brucellosis and was frequently fed with raw cow's milk; a habit which has been widely practised by some nomads in the area. That horse was lethargic at the time of examination. It died three months after the test. The other positive horses were from different localities and husbandry methods. Three horses had disease symptoms pertinent to brucellosis; one mare had aborted at the 4th month of pregnancy (Table 1) but the cause of abortion could not be established. A nomadic cattle owner whose animals were infected also owned the single positive donkey.

The serological tests results of the positive equines and the clinical manifestations associated with them are presented in Table 1.

Discussion

In the United Kingdom, Dawson and Durrat (1975) examined equine serum samples for brucellosis diagnosis using RBPT, SAT, CFT and Coombs Anti-globulin Test (CAGT). They have proved the superiority of CAGT followed by CFT over that of SAT. They added that the results of RBPT agree with those of the CAGT and CFT but in a few instances RBPT was either over or less sensitive than the other two tests. Subsequent to that, MacMillan (1985) used SAT, CFT and CAGT for a similar purpose and confirmed that the latter test was more sensitive than the former two. In this study RBPT was used for screening, SAT for measurement of antibody titres and CFT for confirmation of the two tests results. Unfortunately, CAGT could not be used because it was difficult to obtain antihorse globulins. As a result, some positive cases might have been missed yet the study proved the presence of brucellosis in equines which were kept in direct or indirect contact with cattle and other species in western Sudan.

It was observed that four out of the 17 infected horses had clinical signs pertinent to brucellosis. Ray (1977) believed that *B. abortus* tends to localize in the bursae, tendons, muscles and joints rather than tissues of reproductive tract. Nicoletti (1980) added that the organism also produces abortions in horses and donkeys, and that such abortions could be a source of infection to cattle. MacMillan and Cockrem, (1986) have found out that infected horses did not excrete *Brucella* organisms sufficiently to infect fully susceptible cattle with which they were in contact. As a result, the investigators concluded that horses are infected by contact with infected cattle, other species or both and that transmission of infection from horses to cattle or between horses themselves is very unlikely. As a result control of brucellosis in cattle and other animals in the region is important for the health of over two million equines in western Sudan. Horses used for pulling carts to transport meat are to be used with caution, because cattle with hygromas due to brucellosis are slaughtered in abattoirs in western Sudan and this leads to contamination of the abattoir slabs (Eze, 1981) and hence infection of horses. Likewise, feeding horses with raw cow's milk and other mal-practices that lead to infection of horses should be abandoned. Hay for equine should be collected from uncontaminated fields.

Table 1: The serological tests results and clinical signs of brucellosis-positive equines :

Serial No.	Type of Animal	Sex	Clinical signs	RBPT	SAT		CFT
					Dilution	i.u.	
1	Horse	M		+ve	$\frac{2}{160}$	204	NT
2	"	M		+ve	$\frac{1}{80}$	102.5	$\frac{1}{20}$
3	"	M		+ve	$\frac{2}{160}$	264	$\frac{1}{20}$
4	"	M		+ve	$\frac{1}{160}$	205	$\frac{1}{80}$
5	"	M		+ve	$\frac{1}{80}$	102.5	$\frac{1}{40}$
6	"	M		+ve	$\frac{1}{40}$	51.5	$\frac{2}{5}$
7	"	M		+ve	$\frac{1}{80}$	102.5	$\frac{1}{10}$
8	"	M		+ve	$\frac{1}{80}$	102.5	$\frac{1}{40}$
9	"	M	Muscular stiffness	+ve	$\frac{1}{40}$	51.5	$\frac{1}{20}$
10	"	M		+ve	$\frac{1}{80}$	102.5	$\frac{1}{10}$
11	"	M	Fistulous withers, inflammation of hind quarters	+ve	$\frac{1}{80}$	102.5	$\frac{1}{10}$
12	"	M		+ve	$\frac{2}{40}$	61.5	$\frac{1}{20}$
13	"	M		+ve	$\frac{1}{80}$	102.5	AC
14	"	M		+ve	$\frac{1}{40}$	51.5	$\frac{2}{10}$
15*	"	M	Lethargy	+ve(s)	$\frac{4}{40}$	82	NT
16	"	M		+ve	$\frac{1}{40}$	51.5	$\frac{1}{40}$
17	"	F	Abortion	+ve	$\frac{1}{80}$	102.5	$\frac{2}{10}$
18	Donkey	F		+ve	$\frac{4}{20}$	41	$\frac{2}{4}$

Key: +ve= positive for brucellosis, NT= not tested, i.u.= International Unit, +ve(s)= Strong positive for Rose Bengal Plate Test, M= Male, F= Female, *= fed on raw milk and died 3 months following sample collection.

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References

- Dawson, F. L. M. and Durrat, D. S. (1975). *Equ. Vet. J.*, **3**: 137 – 140.
- Eze, E. N. (1981). *Bull. Anim. Hlth. Prod. Afri.*, **29**: 193-195.
- MacMillan, A. P. (1985). *Vet. Rec.*, **117**, 638 – 639.
- MacMillan, A. P. and Cockrem, D. S. (1986). *Equ. Vet. J.*, **18**(5): 388-390.
- Morgan, W. J. B.; Mackinnon, D. J.; Gill, K. P. W.; Gower, S. G. M. and Norris, P. I. W. (1978). *Brucellosis Diagnosis Standard Laboratory Techniques*. Ministry of Agriculture Fisheries and Food. Central Veterinary Laboratory, New Haw, Weybridge pp. 1 – 36.
- Musa, M. T. (1995). *Brucellosis in Darfur States: The Magnitude of the Problem and Methods of Diagnosis and Control. Ph. D. Thesis*, University of Khartoum, Khartoum, pp. 73 – 104.
- Musa, M. T.; Jahan, K. L. and Fadlalla, M. E. (1990). *J. Comp. Path.*, **102**: 49-54.
- Nicoletti, P. (1980). *Adv. Vet. Sci. Comp. Med.*, **24**: 70 – 95.
- Nielsen, K. and Duncan, J. R. (1990). *Animal Brucellosis*. CRC Press, Boca Raton, Florida. pp. 131 – 153.
- Ray, W. C. (1977). The epidemiology of *Brucella abortus* in bovine brucellosis. *An International Symposium*. Crawford, R. P. and Hidalgo, R. J. (eds). Texas A & M University Press, College Station. p. 103.