

Short Communication

The Prevalence Of Brucellosis In Cattle
In White Nile State, Sudan

Suhair Sayed Mohammed,²Aidrous Majzoub Aidrous, Mona Ali Basher,²Mona Fathalrahman Elshiekh and Manahil Abdalrahman

Dep .of Surgery, Obstetrics and Gynecology, ,College of Veterinary Medicine, University of Bahri ,Director of the Teaching Veterinary Hospital, Alkadru ,North Bahri, Sudan

University of Bahri, College of Veterinary Medicine, North Bahri, Sudan

Received: 22/2/2019

Accepted: 20/4/2019

Abstract:

This study was conducted in White Nile State in order to investigate the prevalence of bovine brucellosis. A surveillance was performed to cover to some areas and eighty three blood samples (n=80, cows,n=3,bulls) were randomly collected from some dairy farms in Assalaia, Kenana and Rabak . Serum samples were obtained and examined by Rose Bengal Plate Test (RBPT) to detect antibodies of brucella. Six samples (7.22%) only were reported to be positive, five cases in Kenana (83.33%) and one case (16.67%)in Rabak . This study indicated that brucellosis could be one of the health and production problems in some dairy farms in White Nile State and probably is one of the major zoonotic diseases.

Keywords: Cattle, Brucellosis, White Nile State

Introduction:

Brucellosis is a sub-acute or chronic disease which may affect many species of animals. Following infection clinical symptoms are often not apparent. However, in sexually mature animals the infection localizes in the reproductive system and produces placentitis followed by abortion in the pregnant female, usually during the last third of pregnancy. In males it causes epididymitis and orchitis and hygroma (Omer *et al.*,2010).

Brucellosis of cattle is a contagious disease of livestock, it is also known as contagious abortion and Bang's disease .It is caused by gram-negative coccobacillae bacteria which belong to the genus *Brucella* . In cattle , infection occurs by the bacterium *Brucella abortus*, which can also cause a disease of humans known as "undulant fever" (Corbel *et al.*,2006).

The first isolation of *Brucella* organisms from animals was made by Bang (1897).In the Sudan, the first isolation of *Br.abortus* was made by Bennet (1943)from a Friesian herd at Bulgrovia Dairy Farm. But the first isolation of *Br.abortus* from local cattle was from a cow which aborted at Juba Dairy Farm (Dafalla , 1962).

The importance of the disease is due to its zoonotic (Young,1995 , Nicoletti,2016) and economic impacts (Angara and Elfadil,2014 , Angara *et al.*,2016 and Mohamed and Idris,2016). Brucellosis is transmitted from cattle, sheep, goats, pigs and camels through

the direct contact with blood, placenta, fetus, uterine secretions, or through consumption of contaminated raw animal products (McDermott *et al.*,2013).

There are different methods adopted for the diagnosis of brucella as serum Rose Bengal plate test (RBPT), modified RBPT(mRBPT), serum agglutination test (SAT) and competitive enzyme-linked immunosorbent assay (cELISA), and milk by the milk ring test(MRT)(Morgan *et al.*,1978, MacMillan and Cockrem, 1985, Kolar,1990 ,Omer *et al.*,2010 and Abdalla and Hamid,2012).

In Sudan the RBPT is widely used in brucellosis screening for regulatory control and export requirements ,as it is cheap, and rapid, test (Anon,2010 , Mohammed and Abdelgadir,,2016).The RBPT is very sensitive and is suitable for screening herds for brucellosis, but it can give false positive results due to vaccination with *B. abortus* strain 19 vaccine or cross reactions with other bacteria. The RBPT has been reported to have high sensitivity , therefore false negative responses are reported to occur less frequently than false positive responses(OIE,2004).

In Sudan, different types of brucellosis had been reported in different areas and animals (Dafalla,1962, Sulieman,1987 , Musa ,1995, El.Ansary *et al.*,2001,Ibrahim,2006, Omer *et al.*,2010,Angra *et al.*,2014 and Mohamed and Idris,2016) .

This study was designed to investigate the prevalence of brucellosis in cattle in some areas in White Nile State.

Materials and Methods:

Study area :White Nile state.: 13°27'N 32°20' E, (Assalia,Kenana and Rabak)

Area :30,411Km²



Materials:

ANIMALS:Atotal number of 83(n=80 cows ,n=3 bulls) from different farms in Assalia,Kenana and Rabak areas were randomly selected .

Methods:

Sampling : Five ml. of blood sample were collected from the jugular vein of cattle (Rabak ,4, Kenana ,23 and Assalaia, 56) using vaccutainers . Blood samples were centrifuged and serum samples were obtained and kept at -20 C° for brucella examination.

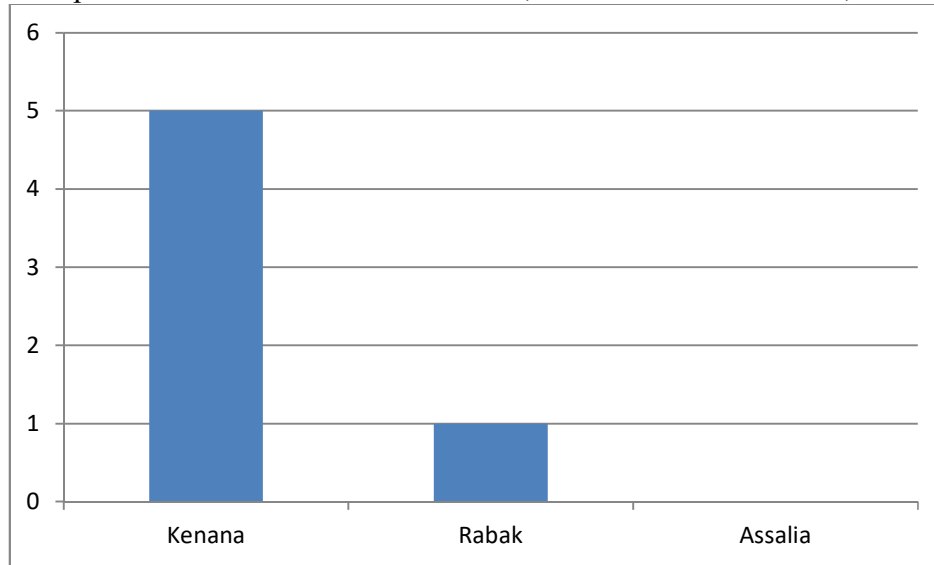
Rose Bengal Plate Test (RBPT) : The Rose Bengal Plate Test is a spot agglutination technique it was adopted by Alton *et al.*, (1988) for brucella detection. With micropipette 0.25ml was taken from each serum sample and 0.25ml of antigen was

placed adjacent to the serum. The serum was mixed with antigen with the broad end of a clean stirrer. Samples showed agglutination, with moderate to large clumps were reported positive and samples did not show agglutination or clumps were reported to be negative. For technical reasons no further confirmatory tests were applied.

Results:

Only 6 samples out of the 83 (7.22%) reacted positively to RBPT . The distribution of positive cases is shown I the figure below .Five cases were reported in Kenana (83.33%) and one (16.67%) in Rabak while none was reported in Assalia.

The prevalence of Brucellosis in Kenana, Rabak and Assalia areas,White Nile State.



Discussion:

In this study a low frequency rates of brucellosis were reported in the examined areas. This could be attributed to the husbandry system in commercial farms. This system is characterized by a restricted cattle movement, minimized contact with others and eventually low contamination, compared to the pastoral or agro-pastoral systems. According to the FAO (1986), the levels of brucella infections tend to be relatively high on intensive farms, whether these have indigenous cattle or introduced breeds. A high incidence of bovine brucellosis was reported in intensive system husbandry in Erteria (Omer *et al.*,2000). However,Mai *et al.*(2012) reported a percentage of (15.9) positive cases of bovine brucellosis in commercial farms compared to(45.1) and (22.0) in pastoral and agro-pastoral systems respectively.

Although the majority of blood samples collected were represented by farms from Assalia area (56 sample)(67,47%), but no positive cases were reported. According to records, the owners did not vaccinate their cattle which are of indigenous breeds. This result could be attributed to the sensitivity of the RBPT test , as it detects specific antibodies of the Ig M and Ig G types and is more effective in detecting antibodies of the Ig G 1 type than Ig M and Ig G 2 types (Levieux, 1974). The test may yield negative results in infected cattle that give positive result with the Complement Fixation Test (CFT) (Rose and Roepke, 1957). Also these findings could be associated with an acquired infection in uterus or by ingestion of contaminated vaginal discharge or milk. These early infections were thought to be temporal, but they react negatively to

serological test. These were referred to as latent carriers (Cunningham, 1977). Nagy and Hignett (1976) indicated that the neonatal infection led to a degree of immunity against subsequent exposure to infection.

Kenana farms were represented by 23 blood samples(27.71%) out of the total samples collected, five of which were positive (6.02%). This group is composed of crosses (Friesian x indigenous) and according to records the vaccination program was not fixed. This high incidence compared to the other obtained figures, could be attributed to the introduction of imported or crossbred cattle, some of which might have originated from infected sources. Bakhiet(1981) recorded a high incidence of brucellosis in cross-bred cattle(22.5%) compared to the native (1.2%). However in Rabak only 4(4.81%) blood samples were obtained and only one case(1.20%) was positive and the animals were of local breed.

Similarly, other studies in other states of Sudan, showed low frequency rates of brucellosis among cattle as in Kassala area(5%) compared with other parts of Sudan(El-Ansary *et al.*,2001). Dafalla(1962) reported 10.7% in Nisheshiba in Al Gezira state, however,Fayza *et al.*(1990) reported an incidence of 15.7% in Khartoum State. Musa,(1995) and Mustafa(2010) reported 13.7% and 31 cases out of 300(10.3%) to be positive in bovine in Darfur and West Darfur respectively. In Kosti area, Ibrahim (2006) reported that, out of 120 bovine serum samples 12(10%) were positive using rose Bengal plate test. Mohammedahmed (2009) reported 9 positive cases of cattle out of 200 in El-Huda locality,Gezira State. However,Angra *et al.*,(2009) reported a high incidence of bovine brucellosis(31.0%) using RBPT in Kuku Dairy Scheme located in the Eastern locality and attributed this to the introduction of foreign breeds. Similarly, 203 cattle (38.7%) (crossbred) were reported to be positive in the Teaching Veterinary Hospital (TVH), Bahri North locality (Mohammed, *Personal communication*).

In conclusion, the incidence of brucellosis in cattle is low in Assalia, Kenana and Rabak in White Nile State. An extensive surveillance is needed and further confirmatory tests should be applied, also investigations for the epidemiology of human and bovine brucellosis are needed. To eradicate bovine brucellosis extension programs are important for the awareness of the importance of vaccination against brucellosis. Vaccination and culling of positive cases policy should be adopted by authorities.

Acknowledgement:

Our thanks and gratitude are to Mr.Alrashid Abass, chief technician, Laboratory Of The Teaching Veterinary Hospital, College of Veterinary Medicine.

References :

1. **Abdalla ,A. and Hamid,M.E.(2012).**Comparison of conventional and non-conventional techniques for the diagnosis of bovine brucellosis in Sudan, *Tropical Animal Health and Production*, 2012, Volume 44, Issue 6, pp 1151–1155
2. **Alton, G.G, Jones, L.M, Angus, R.D.and Verger ,J.M.(1988)** Techniques for the brucellosis Laboratory. Paris: Institut National de La Recherche Agronomique,; 190.
3. **Angara, T- E.E.; Ismail. A.A. A.; Agab. H. and Saeed, N. M. (2009).**Seroprevalence of Bovine brucellosis in Kuku dairy Scheme. *Sudan J.Vet.Sci. and Anim.Husb.*48 (1&2): pp.27-35.
4. **Angara, T- E.E. and Elfadil, M. H.M.(2014).** Economic Impact of Infertility in Crossbred Dairy Cows: The Case of Eastern Nile Locality, Sudan. *PARIPEX Indian Journal of Research.* 3 (8),pp,195-197.

5. **Angara ,T.E., Ismail ,A.A , Ibrahim .A.M , Osman .S.Z.(2016).**Assessment of the Economic Losses Due to Bovine Brucellosis in Khartoum State, *Sud. Int. J. of Tech. Res. and Appl.*, Volume 4, Issue 2 , pp: 85-90.
6. **Anon (2010):** Report of Federal Ministry of Animal Resources and Fisheries, Sudan Government.
7. **Bakheit,M.(1981).**Brucellosis in Creoss-bred cattle.*Sud.J.Vet.Res.*,3:pp:119-120.
8. **Bang, B. (1897).** The etiology of epizootic abortion. *J. Comp. path. Therap.* 10: 125-150.
9. **Bennet, S.G. (1943).** Annual Report of the Sudan Veterinary Service. 29-30.
10. **Corbel ,M.J., Alton ,G.G., Banai ,M., Díaz, R., Dranovskaia ,B.A.(2006).** Brucellosis in human and animals. Geneva: WHO Press.
11. **Cunningham,B.(1977)**Difficult disease Cattle Brucellosis In Crowford,R.P and Hildalgo,R.J(ed.).Bovine Brucellosis. An International Symposium ,College Station Texas,A and M University Press.pp:11-20.
12. **Dafalla, E.N. (1962).** Incidence of animal. and human brucellosis in the Sudan. *J.Vet.Sci.Anim.Husb.*,3:pp:80-89.
13. **El-Ansary ,E.H , Mohammed ,B.A. , Hamad, A.R. , Karom ,A.G.(2001).** Brucellosis among animals and human contacts in eastern Sudan. *Saudi Medical Journal.* 22(7):pp:577-579.
14. **Fayza,A.O,Elshakh,O.H,Zakia,A.M.,Halima,M.O.,Sulieman, H.B. and Osman A.Y.(1990),**Survey of Brucellosis Among Cattle,Camels Goats and Sheep in Sudan.*Sud.J.Vet.Res.*9,pp:36-40.
15. **Food and Agriculture Organization of the United Nations (FAO)/World Health Organisation (WHO) (1986).** Joint Expert Committee on Brucellosis Sixth Report WHO Technical Report Series No. 740, Geneva 1-131.
16. **Ibrahim,E.D.F.(2006).**A Study On Brucellosis In Kosti Area, White Nile State, Sudan, A dissertation submitted to the University of Khartoum in partial fulfillment of the requirements for the degree of Master of Tropical Animal Health .
17. **Kolar, J. (1990).** Diagnosis and control of brucellosis in small ruminants. *Prev.Vet. Med.*2, 512.
18. **Levieux, D. (1974).** Bovine immunoglobulins and brucellosis. Activity of serumIgG1, IgG2 and 19 M in agglutination, coomb's, CFT and Rose BengalPlate Test. *Annals de Research Veterinary* 5: 343-353.
19. **MacMillan, A.P.; and Cockrem, D.S. (1985).** Reduction of non-specific reactions to the *Brucella abortus* serum agglutination test by the addition of EDTA. *Res. Vet. Sci.* 38: 288-291.
20. **Mai,H.M., Irons,P.C.Kabir,J. and Thompson,P.N.(2012).**A large seroprevalence survey of brucellosis in cattle herds under diverse production systems in northern Nigeria, *BMC Vet Res.* 8:144.
21. **McDermott,J. ,Grace,D. and Zinsstag, J. (2013).** Economics of brucellosis impact and control in low-income countries. *Rev. sci. tech. Off. int. Epiz.*, 32 (1), 249-261.
22. **Mohamed,I.A.W and Idris,A.F.(2016)** The Economic Impacts of Animal Disease Transmitted to Human in the Sudan.*Int. J. of Adv.Res. in Manag, Eng. and Tech.* Vol.1, Issue.1,pp :61-68.

23. **Mohammed and Abdelgadir (2016).** Cross-sectional Study of Camel (*Camelus dromedaries*) Brucellosis In the Red Sea State, Sudan. *J. Appl. Sci. and Res.*, 4 (2):67-77
24. **Mohammedahmed,M.A.M.(2009).** Bovine Brucellosis in El-Huda Area, Al-Gezira State, Sudan, A dissertation submitted to the University of Khartoum in partial fulfillment of the requirements for the degree of Master of Tropical Animal Health .
25. **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, London.
26. **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.
27. **Mustafa.Y.M.S.(2010)**Prevalence of Brucellosis in Cattle, Sheep and Goats of West Darfur State,Sudan. partial fulfillment of the requirements for the degree of Master of Veterinary Science.
28. **Nicoletti, P.(2016)**Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Kenilworth, NJ, USA.
29. **Nagy, L.K.; and Hignett, P.G. (1976).** Control of brucellosis in a dairy farm. *Res.Vet. Sci.* Vol. (8).
30. **Omer ,M.K., Skjerve, E., Holstad,G., WoldehIwet,Z. and Macmillan ,A.P.(2000).** Prevalence of antibodies to Brucella spp. in cattle, sheep,goats, horses and camels in the State of Eritrea; influence of husbandry systems.*Epidemiol. Infect.* (2000), 125, 447-453..
31. **Omer , M.M, Musa.M.T , Bakhiet ,M.R and Perrett ,L.(2010).** Brucellosis in camels, cattle and humans:associations and evaluation of serological tests used for diagnosis of the disease in certain nomadic localities in Sudan. *Rev. sci. tech.Off. int. Epiz.*, 29 (3),pp: 663-669.
32. **Rose, J.E.; and Roepke, M. H. (1957).** Rose, J.E.; and Roepke, M. H. (1957). An acidified antigen for detection of non specific reactions in the plate agglutination test for bovine brucellosis.*Anim. J. Vet. Res.* 18: pp:550-555.
33. **Sulieman,M.A.(1987).**The Prevalence of Bovine Brucellosis in Khartoum and Gezira area.MVSc.Thesis.Faculty Of Vet.Sci., University of Khartoum.
34. **World Organisation for Animal Health (OIE) (2004).** Bovine brucellosis. *In* Manual of Standards for Diagnostic Tests and Vaccines. OIE, Paris,pp: 409-439.
35. **Young,E.J. 1995.** An overview of human brucellosis. *Clini. Infect. Dis.*, 21, pp:283-289.