International Journal on Infectious Disease and Epidemiology

Some Observations on Surra Disease in Dromedary Camels in Dubai, UAE

Research Article

Volume 4 Issue 2- 2023

Author Details

AA Taha, AA Ismail and J Juhasz*

Emirates Industry for Camel Milk & Products, UAE

*Corresponding author

AA Taha, Emirates Industry for Camel Milk & Products, UAE

Article History

Received: September 26, 2023 Accepted: September 29, 2023 Published: October 04, 2023

Summary

This study conducted in dairy dromedary camel Farm kept under intensive management system near Dubai, UAE. Camels are kept in good health, environmental and nutritional status. its retrospective study using different diagnostic tools, clinical picture, pathological lesions, and the response of different medication during the period from 2013-2021. Performance of the diagnostic techniques also evaluated in this study.

Introduction

The dromedary camel is specifically adapted to life in hot, arid areas of the world, notably the Middle East, Africa and India, with a considerable feral population in Australia. Camel milk and meat are considered important source of proteins for wide range of population [1]. UAE have 450000 head of camels (MOCCAE) and Dubai have the first and fast camel dairy farm in world [2]. Surra is important camel disease caused by Trypanosoma evansi (T evansi), a hemoflagellate parasite identified for the first time in India in 1880. The disease is transmitted by bloodsucking flies of Tabanidae. The principal hosts and reservoirs for T evansi are reported to differ between regions; however, camels, equids, water buffalo and cattle are generally considered to be the major hosts among domesticated animals. Equids, Bactrian camels (Camelus bactrianus) and dromedaries (Camelus dromedaries) are highly susceptible to disease. Infections are usually mild or asymptomatic in cattle, water buffalo and related species in the Bovinae (the genera Bos, Bubalus, Syncerus, and Poephagus) in Africa or Latin America, but cattle and water buffalo regularly become ill in Asia [3-5]. Clinical signs of trypanosomiosis may be nonspecific or absent in camels, and thus, laboratory diagnosis should be carried out for confirmation of infection. Several methods with varying degrees of sensitivity and specificity may be used for the diagnosis of trypanosomiosis. Standard trypanosome detection methods, such as microscopical examination of fresh or stained blood-smears, has been historically used in the identification of Trypanosome spp. Unfortunately, this technique lacks sensitivity and specificity. A serological assay, the card agglutination test for T evansi (CATT/T evansi) is a rapid diagnostic test and currently recommended by the World Organization for Animal Health [4,6]. Additionally, molecular analysis targeting the internal transcribed spacer 1 (ITS1) region provides multi-species-specific detection of trypanosomes in a single PCR [7] and has been used in epidemiological studies.

Materials and Methods

Blood samples were collected from different camel groups and subjected for direct detection of parasites by direct smear method, hematocrit centrifuge as described by [8]. Serum samples were tested by ELISA and CATT test, PCR test also performed according to OIE manual.

Response to Treatment

Three types of drugs were used in treatment of new arrived (quarantine) and suspected animals. These drugs are mentioned with doses and routes of administration in (Table 1).

Table 1: The Different Medicine used and their dosage and Route of Administration.

Drug	Dosage and Rout of Administration
Isometamidium chloride (Veridium®, Ceva, France)	0.5 to 1mg/kg by Deep I/M or slow I/V
Quinapyramine sulphate 1.5g and Quinapyramine Chloride 1g (Triquin®, Vetoquinol, India)	0.030ml/kg by S/C only
Bis (aminoethylthio)- 4melaminophenylarsine hydrochloride (Cymelarsan®, Merial, France)	1ml/20kg by Deep I/M

Results

In this Retrospective study the result of clinical, blood examination, postmortem findings and response to treatment of trypanosome infection were reported. Diagnosis was made by clinical sings, Microhaematocrit Technique, CATT/T evansi, Ab ELISA, PCR and postmortem of dead animals.

Parasitological and Serological Findings

587 blood samples from suspected cases during the period of study were tested by blood smear, only 12 cases out of them were shown the parasite under microscope. Out of 110 blood samples tested by Microheamatocrit technique, only 4 samples were shown parasite under microscope. 750 of new quarantined animals were tested by ELISA, 103 samples were reacted positive. 53 serum samples from suspected animals were tested for CATT/ T. evansi, 51 samples out of them were reacted positive for trypanosome. Depending upon parasitological tests of blood (blood smear and Microhaematocrit Technique) number of positive cases is very low while the prevalence is high when serological test (ELISA and CATT) is used, see (Table 2). 55 blood and serum samples of suspected animals tested by Micro hematocrit technique, CATT/T evansi and Ab ELISA to compare the different diagnostic tools. Only 3 (5.5%) blood samples showed blood parasite under microscope. 44 (80%) serum samples were reacted positive to CATT test and 10 (18%) samples were positive to Ab ELISA (see table 3). The 3 parasitological positive animals were positive for CATT/T evansi and 2 of them were positive for Ab ELISA. Out of 44 CATT/T evansi positive samples, only 3 and 10 were positive for hematocrit and Ab ELISA respectively. The 10 Ab ELISA positive samples, two of them were positive hematocrit test and all of them positive by CATT/T evansi.

PCR Result

The PCR result was summarized in (Table 4), only 2 out of 13samples were tested positive for PCR. All The tested samples (13) are CATT/T evansi positive, while the 2 positive PCR animals are also positive by hematocrit.

Table 2: Parasitological and serological result.

Test	No of sample tested	No of positive results
Blood Smear	587	12
Microhaematocrit Technique	110	4
Ab ELISA	750	103
CATT/ T evansi	53	51

Table 3: The result of CATT/T. evansi, Surra Ab ELISA and Micro hematocrit result.

No of tested samples	No of heamacrit positive	No of CATT/T evansi	No of Ab ELISA positive
55	3	44	10
Percentage	5.50%	80%	18%

Table 4: The result of RT-PCR.

No of tested samples	No of heamacrit positive	No of CATT/ T evansi	No of RT-PCR positive
13	2	13	2

Clinical Picture

Pyrexia up 42°C body temperature, anorexia, emaciation, decrease milk yield (dry udder), congested or hyperaemic cutaneous blood vessels and gnashing of teeth. Nervous signs include restless, apparent blindness, mania, ataxia, aimless moving, circling, paresis, paralysis, recumbence, salivation with white foam from the mouth and a three case of Bent Neck (wry neck) was linked to the disease. All these symptoms were observed in the suspected and diagnosed animals. The severity of the symptoms is varying from animal to animal. 26 aborted camels were included in this study, their blood tested for CATT serological technique and for hematocrit blood smear. We found all of them positive for Ab and the parasite not seen under microscope.

Postmortem Findings

Death occurred few days after the onset of the illness and in some cases even after treatment with trypanocides (eg: Cymelarsan®). During the period from April- 2013 to Oct- 2021 about 132 adult camels died for different reasons and different pathological alterations. Only 16 camels (12.1%) from dead camels are having specific pathological changes which can be linked to Surra. While gross lesions are general and nonspecific, the histopathological changes from CNS of these dead camels are typical of Surra encephalitis or meningoencephalitis. Histopathological sections from dead camels show focal nonsuppurative encephalitis or meningoencephalitis with mild to severe perivascular cuffing, meningeal edema and eosinophils infiltrations.

Response to Treatments

the treatment according to the clinical signs and the CATT screening test regardless to the result of the confirmation test, using different medicine see (Table 4). 40 animals were treated by triquin 10 of them died. 30 animals got the cymelarsan, 12 of them died. Verdium was used for 21 animals one of them relapse. we checked the blood 3 days after the Cymelarsan treatment of camels with parasitaemia and we didn't found the parasite. Response of chronic cases or advanced cases to treatment is weak and animals continue expressing the signs till they die or received the second dose Triquin®. One case of a parasitaemic camel had a good response to treatment with Cymelarsan® and 2 years later again the same animal shows the same signs. No change in clinical picture after administration (4=cases) of Cymelarsan® or Veridium® and the improvement only occurred after giving Triquin®. In some confirmed cases (No=4) camels die even after treatment with trypanocides (eg: Veridium® and Cymelarsan®). As all camels entered the Farm received a dose of trypanocid at the quarantine period it seem that is effective but not enough to complete eradication and prevention of the disease. See (Table 5).

Table 5: The response of different medicine used.

Medicine	No of Treated	No of Relapse	No of Dead
Triquin®	40	0	10
Cymelarsan®	30	1	12
Veridium®	21	1	0

Discussion

Surra, caused by Trypanosoma evansi, is one of the most important diseases of animals in tropical and semitropical regions. T evansi is transmitted mechanically by various tabanids and other flies, and it can readily become endemic when introduced into a new area. The morbidity and mortality rates in a population with no immunity can be high. In addition to illness and deaths, Surra causes economic losses from decreased productivity in working animals, reduced weight gain, decreased milk yield, reproductive losses and the cost of treatment [3,9]. Camels under the study were brought from abroad where Surra is endemic. In spite of absences of clinical signs and the trypanosomes from blood sample some animals are sero-positive for Surra. All these animals are received a dose of trypancidal drug at the quarantine period. Sero-positive camels which are not response to the treatment may be they express the infection later or act as carriers which transmit the disease for the others in presence of the vector. Tabanus and stomoxys spp flies the main vector of Surra is observed near camel Paddocks and camel Walking Tracks. However, it was founded that the vector is presence in low numbers and active when weather temperature is moderate. This was observed tow times in the year The environment of the Farm can support the breeding of the vectors specially the bushes, gardens and area near the drinkers and water source in camel Paddocks.

In the present study the occurrence of the disease is varying between low to high depending upon the diagnostic tool used. High number of positive camels was found when serological test (CATT or ELISA) was used compared with low positivity when parasitological test was used (Blood Smear and MHCT). This can be justified by the presence of the parasites in the camel blood either rear or in low number and only at the last stage of the disease course. Our evidence agreed with other studies in diagnosis of trypanosome, like Mohamoud et al, in Egypt, they found high prevalence of antibody and genome detection by PCR assays among slaughtered camels as reported at the main Abattoir of the Cairo governorate [10] revealed that, many camels were negative by blood examination but positive by PCR, which may be related to low parasitemia and/or low sensitivity of the thin blood smear technique and indicates that low parasitemia might be due to early infections, chronic infection and/or lower strain virulence. This is in agree with the fact that T evansi parasites are naturally present in the blood but also localize extravascular in tissues including the CNS, the aqueous humor, heart, lung, liver, kidney and spleen [11,12]. Serologically the comparison between CATT test and ELISA showed the CATT test is very sensitive in contrast to ELISA, but the specificity of the test need more investigation.

However, our finding is agree with [12,13] who stated that when there is high parasitaemia, the examination of wet blood films, stained blood smears and lymph node materials reveals the trypanosomes but in chronic cases such as the carrier status, examination of thick blood smears as well as methods of parasite concentration are required. The standard diagnostic test for T evansi infection is the giemsa-stained thin blood-smear, which has a sensitivity of ~105 trypanosomes ml-1 of blood The diagnostic capability can be significantly improved by adopting simple, low-cost alternatives, such as HCT (hematocrit centrifugation technique), which has a sensitivity of ~85 Trypanosomes ml-1 blood. The sensitivity of parasite detection can be enhanced by approximately tenfold when using buffy coat. In this report the clinical picture of the disease is chronic characterized by wide range of non-specific symptoms but neurological symptoms are more predominant. It worth mentioning that in this study we report for the first time that Surra can be one of the causes of the bent nock (Wry Neck Syndrome) in the dromedary camels.

Many publications referred Camel trypanosomosis is one of the main causes of camel infectious abortion in the Middle East and Africa [14]. In Canary Islands, T evansi is behind an outbreak of abortions and high neonatal mortality observed in camels [15]. In our farm we reporting high number of abortion of un known cause, the aborted animals included in this study were reacted positive for CATT test and negative for parasitological technique. The presence of the parasite in the internal organs may cause abortion with the disappearance in the blood. And the clinical manifestations of Surra, although indicative, are not pathognomonic enough to confirm the disease without laboratory diagnosis.

In the present report the PM findings is mainly associated with CNS. These CNS lesions are explained the neurological symptoms and bent neck (Wry Neck Syndrome) observed in sick animals. Other PM findings are nonspecific. These finding are in agree with previous reports by [11,16-18] that T evansi parasites are naturally present in the blood but also localize extra vascularly in tissues including the CNS, the aqueous humour, heart, lung, liver, kidney and spleen. The presence of Tabanus spp flies near camel Paddocks and camel Walking Tracks in addition to infected animals consider as a main risk factors and gives evidences or alarm that the disease can be easily transmitted within the farm and even it can be endemic unless effective control measures are put in place.

Response to treatment in this study we observed that all three available veterinary medicine in UAE market (Triquin®, Veridium® and Cymelarsan®) are effective in removing the parasite from the blood in camels with parasitaeimia. But this in not indicating complete cure or rid of the parasites from the camel body. Relapse cases occurred after administration of Veridium® and Cymelarsan® and death also occurred. For the chronic form of the disease we found that Triquin® the most suitable choices for treatment. This is in agree with [19] who reported that the isometamidium chloride (Samorin) only removes the parasites from the blood-stream for 21h followed by relapse and

causes some serious adverse effects. However, in chronic cases the efficacy of these drugs and their ability to reach the parasite extravascularlly in different host tissues and ability to pass tissue barriers (Blood Brain Barrier) should be further investigated. [10] reported that relapse of parasitaemia after drug treatment of trypanosome infection is normally attributed to drug-resistance on the part of the parasite, under-dosage of the drug or reinfection of the host. In addition, inaccessibility of parasites to drug through sequestration in privileged extravascular sites has been shown in the past to occur with Trypanosoma brucei, and we have obtained evidence that extravascular foci of T vivax can also serve as a source of relapsing infections [20,21].

Conclusion

This study concludes that surra disease is present in camel raised under intensive management system, the disease is attributed with various clinical signs, morbidity and mortality. The diagnostic tools play key role in the control of disease, whoever, the result of serological techniques looks more sensitive compared with the result of traditional methods. The chemotherapeutic drugs showing low curative effect specially in chronic cases, therefor integrated control measures should be in place to prevent the disease transmission.

References

1. Nagy P, Thomas S, Marko O, Juhasz J (2013) Milk production, raw milk quality and fertility of dromedary camels (Camelus dromedarius) under intensive management. Acta Vet Hung 61(1): 71-84.
2. Silva Pereira S, Trindade S, De Niz M, Figueiredo LM (2019) Tissue tropism in parasitic diseases. Open Biol 9(5): 190036.
3. Spickler AR (2015) Surra. CFSPH, Iowa State University, USA.
4. OIE-World organisation for animal health (2012) Trypanosoma evansi infection (surra) 7th (Edn.) Manual of diagnostic tests and vaccines for terrestrial animals.
5. Salim B, Bakheit AM, Kamau K, Nakamura I, Sugimoto C (2011) Molecular epidemiology of camel trypanosomiasis based on ITS1 rDNA and RoTat 1.2 VSG gene in the Sudan. Parasit Vectors 4: 31.
6. Paris J, M Murray, F McOdimba (1982) A comparative evaluation of the parasitological techniques currently available for the diagnosis of African trypanosomiasis in cattle. Act Trop 39(4): 307-316.
7. Eyob E, Matios L (2013) Review on camel trypanosomiasis (surra) due to Trypanosoma evansi: epidemiology and host response. J Vet Med Animal Health 5(12): 334-343.
8. Breulmann M, Böer B, Wernery U, Wernery R, Shaer HE, et al. (2007) The camel, from tradition to modern times; a proposal towards combating desertification via the establishment of camel farms based on fodder production from indigenous plants and halophytes. The United Nations Educational Scientific and Cultural Organization Office Doha.
9. Woo PTK (1971) Evaluation of the hematocrit centrifuge and other techniques for the field diagnosis of human trypanosomiasis and filariasis. Acta Trop 28(3): 298-303.
10. https://www.researchgate.net/publication/287994062_Effect_of_Seasonal_Variations_on_Distribution_of_Parasites_in_Camels_at_Assiut_Locality.
11. Sudarto MW, Tabel H, Haines DM (1990) Immunohistochemical demonstration of Trypanosoma evansi in tissues of experimentally infected rats and a naturally infected water buffalo (Bubalus bubalis). J Parasitol 76(2): 162-167.
12. Tibary A, Fite C, Anouassi A, Sghiri A (2006) Infectious causes of reproductive loss in Camelids. Theriogenology 66(3): 633-647.
13. Reid SA, A Husein, PD Compeman (2001) Evaluation and improvement of parasitological tests for Trypanosoma evansi infection. Vet. Parasitol 102(4): 291-297.
14. Dia ML, Diop C, Aminetou M, Jacquiet P, Thiam A, et al. (1997) Some factors affecting the prevalence of Trypanosoma evansi in camels in Mauritania. Vet Parasitol 72(2): 111-120.
15. Ali BH, Hassan T, El Malik KH (1986) The Efficiency of Furazolidone against experimental infections with Trapanosoma evansi in camels and mice in Sudan: Comparisons with quinapyramine and suramin. Rev Elev Med Pays Trop 39(2): 197-201.
16. Rodrigues A, Fighera RA, Souza TM, Schild AL, Barros CSL (2009) Neuropathology of naturally occurring Trypanosoma evansi infection of horses. Vet Pathol 46(2): 251-258.
17. Derakhshanfar A, Mozaffari AA, Zadeh AM (2010) An outbreak of trypanosomiasis (surra) in camels in the Southern Fars province of Iran: clinical, hematological and pathological findings. Res J Parasitol 5(1): 23-26.
18. Paris J, M Murray, F McOdimba (1982) A comparative evaluation of the parasitological techniques currently available for the diagnosis of African trypanosomiasis in cattle. Acta Trop 39(4): 307-316.
19. Whitelaw DD, Gardiner PR, Murray M (1988) Extravascular foci of Trypanosoma vivax in goats: the central nervous system and aqueous humor of the eye as potential sources of relapse infections after chemotherapy. Parasitology 97(1): 51-61.
20. Tuntasuvan D, Mimapan S, Sarataphan N, Trongwongsa L, Intraraksa R, et al. (2000) Detection of Trypanosoma evansi in brains of the naturally infected hog deer by streptavidine-biotin immunohistochemistry. Vet Parasitol 87(2-3): 223-230.
21. Tuntasuvan D, Sarataphan N, Nishikawa H (1997) Cerebral trypanosomiasis in native cattle. Vet Parasitol 73(3-4): 357-363.