

Trypanosoma evansi AS A CAUSE OF OCULAR DISORDERS IN DROMEDARY CAMEL (*Camelus dromedarius*) IN THE UNITED ARAB EMIRATES: A CLINICAL REPORT

Ahmed Abdelrahman Ismail¹, Abdelnassir Ahmed Taha¹, Yasin Ahmed Hassan¹, Jutka Juhasz¹ and Elmahi Bilal Abdelsalam²

¹Emirates Industry for Camel Milk and Products, Dubai, United Arab Emirates (UAE)

²Department of Pathology, Faculty of Veterinary Medicine, University of Khartoum, P.O. Box 32, Khartoum North. Code. 13314, Sudan

ABSTRACT

Ocular disorders characterised by corneal opacity, hyperaemia, oedema, excessive lacrimation and ocular discharges were detected in 4 female dromedary camels naturally infected with the *Trypanosoma evansi* in the dairy camel farm in the United Arab Emirates. Animals with ocular lesions also showed clinical signs of emaciation, pyrexia, anorexia, ataxia and decreased milk yield. *T. evansi* antibodies were detected in the serum of affected animals by card agglutination trypanosomosis test (CATT/ *T. evansi*) and by the enzyme - Linked immunosorbent assay (ELISA). The presence of the parasite in the blood was confirmed in one animal by the use of the haematocrit technique.

Key words: Dromedary camel, ocular disorders, *Trypanosoma evansi*, trypanosomosis, UAE

Camel trypanosomosis caused by *Trypanosoma evansi*, is a widely prevalent insect- borne disease of camels in Africa, Asia and Middle East (Enwezor and Sackey, 2005; Desquesnes *et al*, 2013). *Trypanosoma* spp are mainly present in the blood of infected animals but may also localise extravascularly in many other tissues including the central nervous system (CNS), aqueous humour, heart, lung, liver, kidney and spleen (Sudarto *et al*, 1990; Tuntasuvan *et al*, 1997, 2000; Rodrigues *et al*, 2009). The clinical signs of the disease are nonspecific and not sufficiently pathognomonic but the most prominent signs include dullness, emaciation, and paleness of mucous membranes, brisket oedema and oedema of the eyelids (Derakhshanfar *et al*, 2010; Padmaja, 2012). Neurological manifestations may also occur in advanced stages when the parasite invades the central nervous system. In addition, ocular disorders particularly corneal opacity and loss of vision were occasionally reported in man and several species of domestic animals including cattle, buffaloes, sheep, goats, dogs and cats (Ikede, 1974; Morales *et al*, 2006; Bal *et al*, 2014; Lisulo *et al*, 2014; Rjeibi *et al*, 2015). The *Trypanosoma* - induced ocular lesions in infected animals are apparently attributed to the

immunosuppressive effect of the parasite (Reddy and Sivajothi, 2017; Sivajothi and Reddy, 2018). However, previous reports on ocular disorders associated with camel trypanosomosis are apparently lacking and the present communication describes their occurrence in 4 dairy camels naturally infected with *T. evansi* in the United Arab Emirates (UAE).

Materials and Methods

The present investigation was carried out at the Dairy Camel Farm owned by the Emirates Industry for Camel Milk and Products (EICMP), Dubai, United Arab Emirates. The farm contains the largest herd of dairy camels in the world with a total population of 8500 heads of dromedaries. The camels are kept under intensive management system. Their general health condition, environment and nutrition are closely supervised by well-trained veterinary medical staff. Heparinised and non-heparinised blood samples were collected from animals showing observable clinical signs and ocular disorders. The haematocrit centrifuge technique described by Woo (1971) was used for microscopic detection of trypanosomes in a buffy coat of blood of suspected animals. In addition, card agglutination trypanosomosis test (CATT/ *T. evansi*;

SEND REPRINT REQUEST TO AHMED ABDELRAHMAN ISMAIL [email: drabohmaid@hotmail.com](mailto:drabohmaid@hotmail.com)

Institute of Tropical Medicine, Antwerp, Belgium) and enzyme-linked immunosorbent assay (Surra Ab - EISISA in-house Method) (Laha and Sasmal, 2009) were further used for detection of *T. evansi* antibodies in the serum of camels with clinical signs and ocular involvement. Affected camels received medicinal treatment with a systemic trypanocidal drug (Triquin injections; Vetoquinol-India. 0.03ml suspension/kg body wt subcutaneously) combined with supportive vitamin therapy (AD₃E-Vitamin A 100000 IU, Vitamin D₃ 50000 IU and Vitamin E 50mg; Dana Pharmaceuticals, given intramuscularly as a single dose of 10 ml). These animals also received topical ophthalmic treatment with combined antibiotics and anti-inflammatory eye drops (TobraDex: Tobramycin 0.3% and Dexamethasone 0.1%, Novartis, Switzerland) 3 drops twice daily for 1 week.

Results

Table 1 and Figs 1-4 summarise ocular disorders, laboratory tests and treatment response in *T. evansi* infected camels in the dairy farm owned by the Emirates Industry for Camel Milk & Products, Dubai, UAE.

Ocular disorders were detected in 4 camels showing systemic clinical signs including pyrexia, anorexia, ataxia decreased milk yield, emaciation and lacrimation. The ophthalmic involvements were bilateral in 2 camels and unilateral in the other 2. The affected eyes showed corneal opacity in all of the 4 cases. Moreover, hyperaemia, oedema, excessive lacrimation and either seromucoid or purulent ocular discharges were also observed. Some affected eyes showed corneal granulation and change of the normal colour of the lens to white, red or dark blue with complete response defect of pupil and eyelids. The vision of the affected eyes which was partially lost in 2 camels started to improve within 48 hours after treatment with systemic and local medication. Gradual improvement in the vision was concomitant with decrease of the intensity of the corneal opacity in the treated animals. On the other hand, the remaining

two camels showed complete lack of response to medical treatment with consequent development of permanent corneal opacity (cataract) and partial blindness.

The results of the serological tests CATT/*T. evansi* and ELISA were positive in the 4 cases which showed detectable clinical signs and ocular disorders.

In addition, *T. evansi* was further detected in the buffy coat smear prepared from the blood of one infected camel.

Discussion

Trypanosoma species such as *T. evansi*, *T. cruzi* and *T. vivax* were occasionally found to cause various types of ocular disorders in man and several species of domestic animals including cattle (Bal *et al*, 2014), sheep (Ikede, 1974), goats (Morales *et al*, 2006) and dogs (Lisulo *et al*, 2014; Rjeibi *et al*, 2015). No reports are currently available on the incidence of ocular lesions in *Trypanosoma* - infected camels.

The existence of camel trypanosomosis in the UAE has recently been confirmed by various methods including direct microscopy, CATT/ *T. evansi* and PCR (Habeeba *et al*, 2022). The disease was also diagnosed in female camels with recent history of abortion without mentioning any type of ocular involvement in infected animals (Wernery *et al*, 2020; Schuster *et al*, 2021). The present communication, however, describes the occurrence of ocular disorders in 4 dairy camels naturally infected with *T. evansi* in the largest dairy camel farm in the United Arab Emirates. Infection with *T. evansi* was confirmed by serological tests (CATT/*T. evansi* and ELISA) and demonstration of the parasite in the blood stream by the use of haematocrit method. The incidence of *T. evansi* infection in camels described in the present report is mostly attributed to the presence of the vector of the parasite (*Stomoxys* and *Tabanus*) in the area of study and to the fact that all camels in the farm were imported from an area of the South Central Asia where the disease is endemic.

Table 1. *T. evansi* ocular disorders in camels: laboratory tests, eye lesions and treatment response.

Camel ID	Buffy coat smear	CATT/ <i>T. evansi</i>	Surra Ab ELISA	Ocular lesions	Location	Treatment Response
4301	-ve	+ve	NA*	+v	Bilateral	Permanent corneal opacity and partial blindness
3229	+ve	+ve	+ve	+v	Bilateral	Permanent corneal opacity
7079	-ve	+ve	+ve	+v	Unilateral	Cured
6776	-ve	+ve	NA*	+v	Unilateral	Cured

* Not available (NA)



Fig 1. Right eye of camel no. 4301 showing corneal opacity. Note lacrimation and colour change.



Fig 3. Left eye of camel no. 7079 showing change of colour of the affected cornea.

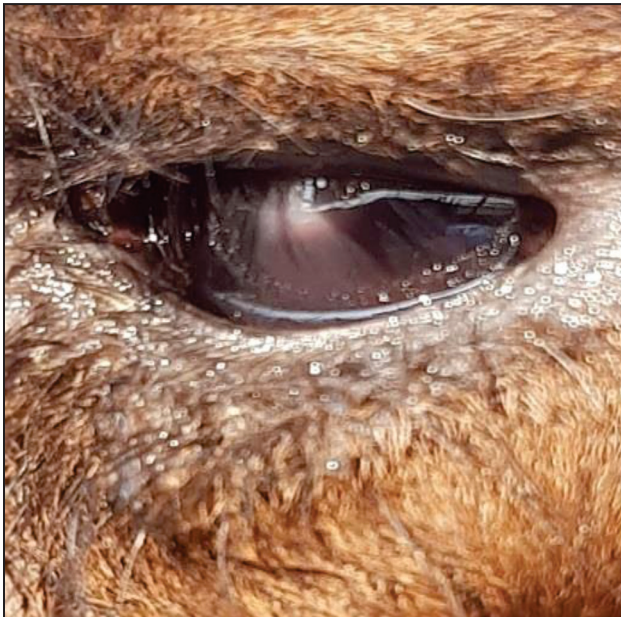


Fig 2. Right eye of camel no. 3229 showing corneal opacity affecting sizable portion of the cornea.



Fig 4. Left eye of camel no. 6776 showing corneal opacity and change of colour.

Ocular disorders characterised by corneal opacity, corneal ulceration, oedema, conjunctivitis, blepharitis, keratitis and partial or total loss of vision have occasionally been reported in camels as a result of traumatic, nutritional or infectious causes other than *Trypanosoma* spp (Bishnoi and Gahlot, 2001, 2004; Tharwat and El-Tookhy, 2021; Ranjan *et al*, 2016; Kumar *et al*, 2016; Abdella, *et al*, 2018). The present report therefore, confirms the occurrence of ocular disorders in *T. evansi* - infected camels. Further

investigations are essentially required to establish the possible role of *T. evansi* in the development of ocular lesions in the dromedary camel.

Acknowledgement

This work was supported by the Emirates Industry for Camel Milk and Products (EICMP) and the Central Veterinary Research Laboratory (CVRL), Dubai, UAE. We are grateful to the General Manager of the Company and the Director of the CVRL for their interest and moral support.

References

- Abdella ME, Habeeballa HA, Mohamed MS, Babiker MYA and Abakar AD. Preliminary report on the occurrence of ocular disorders among one-humped camel (*Camelus dromedarius*) Raised at Al Butana Plain, Sudan. *Journal of Camel Research and Production*. 2019; 18:(1)28-39.
- Bal MS, Ashuma AS, Batth BK, Kaur P and Singla LD. Detection and management of latent infection of *Trypanosoma evansi* in a cattle herd. *Indian Journal of Animal Research*. 2014; 48:(1)31-37.
- Bishnoi P and Gahlot TK. A note on incidence and occurrence of diverse ophthalmic affections in camels (*Camelus dromedarius*). *Journal of Camel Practice and Research*. 2001; 8(1):73-75.
- Bishnoi P and Gahlot TK. Ophthalmic affections in camels (*Camelus dromedarius*). *Veterinary Practitioner*. 2004; 5(2):89-93.
- Derakhshanfar A, Mozaffari AA and Mohaghegh Zadeh A. An outbreak of trypanosomiasis (surra) in camels in the southern Fars province of Iran: clinical, hematological and pathological findings. *Research Journal of Parasitology*. 2010; 5:23-26.
- Desquesnes M, Dargantes A, Lai DH, Lun ZR., Holzmuller P and Jittapalpong S. *Trypanosoma evansi* and surra: A review and perspectives on transmission, epidemiology and control, impact, and zoonotic aspects *Biomed Research International*. Volume 2013; Article ID 321237, 20 pages. <https://doi.org/10.1155/2013>.
- Enwezor FNC and Sackey AKB. Camel trypanosomosis - a review. *Veterinarski Arhiv*. 2005; 75(5):439-452.
- Habeeba S, Khan RA, Zackaria H, Yammahi S, Mohamed Z, Sobhi W, Abdelkader A, Alhosani MA and Al Muhairi S. Comparison of microscopy, card agglutination test for *Trypanosoma evansi* and real-time PCR in the diagnosis of trypanosomosis in dromedary camels of the Abu Dhabi Emirate, UAE. *Journal of Veterinary Research*. 2022; 26(1):125-129.
- Ikede OB. Ocular lesions in sheep infected with *Trypanosoma brucei*. *Journal of Comparative Pathology*. 1974; 84(2): 203-213.
- Kumar P, Purohit NR and Gahlot TK. Retrospective analysis of ocular affections in dromedary camels. *Journal of Camel Practice and Research*. 2016; 23(2):247-250.
- Laha R and Samsal NK. Detection of *Trypanosoma evansi* infection in clinically ill cattle, buffaloes and horses using various diagnostic tests. *Epidemiology and Infection*. 2009; 137(11):1583-1585.
- Lisulo M, Sugimoto C, Kajino K, Hayashidan K, Mudenda M, Moonga L, Ndebe J, Nzala S and Namangala B. Determination of the prevalence of African trypanosome species in indigenous dogs of Mambwe district, Eastern Zambia, by loop-mediated isothermal amplification. *Parasites and Vectors*. 2014; 7:19.
- Morales I, de Le'on M, Morales M, Dalla F and Gutierrez C. Ocular lesions associated with *Trypanosoma evansi* in experimentally infected goats. *Veterinary Parasitology*. 2006; 141(3-4):325-329.
- Padmaja K. Haemato-biochemical studies of camels infested with Trypanosomiasis. *Veterinary World*. 2012; 5(6):356-358.
- Ranjan R, Nath K, Naranware S and Patil NV. Ocular affections in dromedary camel - a prevalence study. *Intas Polivet*. 2016; 17(11):348-349.
- Reddy SB and Sivajothi S. Corneal opacity due to trypanosomosis in buffaloes-need of topical medication. *Open Access Journal of Science*. 2017; 1(6):155-156.
- Rjeibi MR, Ben Hamida T, Dalgatova Z, Mahjoub T, Rejeb A, Dridi W and Gabi M. First report of surra (*Trypanosoma evansi* infection) in a Tunisian dog. *Parasite*. 2015; 22:3.
- Rodrigues A, Figuera RA, Souza TM, Schild AL and Barros CSL. Neuropathology of naturally occurring *Trypanosoma evansi* infection of horses. *Veterinary Pathology*. 2009; 46:251-258.
- Schuster R K., Raghavan R, Ringu M, Mheiri I F, ALQuassim MI, Wernery U. *Trypanosoma evansi* in a dromedary camel herd in the UAE-PART II. *Journal of Camel Practice and Research*. 2021; 28(2):125-130.
- Sivajothi S and Reddy BS. *Trypanosoma evansi* infection in a cat-a rare case. *Comparative Clinical Pathology*. 2018; 27:115-116.
- Sudarto MW, Tabel H and Haines DM. Immunohistochemical demonstration of *Trypanosoma evansi* in tissues of experimentally infected rats and a naturally infected water buffalo (*Bubalus bubalis*). *Journal of Parasitology*. 1990; 76:162-167.
- Tharwat M and El-Tookey O. Ocular ultrasonography in camels (*Camelus dromedarius*): a review. *Journal of Camel Practice and Research*. 2021; 28(2):185-190.
- Tuntasuvan D, Sarataphan N and Nishikawa H. Cerebral trypanosomiasis in native cattle. *Veterinary Parasitology*. 1997; 73:357-363.
- Tuntasuvan D, Mimapan S, Sarataphan N, Trongwongsa L, Intraraksa R and Luckins AG. Detection of *Trypanosoma evansi* in the brain of the naturally infected hog deer by streptavidine-biotin immunohistochemistry. *Veterinary Parasitology*. 2000; 87:223-230.
- Wernery U, Raghavan R, Ringu M, Kinne J, Rodriguez M, Al Qassim M and Al Mheiri F. *Trypanosoma evansi* Abortion in a dromedary camel herd in the UAE - Part I. *Journal of Camel Practice and Research*. 2020; 27(3):305-308.
- Woo PTK. Evaluation of the haematocrit centrifuge and other techniques for the field diagnosis of human trypanosomiasis and filariasis. *Acta Tropica*. 1971; 28:298-303.