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EPIDEMIOLOGICAL ASPECTS OF CAMEL TRYPANOSOMOSIS IN SAUDI ARABIA

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ABSTRACT

Overall prevalence of *T. evansi* infection among camels in the Kingdom of Saudi Arabia was 0.8% (n=526) based on parasitological examination and 39.4% (n=198) based on serological examination by CATT/*T. evansi*. The regional sero-prevalence ranged from 26% in the Eastern region to 46% in the central region. Patent infection was detected only in pastoral camels from the southern region and camels presented at the marketplaces in the central and western regions. None of the sampled camels from the eastern region had patent *T. evansi* infection. Likewise, neither the camels presented to the veterinary clinics nor those put to slaughter had patent parasitaemia. The results could be attributed to variable practice of anti-trypanosomal drugs usage.

Key words: Camel, epidemiological aspects, trypanosomosis, Saudi Arabia

T. evansi epidemics tend to involve different animal hosts in different parts of the world. In Indo-China region, horses are mainly affected, followed by camels, whereas in Middle Asia, the main host is camel and to lesser extent horses. In certain parts of Africa such as Somalia, Kenya, Sudan and West Africa the camel is the host. Natural infections have also been reported in donkeys and dogs (Pathak,1997). Trypanosomisis in camels has been a priority research by many scientists (Gahlot and Chhabra, 2009) *T. evansi* is transmitted mechanically by biting flies, but has no intermediate host. Studies conducted on trypanosomiasis in Saudi Arabia are scanty and information available on the disease pattern and prevalence is only fragmentary (Diab *et al,* 1984; Hussein *et al,* 1991). The present work was, therefore, initiated to study some aspects of the epidemiology of *T. evansi* infection in camels in Saudi Arabia.

Materials and Methods

Survey population

A total of 526 samples from different regions of Saudi Arabia were collected. One hundred and thirty two camels (25%) were sampled from each of the eastern and the central regions, 162 camels (31%) from the western region and 100 camels (19%) from the southern region. Those camels comprised 4 different categories, *viz.* pastoral camels, camels presented to veterinary clinics, animal market places or slaughterhouses. All of the camels (526 heads) were examined for blood parasites and only 198 (49-50 camels from each region) (38%) samples of those camels were randomly selected and subjected to serological testing as shown below.

Sampling procedures

Camels were bled by jugular venipuncture into heparinised or plain vacutainer tubes (Becton-Dickson, NJ, USA). Thick and thin blood smears were immediately prepared and labelled for Giemsa's staining and microscopical examination. Vacutainer blood samples were quickly transported on ice to the laboratory at the Faculty of Veterinary Medicine and Animal Resources, King Faisal University for buffy coat technique (Killick-Kendrick, 1968) and serum preparation. Sera were kept at -20°C until used.

Serological examination

Antibodies to *Trypanosoma evansi* were detected in the sera of camels using a card agglutination test kit for *T. evansi* (CATT/*T. evansi*) manufactured by laboratory of Safety, Institute of Tropical Medicine, Antewerp, Belgium. The test was performed as described by the manufacturer.

Results

Blood examination

Trypanosoma evansi was detected in the blood of 2 out of 100 (2%) pastoral camels from the southern

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region; 1 out of 132 (0.7%) and 1 out of 162 (0.6%) of camels presented at the market places in the Central and western regions, respectively. None of the sampled camels (n=132) from the eastern region had patent *T. evansi* infection. Likewise, neither of the camels presented to the veterinary clinics nor those put to slaughter had patent parasitaemia. Thus, the overall prevalence of *T. evansi* infection based on buffy coat technique examination among the camels of the kingdom is 0.8% (n=526).

Serological examination

The overall sero-prevalence of *T. evansi* infection mounted to 39.4% (n=198) based on CATT/*T. evansi* examination (Table 1). Table 1 also summarises the prevalence of infection by region and category. Infection was less prevalent (26%) and significantly lower ($p<0.05$) in the eastern region than the other regions in which it ranged from 42%-46%. The sero-prevalence of infection was higher in the groups of camels presented to veterinary clinics of the southern region (75%) and slaughterhouses of the western region (68%).

Discussion

It is shown here that 0.8% of surveyed camels had patent *T. evansi* infection and that was recorded for pastoral camels of the southern region and camels presented at marketplaces of the western and Central regions. This result is still comparable to what was reported previously for the overall prevalence of infection among camels in the Kingdom of Saudi Arabia, *viz.* 2% (Kasim, 1984). Presence of Tabanids, the mechinical vector of *T. evansi* in Saudi Arabia will further support these results, about 31 species have been found, similar to Palaearctic region (Al-Dafer *et al,* 2009)

Table 1. Ratio and per cent of CATT / *T. evansi* positive camels distributed by region and category.

Category / Region	Field	Slaughter-houses	Veterinary clinics	Camel market places	Total
Eastern	6/17 (35)	0/15 (0)	4/9 (44)	3/9 (33)	13/50 (26)
Central	4/11 (36)	7/17 (42)	3/7 (43)	9/15 (60)	23/50 (46)
Western	1/9 (11)	13/19 (68)	0/8 (0)	7/13 (54)	21/49 (43)
Southern	7/22 (32)	0/8 (0)	15/20 (75)	ND	22/49 (45)
Total	18/58 (31)	20/59 (34)	22/44 (50)	18/37 (49)	78/198 (39.4)

At the regional level, the prevalence of patent infection ranged from 0.6% in the western region to 2% in the southern regions. In contrast, Omer *et al* (1998) reported a prevalence of 5.5% among camels of Qasim area of central region. In this survey, none of the camels bled from the eastern region had patent parasitaemia. However, Al-Khalifa *et al* (2009) has documented an infection rate of 40% in southern region which is much higher than that (18.3%) reported earlier by Hussein *et al* (1991) for the same region.

In the neighboring countries, Surra in camels has been diagnosed in Jordon (Abo-Shehada *et al,* 1999), Kuwait (Al-Taqi, 1989), United Arab Emirates (Wernery *et al,* 2007; Wernery *et al,* 2014), Oman (Srivastava *et al,* 1984), Iran (Derakhshanfar *et al,* 2010) and Israel (Berlin *et al,* 2010).

Results of similar parasitological surveys for patent *T. evansi* infection conducted elsewhere reflected variable records of infection rates. Thus, the prevalence of infection was 12.3% in Iraq (Awakati and Al-Khalifa, 1972); 33% in Jordan (Al-Rawashdeh *et al,* 2000) ; 1.7% in Kuwait (Al-Taqi, 1989); 5.4%-5.5% in Sudan (Boid *et al,* 1981; Elamin *et al,* 1998); 0.9% in Canary Islands (Gutierrez *et al,* 2000); 1.4% in Mauritania (Dia *et al,* 1997); 3% - 13.7% in Pakistan (Butt *et al,* 1996; Shah *et al,* 2004); 5.3% in Chad (Delafosse and Doutoum, 2004) and 5.3% in Kenya (Njiru *et al,* 2004).

This variation in the results of examination of blood for circulating trypanosomes could be attributed to various factors that are associated with the parasite, the host, the blood sample or the testing techniques. It is known that trypanosomes exhibit intermittent parasitaemia and the number of circulating trypanosomes tend to be rather low especially in chronically infected animals; a phenomenon which decreases the chances of demonstrating the presence of the parasite microscopically. Moreover, the number of circulating trypanosomes tends to be low in younger camels than in older camels (Diall *et al,* 1992; Elamin *et al,* 1998). It was more likely to detect the trypanosomes in blood samples collected from the ear vein than from the jugular vein (Hornby and Bailey, 1931) and in the early morning than otherwise (Stephen, 1968). It is known that the routinely used parasite detection tests vary in their sensitivity (Killick-Kendrick, 1968; Boid *et al,* 1981; Kelly and Schillinger, 1982).

On the other hand, the overall sero-prevalence of *T. evansi* infection in camels of the Saudi Arabia amounts to 39.4% based on card agglutination test (CATT/*T.evansi*). The regional sero-prevalence ranged from 26% in the eastern region to 46% in the central region.

In comparison, this test revealed a prevalence of infection reaching 16.7% in Mauritania (Dia *et al,* 1997); 45.9% in Kenya (Njiru *et al,* 2004) and 30.5% in Chad (Delafosse and Doutoum, 2004).

While the detection of the trypanosomes in the blood is frequently difficult and have limited sensitivity; results of the antibody detecting systems, e.g. CAAT/*T. evansi* would only be interpreted as previous exposure of the host to the parasite without elucidating its current health status. (Nantulya, 1990; Elamin *et al,* 1998). Serological tests are used as complementary diagnostic tools in many clinical or epidemiological situations, but these techniques are not always capable of distinguishing current infections from past infections due to the prolonged persistence of antibodies in the blood of treated camels. However, the low prevalence of patent infection among serologically positive clinics attendants, slaughter camels and camels reared in the eastern region could be a reflection of the practice of application of anti-trypanosomal drugs to these categories of camels. Only a few drugs e,g, Cymelarsan (melarsomine, Merial), Triquin (quinapyramine, Wock-herde) and Trypomidium-Samorin (isometamedium cholride, Merial) have been approved in Saudi Arabia (Al-Dughym *et al,* 1998). These compounds when used in United Arab Emirates (UAE), where Surra in dromedaries is endemic, a decrease in sero-prevalence was achievable from 12.5% in 1990 to 2.5% in 1999, due to treatment of positive cases and control of vector (Central Veterinary Research Laboratory, UAE, 1999). It could be concluded that the epidemiology of camel trypanosomosis in Saudi Arabia warrants a closer look so as to implement relevant control measures.

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