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APPLICATION OF CARD AGGLUTINATION TEST AND CARD INDIRECT-AGGLUTINATION ANTIGEN TEST FOR DETECTION OF CAMEL TRYPANOSOMOSIS IN WESTERN SUDAN

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ABSTRACT

A total of 81 blood samples from traditionally managed camels were examined parasitologically and serologically for presence of camel trypanosomiasis in Northern and Southern Kordofan State in western Sudan. Parasitological examinations revealed that only 4 cases (4.94%) were positive. Serological investigations showed that 4 and 14 cases (4.94% and 17.28%, respectively) were recorded as ++ and + for Suratex. The results of CATT indicated that 20, 15, 12 and 13 cases (24.69%, 18.52%, 14.81% and 16.05%, respectively) were reacted as +++, ++, + and ±, respectively). While 4 and 13 cases (4.94%, 16.05%, respectively) were recorded as ++ and + for CIATT. Suratex, CATT and CIATT were found to be 100% sensitive for detection of *Trypanosoma brucei evansi* infection in camel but high specificity was only recorded for CIATT and Suratex (83.1% and 81.8%, respectively).

Key words: Camel, CATT, CIATT, Suratex, trypanosomiasis

Diagnosis of the trypanosomiasis is mainly based on parasitological and serological examinations. Suratex is a commercially available card latex agglutination test for diagnosis of infection caused by *Trypanosoma brucei evansi* (surra). It is penside test applicable for diagnosis of both patent and sub-patent infections (Nantulya, 1994). Only two field serological tests were developed for detection of human African trypanosomiasis. The first one is the card agglutination test for trypanosomiasis (CATT) (Magnus *et al*, 1978) for diagnosis of chronic infection with *T. b. gambiense*. The other one is the card indirect-agglutination antigen test for trypanosomiasis (CIATT) for diagnosis of both *T. b. gambiense* and *T. b. rhodesiense* (Komba *et al*, 1992; Nantulya *et al*, 1992). An attempt was made in this study to apply CATT and CIATT for detection of the *Trypanosoma brucei evansi* infection in camels.

Materials and Methods

The study was conducted in Northern Kordofan State (El-Hajiz and Phongoga) and Southern Kordofan State (Abu Karsholla) in western Sudan.

A total of 81 blood samples from traditionally managed camels were collected for parasitological and serological examinations. Sample collection was done according to the willingness of the owners of the camels (Non-probability sampling) (Thrusfield, 1995).

A wet mount and stained smears were left to dry and examined under the microscope for presence of the parasite.

Suratex was employed as described by Nantulya (1994). Twenty five µl of serum was mixed by stirrer with 25 µl of latex reagent on the circle of test slide and shacked for 5 minutes on the rotor. A clear agglutination pattern indicated that the test was positive. Strong reaction (++) was developed immediately but weak reaction (+) took 4-5 minutes to develop.

Card agglutination test for trypanosomiasis (CATT) was applied as described by Magnus *et al* (1978). Forty five µl of well homogenised CATT reagent was mixed with 5 µl of serum on the card, then the card was shaken for 5 minutes on a rotor. The results were read before removing the card from the rotor. The interpretation was read as follow:

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(+++): very strong agglutination

(++):strong agglutination

(+):good agglutination

(±): doubtful reaction (very fine agglutination)

(-): negative reaction (absence of agglutination)

Card indirect-agglutination antigen test for trypanosomiasis (Tryp Tect CIATT) was done as described by Nantulya *et al* (1992) and Komba *et al* (1992). Twenty five µl of serum was transferred to test circle on the test slide and 25 µl of CIATT reagent was added, stirring rod was used for mix the two drops and shaked on the rotor for 5 minutes. A clear agglutination pattern indicated that the test was positive. Strong reaction (++) was developed immediately, weak reaction (+) took 4-5 minutes to develop.

Microsoft Excel (Windows 1997) was used for data analysis.

Results

The results are summarised in table 1. The results of parasitological examinations showed that out of 81 blood samples only 4 (4.94%) were reported as positive. While, serological investigations revealed that 4 and 14 cases (4.94% and 17.28%, respectively) were recorded as ++ and + for Suratex. The results of CATT showed that 20, 15, 12 and 13 cases (24.69%, 18.52%, 14.81% and 16.05%, respectively) reacted as +++, ++, + and ±, respectively and for CIATT 4 and 13 cases (4.94%, 16.05%, respectively) were detected as ++ and +.

Suratex, CATT and CIATT were found to be 100% sensitive for detection of *Trypanosoma brucei evansi* infection. These tests not only had a high sensitivity, but also appeared to have a high predictive value 100% for negative test (Table 2). However, CIATT (83.1%) and Suratex (81.8) were found more specific than CATT (44.2%). The results are given in table 2.

Discussion

High sensitivity and specificity (100% and 81.8%, respectively) were reported for Suratex. These results are in agreement with Nantulya (1994) who explained that Suratex is a sensitive latex agglutination test for diagnosis of infections caused by *Trypanosoma brucei evansi*. Moreover, it was observed that Suratex was 100% specific and can be used for diagnosis of both patent and sub-patent infections (Olaho-Mukani *et al*, 1996).

Table 1. Descriptive statistic of camel trypanosomiasis using parasitological and serological examinations in Kordofan State.

Unit	Northern Southern Kordofan		Total
	n %		
No. of camel examined	54 (66.6)	27 (33.3)	81 (100.00)
Parasitological examinations			
+ve	2 (3.70)	2 (7.41)	4 (4.94)
-ve	52 (96.30) 53	25 (92.52) 27	77 (95.06) 81
Serological examinations 1. Suratex			
++	2 (3.70)	2 (7.41)	4 (4.94)
+	9 (16.67)	5 (18.52)	14 (17.28)
-ve	43 (79.63) 54	20 (74.07) 27	63 (77.78)
2. CATT			
+++	13 (24.07)	7 (25.93)	20 (24.69)
++	12 (22.22)	3 (11.11)	15 (18.52)
+	7 (12.96)	5 (18.52)	12 (14.81)
±	8 (14.81)	5 (18.52)	13 (16.05)
-ve	13 (25.93) 54	7 (25.93) 27	21 (25.93)
3. CIATT			
++	4 (7.41)	0.00 -	4 (4.94)
+	7 (12.96)	6 (22.22)	13 (16.05)
-ve	43 (79.63)	21 (77.78)	64 (79.01)

n : Number of samples (%) : Percentage

cd indirect-agglutination antigen test for trypanosomiasis

* : Using thin blood films and wet mount

As seen from results CIATT was found more specific than CATT for diagnosis of camel trypanosomiasis (83.1% and 44.2%, respectively**).** From researches conducted on human African trypanosomiasis, CATT was developed to detect antibodies directed against a specific commonly occurring variable antigen of *T. b. gambiense* (Magnus *et al*, 1978). While, CIATT for the diagnosis of *T.*

Table 2. Evaluation of serological tests used for detection of camel trypanosomiasis in Kordofan State.

Test	Sensitivity	Specificity	Predictive value	
			+ ve test	- ve test
Suratex	100%	81.8%	22.2%	100%
CATT	100%	44.2%	8.5%	100%
CIATT	100%	83.1%	23.5%	100%

+ ve : positive - ve: negative

CATT : card agglutination test for trypanosomiasis

CIATT : card indirect-agglutination antigen test for trypanosomiasis

b. gambiense and *T. b. rhodesiense*, is based on the detection of specific circulating trypanosomal antigens in blood (Nantulya *et al*, 1992; Komba *et al*, 1992). Some reports suggested that CATT was not effective in all *T. b. gambiense* endemic foci. This is possibly due to that infected individuals did not possess the gene encoding expression of target antigen (Dukes *et al*, 1992). On the other hand application of CATT for diagnosis of African bovine trypanosomiasis was discussed by Duvallet and Pagot (1988). Reliable results were obtained only for *T. brucei brucei* infection. But CATT can not be recommended for diagnosis of African bovine trypanosomiasis due to *T. congolense* or *T. vivax*. Furthermore, Noireau *et al* (1991) demonstrated lack of specificity of CATT in detecting *T. b. gambiense* infection in animals living in close contact with man in a human trypanosomiasis focus.

The proportion of parasite-negative and sero-positive infected camels detected by using Suratex, CATT and CIATT could be attributed to the following possible interpretations: either some of the sero-positive infected camels were indeed infected but their parasitaemia is too low to be detected, or they were false positives due to the cross-reactivity (WHO, 1998).

In conclusion, the subgenus Trypanzoon can be identified and grouped on the basis of iso-enzyme and DNA characteristics, it will be necessary more research on trypanosomes surface antigen before application of CIATT for detection of camel trypanosomiasis.

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BOOK-REVIEW

Title of the Book: The Sheep with Souls and other stories
Veterinary chronicles from different countries
Editors: Johannes Odendaal and Namitha Dipak
Edition : Ist 2006, Paperback, pages 105+xxii
ISBN : 81-7525-669-9
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(payable to Clarity COmmunications by DD) ; Abroad US $ 7.5

These veterinary chronicles from different countries like Mexico, USA, South Africa, and India form a unique compilation authored by veterinarians, and edited by Johannes Odendaal and Namitha Dipak. The stories feature real-life experiences on the basis of which the authors have constructed stories that reveal different facets of their professional lives, in the process giving an insight not just about their animal patients, but the human clients and the environment.

The book has an explicitly straightforward layout and a meaningful cover page showing all animals in the treatment bag of a veterinarian. Each story has a full page sketch relevant to the story with a pertinent legend. The brief biographies at the end of each story really satisfy the curiosity of the reader to know more about the authors of these inspiring stories. The editors deserve kudos for narration of these stories in uncomplicated English.

The stories include Hassan Ahmed Mohamed's "Trial and triumph" which describes a situation when the author had to face the challenge of initiating a much opposed vaccination programme in a Somali village. "A camel in the puzzle" is authored by Ilse Kohler- Rollefson who found a missing piece in the puzzle in the form of the skeleton of a pregnant camel that helped her to date an archaelogical event in Jordan. The title story "The sheep with souls" authored by Raul Perezgrovas describes the history and life of the Tzotzils of Mexico and their relationships with their sheep. The strong bonds between the Tzotzil shepherdesses and the Chiapas sheep are full of emotions. This is evident by this phrase of story- "They don't want to hurt the feelings of the animals. The heart of the sheep will become sad". Cheryl M.E. McCrindle describes how a farmer called Pele turns teacher and demonstrated his techniques for control of ticks to veterinarians and animal health workers in Sout! h Africa. Although the incident in "Fielding practice" by Sagari R. Ramdas where one paraveterinarian wanted to know about reproduction in humans is interesting, it is not uncommon. Rural veterinarian have to face such challenges very often but unfortunately these are beyond records. Johannes Odendaal describes the existence of a bond between animal and owner in his story "Who treats whom?" and gives an insight into a case that puzzled him early on in his career.

I always tell my veterinary students to realise and appreciate the horizons of the veterinary profession which provides an opportunity to look after the health and disease of a wide spectrum of animal species, ranging from the cat to the camel and domestic to wild animals. In the wake of this fact, the diverse experiences enunciated by veterinarians in the nine stories of this books are the real challenges faced by a veterinarians and are worth reading. Clarity Communications deserves congratulations for bringing out this unique book having a very reasonable price tag.

Reviewed by: Dr. T.K. Gahlot
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