International Journal of Veterinary Sciences and Animal Husbandry

ISSN: 2456-2912
VET 2024; SP-9(1): 781-783

www.veterinarypaper.com
Received: 21-10-2023
Accepted: 30-12-2023

PI Ganesan
Professor and Head, Department of Veterinary Medicine, Apollo College of Veterinary Medicine, Jaipur, Rajasthan, India

Raut Akash
Assistances Professor, Department of Veterinary Pharmacology & Toxicology, Apollo College of Veterinary Medicine, Jaipur, Rajasthan, India

Som Dutt
Registered Veterinarian, Apollo College of Veterinary Medicine, Jaipur, Rajasthan, India

Corresponding Author:
PI Ganesan
Professor and Head, Department of Veterinary Medicine, Apollo College of Veterinary Medicine, Jaipur, Rajasthan, India

Studies on the subclinical status of ehrlichiosis in camel population and its attributable risk factors

PI Ganesan, Raut Akash and Som Dutt

Abstract
A random survey was conducted in six apparently healthy camels (camelus dromedarius- one humped) in a village nearer to Jamdoli, Jaipur for blood parasites by staining methods. Studies revealed the presence of Ehrlichia spp. in all the above six camels in the monocytes of the peripheral blood smears. Detailed studies ruled out the absence of ticks on the body surfaces of the camels and in the nearby vicinities. The camels maintained normal health state with subclinical status for Ehrlichia species organisms. The attributable risk factors associated for the presence of Ehrlichia species organisms in the healthy camel population discussed in this study.

Keywords: Camel population-ehrlichia-sub clinical status-risk factors

Introduction
Camelids are even-toed animals belonging to the family Camelidae and are classified into two tribes: Camilini and Lamini. Camlini includes the genus Camelus and camelus dromedarius is a one humped camel. It is a domestic species in semi-arid and desert areas (Plasil *et al.* 2016) [12]. The global population of camel is 35.5 million (FAOSTAT, 2020). Dromedory camels accounts for 95% of the population. The camel population in India is 2.52 lakhs and in Rajasthan state it is 2.13 lakhs. Camels are in use for milk, meat, wool, and hides and they are used for draught and racing purposes also (Diall *et al.* 2022; Zarrin *et al.* 2020, Khalafalla *et al.* 2021a) [11, 15, 18]. A section of people in India rearing camels as companion animals. Ticks are the most crucial vectors of diseases causing pathogens in domestic and wild animals (Boulanger *et al.* 2019) [4]. In recent years substantial work has been done worldwide in the characterization and taxanomic justification of camel infected tick borne pathogens. Studies on the prevalence of tick borne pathogens infecting camel population will be useful for interpreting the role of camels in the transmission of this group of tick borne pathogens. Armanda D. S. Bastos *et al.* (2015) [2] reported a prevalence rate of 4% in Saudi Arabia by PCR approach.

Abdullah D Alanazi *et al.* (2020) [1] reported that ticks and tick borne pathogens affects the health and well-being of camels and further reducing their productivity and performances and these affected camels may act as hosts for various tick borne pathogens. Hyalomma dromedarii ticks infesting camels in Saudi Arabia and these camels are exposed to many tick borne pathogens. E. *canis* also identified as one of the pathogen infecting camels and the author suggested detailed investigation of the Hyalomma ticks for all tick borne pathogens including Ehrlichia, since some of the pathogens detected are of zoonotic importance. Nayyerech Choubdar *et al.* (2021) [10] reported the prevalence of Ehrlichia Ewangii an important zoonotic pathogen in camels infested with Hyalomma ticks on the Iran –Pakistan border (Younan *et al.* 2021) [14] reported death in camel in the year 2016 in Kenya because of ehrlichiosis species close to E. ruminatum, E. *canis*, and *Ehrlichia regneryi* organisms often in young ones infested with Hyalomma, Amblyomma, and Rhipicephalus ticks and the camels affected were in good body condition. The author reported no evidence of direct transmission from affected to non-affected herds. Collins *et al.* (2022) [9] confirmed the prevalence of *E. ruminatum* in Kenya in 2016 by ELISA and reported that Kenyan camels are frequently exposed to *E. ruminatum* at an early age. Candidatus *Ehrlichia regneryi* DNA was detected in healthy camels in Kenya (Getange *et al.* 2021) [7] and the results showed E. *ruminatum* is unlikely to be

the only cause of the heart-water like disease outbreak. (Collins *et al.* 2022; Selmi *et al.* 2022) [9, 13]. Alanazi *et al.* (2020) [1] reported E. *canis* infection in camel from Saudi Arabia by phylogenetic analysis of the groEL.genes (Bastos *et al.* 2015) [2].

Published data on tick borne diseases in camels collected throughout the world to know the prevalence of the various tick borne diseases in camel population. The blood samples were from the normal healthy camels and studied by PCR method. A pooled prevalence of 4.6% was estimated for 566 camels by PCR studies for Ehrlichiosis. The author reported that insubstantial evidence exists regarding the natural infection of Ehrlichiosis in healthy camel populations. The substantially low incidence and scarcity of data on rickettsia and Ehrlichia species imply that camels were accidentally infected. It was further added by the author that Dromedary camels can become infected with various tick borne pathogens; however it is not known whether they are natural hosts for any species. Further it was suggested by the same author that detection of ruminant, equine and dog tick borne pathogens DNA may be linked to the close contact of dromedaries with these animals or accidental tick bites.

Materials and Methods

A random survey was conducted in 6 apparently healthy camels (camelus dromedarius- one humped) in a village nearer to Jamdoli, Jaipur, Rajasthan state. Peripheral blood smears were collected and stained with giemsa staining as per standard procedure.

Results and Discussion

A detailed study on the prevalence of various tick borne diseases were carried out by peripherical blood smear examinations.Out of 6 healthy camel smears screened, all were found positive for Ehrlichiosis species (Figures 1 (a-c). All the 6 blood smears revealed the presence of morulae in the monocytes of the infected camel blood smears, which were characteristic of Ehrlichia species. Other blood protozoan pathogens were not detected in the tested blood smears.

Published data on tick borne diseases, collected throughout the world to know the prevalence of the various tick borne diseases in camel population. The blood samples studied were from the normal healthy camels. The author reported that insubstantial evidence exists regarding the natural infection of Ehrlichiosis in healthy camel populations. The substantially low incidence and scarcity of data on rickettsia and Ehrlichia species imply that camels were accidentally infected. It is attributed that camels might have been infected by tick borne pathogens DNA of ruminants, equines and dogs due to their nearby vicinities to the camel population since they are in open yards or and by accidental tick bites by the infected ticks on dromedaries.

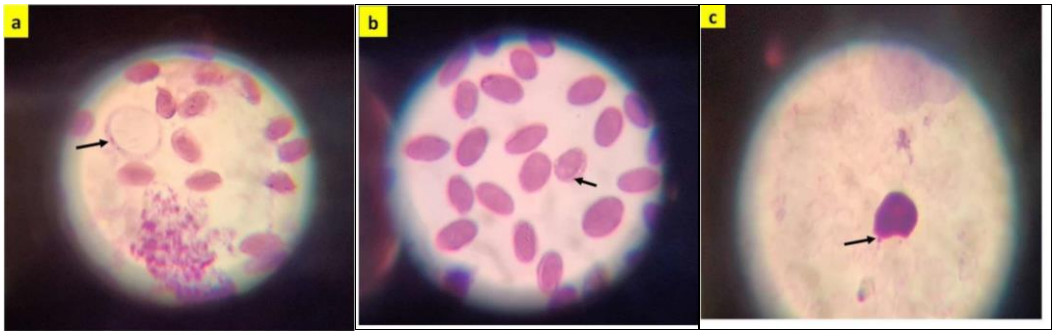

Fig 1(a-c): Morulae in camel monocytes indicated by arrow

Conclusion

The ticks and tick borne pathogens affects the heath and wellbeing of camels and reduces the productivity of these animals. These affected camels may act as reservoir hosts for various tick borne pathogens.Ticks like Hyalomma dromedarii infesting camel population, harbouring E.ewangii, a zoonotic pathogen causing monocytic and granulocytic Ehrlichiosis in humanbeings. Hence screening of camel population for various tick borne pathogens for their reservoir status needed to avoid the diseases created by these ticks both in animals and human beings. Studies on the prevalence of tick borne pathogens infecting camel population will be useful to interprete the role of camels in transmission of tick borne pathogens to animals and human beings.

References

1. Alanazi AD, Nguyen VL, Mohamed S, Alyousif, Manoj RRS, Abdulaaziz S, *et al.* Alouffi, Ridolfi Donato, Alireza Sazmand, Jairo A. Mendoza-Roldan, Filipe Dantas-Torres, Domenico I Otrantoi. Ticks and associated pathogens in camels from Riyadh Province, Saudi Arabia. Parasites Vectors. 2020;13:110.
2. Bastos ADS, Mohammed OB, Bennet NC, Petevinos C, Algaili AN. Molecular detection of novel Anaplasmataceae closely related to Anaplasma platys and Ehrlichia canis in the dromedary camels. Vet Microbiol. 2015;179(3-4):310-314.
3. Bostos AD, Mohammed OB, Bennet NC, Petevinos C, Alagaili AN. Molecular detection of novel Anaplasmataceae closely related to Anaplasma platys and Ehrlichia canis in the dromedary camel. Vet Microbiol. 2015;179:310-314.
4. Boulanger N, Boyer P, Talagrand-Reboul E, Hansmann Y. Ticks and Tick borne diseases. Med Mal Infect. 2019;49:87-97.
5. El-Sayed EI, Abbas AI, Saleh S, Elseadawy R, Fereig RM, Rizk MA, *et al.* Tick-borne pathogens in camels: A systemic review and meta-analysis of the prevalence in dromedaries. Ticks Tick Borne Dis. 2024;15(1):102268.
6. FAOSTAT: Food and Agriculture Organization of the United Nations statistic division. Assessed on 29 August 2021.
7. Getange D, Bargul JL, Kanduma E, Collins M, Bodha B, Denge DT, *et al.* Ticks & Tick-borne pathogens associated with dromedary camels in Northern Kenya. Microorganisms. 2021;9:1414.

8. Khalafalla AI, Hussein MF. Infectious diseases of Dromedary Camels. Springer International Publishing; c2021.
9. Collins M, Ngrtich C, Owido M, Getange D, Harris R, Bargul JE, *et al*. Detection of antibodies to Ehrlichia spp. in Dromedary Camels and Co-grazing sheep in Northern Kenya using an *Ehrlichia ruminatum* polyclonal Competitive ELISA. Microorganisms. 2022;10(5):916.
10. Choubdar N, Karimian F, Koosa M, Nejati J, Oshaghi MA. Hyalomma spp. ticks and associated Anaplasma spp. and Ehrlichia spp. on the Iron - Pakistan border. Parasites Vectors. 2021;14:469.
11. Diall O, Desquesnes M, Faye B, Dia ML, Jacquiet P, Sazmand A, *et al.* Development of a control strategy towards elimination of Trypanosoma evansi in camels in Africa. Acta Tropica; c2022. p. 234.
12. Plasil M, Mohandesan E, Fitak RR, Musilova P, Kubickova S, Burger PA, *et al.* The major Histo compatibility complex in old world camelids and low polymorphism of its class II genes. BMC Genet. 2016;17:167.
13. Selmi, Belkahia H, Sazmand A, Said MB, Messadi L. Epidemiology and genetic characteristics of tick borne bacteria in dromedary camels of the World. Acta Tropica. 2022;234:106599.
14. Younan M, Ouso DO, Bodha B, Keitany EK, Wesonga HO, Sitawa R, *et al. Ehrlichia* spp. close to *Ehrlichia ruminatum*, *Ehrlichia canis*, and Candidatus Ehrlichia regneryi linked to heart water-like disease in Kenyan camels. Trop Anim Health Prod. 2021;53:147.
15. Zarrin M, Riveros JL, Ahmadpour A, Vargas-Bello-Perez E, Faye B, Hernandez-Castellano LE, *et al.* Camelids: new players in the international animal production context. Trop Anim Health Prod. 2020;52:903-913.