



**EXISTENCE OF PESTIVIRUS INFECTION IN CAMELS IN NORTHERN
REGION OF SAUDI ARABIA**

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ABSTRACT

Pestivirus infection is widely spread in different species worldwide. This study was carried out to investigate the presence of pestivirus infection in camels in northern region of Saudi Arabia. A total of 316 camel serum samples were collected from Hail and Rafhaat the northern region of Saudi Arabia. Antibodies against bovine viral diarrhoea virus were tested in collected sera using ELISA. Antibodies to pestivirus were found in 10.8% of tested sera. Highest sero-positivity was noticed in Hail region (13.1%). The results confirmed the existence of pestivirus infection in camels in northern region of Saudi Arabia.

Keywords: Camel Pestivirus, ELISA, Saudi Arabia

INTRODUCTION

Pestivirus genus is a member of *Flaviviridae* family; the genus includes classical swinefever virus, bovine viral diarrhoea virus (BVDV), and border-disease virus [1].

BVDV is known to cause reproductive as well as respiratory and digestive disorders in domestic ruminants, previously reviewed [2] and [3].

BVDV as well as border disease virus infections are widely exist in cattle in Europe [4], in China [5], in USA [6] in Iraq [7]. BVDV and/or border disease infections in sheep and goats were also reported in sheep in Turkey [8], in Japan [9] and in goats in Korea [10] and in Sudan [11].

Until recently, camels were thought to be resistant to most of the infectious

diseases that affect ruminants. The natural exposure of camels to BVDV infection was well documented, in Egypt [12] in Sudan [13] in Tunisia [14] in Oman [15] and United Arab Emirates [16]. In Saudi Arabia little work on pestivirus was published, in cattle [17] and in camels [18], [19]. This study was intended to explore the existence of pestivirus in camels in northern region of Saudi Arabia through the detection of antibodies to the virus.

MATERIALS AND METHODS

Area of study

Two localities in the northern region of Saudi Arabia were selected for the study, Hail and Rafha (Figure 1).

Sample collection

A total of 316 serum samples were collected, Hail (n = 206) and Rafha (n = 110). Samples were randomly collected from camels in the slaughterhouse and some farms. Blood was drawn from jugular vein, centrifuged and serum was kept at -20° C till tested.

Examination of sera for pestivirus antibodies using ELISA

ELISA Kits used are based on a competitive enzymatic immunoassay (blocking Elisa), used conjugate is a pestivirus p80/p125 specific monoclonal antibodies peroxidase conjugated. Kits (Ingezim pestivirus compac) were purchased from Immonologia Y Genetica Aplicada, S.A. C./Hnos. Garcia Noblejas, 39 28037 –Mardid. Spain. Procedure of the test was applied as instructed by the manufacturer.

RESULTS

Antibodies to pestivirus detected using ELISA in camel sera

The overall tested camel sera were 316 (206 from Hail, 110 from Rafha regions). Out of this number, antibodies to pestivirus were found in 34 sera (10.8%). Within regions highest seropositivity was noticed in Hail region (13.1%), the details are presented in Table (1).



Figure 1: Area of camel sera collected for the study

Table 1: Pestivirus antibodies examination in camel sera using ELISA

Region	Total examined	No. positive	No. Negative	Percentage positive
Hail	206	27	179	13.1
Rafha	110	7	103	6.4
Total	316	34	282	10.8

DISCUSSION

Pestivirus is one of the significant viral causes of infectious diseases affecting domestic animals resulting in great economic losses. The virus exists worldwide with variable prevalence rates. Pestivirus infection in cattle was well known since long time, afterwards its causation of border disease in sheep and goats had been reported; more recently the susceptibility of camels to this viral infection was confirmed. In this study antibody to pestivirus was found in 10.8% of 316 examined camel sera collected from two different regions at the north of Saudi Arabia. Within regions the highest prevalence rate was found to be in Hail where more camel flocks are raised. Rafha is a small locality with very few animal production facilities, this explains the low prevalence (6.4%) detected.

Previous reports reflected the presence of antibodies to pestivirus in low percentage in camel sera. In Egypt only 1% of 190 tested camel sera reacted positive [20], 1.6% in UAE [21] and 3.8% in Tunisia [14]. Also similar result was found on testing bovine sera in

northern region of Saudi Arabia while it was higher in Western region (50%) and the Eastern region (38%) [17]. These low percentages are most probably due to the low number of raised camels in these countries and they are rarely kept with other species.

The determined percentage of antibodies in this study is comparable to that seen in camels (9%) in Algeria [22], (13.6%) in a study in Iraq [23], 14.7% in Ethiopia [24], 14.5% in Egypt [25]. Some slightly higher prevalence of pestivirus antibodies in camels (18%) was found in Saudi Arabia [18] as well as in 21.3% in Egypt [26].

It was noticed that despite the high prevalence (52.5%) reported in 1998 in Egypt [27], in the more recent reports high percentages of positivity had been reported. It was 29% in Saudi Arabia, 32.6 in northern region in localities other than those included in this study [19], 31% in Nigeria [28], 33% in Egypt [29]. This may be due to the change of management system and the more exposure of camels to other domestic animals. The highest ever reported prevalence (84%) was observed in Sudan [30]. This is

expected due to the very large number of raised camels and its nomadic nature where they are being in continuous contacts with cattle, sheep and goats in different localities leading to the wide exposure of camels to the infection.

The results obtained in the present study confirmed the existence of pestivirus infection in camels in Saudi Arabia. Molecular characterization of pestivirus in camels in Saudi Arabia is to be applied to investigate the epidemiology of this viral infection.

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Conflict of interest:

The author declares that no conflicts of interest exist.

REFERENCES

- [1] Murphy F.A., Gibbs E.P., Horzinek M.C., Studdert M.J. (1999). Flaviviridae. In *Veterinary Virology*, 3rd edition. Academic, New York, USA pp 556.
- [2] Collins M.E., Heaney J., Thomas C.J., Brownlie J. (2009). Infectivity of pestivirus following persistence of acute infection. *Veterinary Microbiology* 138 (2009) 289–296.
- [3] Bachofen C. , Vogt H., Stalder H. , Mathys T. , Zaroni R. , Hilbe M., Schweizer M. Peterhans E. (2013). Persistent infections after natural transmission of bovine viral diarrhoea virus from cattle to goats and among goats. *Veterinary Research*, 44:32.
- [4] Bachofen, C; Braun, U; Hilbe, M; Ehrensperger, F; Stalder, H; Peterhans, E (2010). Clinical appearance and pathology of cattle persistently infected with bovine viral diarrhoea virus of different genetic subgroups, *Vet Microb*, 141(3-4) 258-267.
- [5] Wang W., Shi X., Tong Q., Wu Y., Xia M. Q., Ji Y., Xue W., Wu H. (2014). A bovine viral diarrhoea virus type 1a strain in China: isolation, identification, and experimental infection in calves. *Virology Journal*, 11:8.
- [6] Duff G. C. and Galyean M. L. (2007). Board- invited review: Recent advances in management of highly stressed, newly received feedlot cattle. *J. Anim. Sci.* 85:823–840.
- [7] Al-Rubaye K. M. I. and Hasso S.A. (2012). Detection of

- bovine viral diarrhoea –mucosal disease (BVD-MD) in buffaloes and cows using ELISA. The Iraqi J. Vet. Med. 36 (1): 45 – 50.
- [8] Okur-Gumusova S., Yazici Z., Albayrak H. (2006). Pestivirus sero prevalence in sheep populations from inland and coastal zones of Turkey. *Revue Méd. Vét.*, 157 (12): 595-598.
- [9] Giangaspero M., Ibata G., Savini G., Osawa T., Tatami S., Takagi E., Moriya H., Okura N., Kimura A., Harsawa R. (2011). Epidemiological Survey of Border Disease Virus among Sheep from Northern Districts of Japan, *J Vet Med Sci*, 73(12): 1629–1633.
- [10] Yang D., Kweon C., Kim B., Choi C., Kang M., Hyun B., Hwang I., Lee C., Kyoung-Oh Cho K. (2008). Prevalence and genotypes of pestivirus in Korean goats. *Korean J Vet Res*, 48(1): 83~88.
- [11] Ali Y.H., Intisar K.S. , Taha K.M., Ishag O.M. , Nada E.M., Nouri Y.M , Baraa A.M. Salma B.E., Elghazali F. (2015). Detection of pestivirus in pneumonic sheep and goats, *Current Trends in Technology & Sciences*, 4(1) 436-440.
- [12] Zaghawa A. (1998). Prevalence of antibodies to bovine viral diarrhoea virus and/or border disease virus in domestic ruminants. *Zentralbl Veterinary Medicine B.*, 45(6):345–351.
- [13] Intisar, K. S.; Ali, Y.H.; Khalafalla, A. I.; Mahasin, E. A/ Rahman; Amin, A. S. (2010). The first report on the prevalence of pestivirus infection in camels in Sudan. *Trop AnimHlth Prod*, 42: 1203- 1207.
- [14] Burgemeister V.R., Leyk W., Gossler R. (1975). Investigation on the occurrence of parasites and bacterial and virus infection in Southern Tunisian dromedaries. *Deutsche Tierärztliche Wochenschrift*, 82: 341–348.
- [15] Hedger R.S., Barnett I.T.R., Gray D.F. (1980). Some virus diseases of domestic animals in the Sultanate of Oman. *Tropical Animal Health Production*, 12:107–114.
- [16] Wernery U. and Wernery R. (1990). Seroepidemiologic studies of the detection of antibodies to brucella,

- Chlamydia, leptospira, BVD/MD virus, IBR/IPV virus and enzootic bovine leucosis virus (EBL) in dromedary mares (*Camelus dromedarius*). Deutsche Tierärztliche Wochenschrift., 97 (3):134–135.
- [17] Al-Hammadi M.A. (2016). Serological Surveillance of Infectious Bovine Rhinotracheitis virus, Bovine viral diarrhea virus and Bovine Parainfluenza-3 virus in Saudi Arabia. Alexandria Journal of Veterinary Sciences, 51 (1): 48-53.
- [18] AL-Afaleq A.I., Abu Elzein E.M.E., Hegazy A.; Elnaem A. (2007). Sero surveillance of camels (*Camelelus dromedarius*) to detect antibodies against viral diseases in Saudi Arabia. J Camel. Practice Research, 14(2):91–96.
- [19] Khalafalla, A I., Al Eknah M. M., Abdelaziz M. Ghoneim, I. M. (2017). A study on some reproductive disorders in dromedary camel herds in Saudi Arabia with special references to uterine infections and abortion. Tropical animal health and pTrop. Anim Health Prod, 49(5):967-974.
- [20] Eisa M.I. (1998). Serological survey against some viral diseases in camels in Sharkia Governorate, Egypt. Proceedings of the Third Annual Meeting for Animal Production Under Arid Conditions, United Arab Emirates University, 1: 167-173.
- [21] Saidi R., Bessas A., Bitam I., Ergün Y. Ataseven V.S. (2018). Bovine herpesvirus-1 (BHV-1), bovine leukemia virus (BLV) and bovine viral diarrhea virus (BVDV) infections in Algerian dromedary camels (*Camelus dromaderius*). Trop Anim Health Prod, 50(3):561-564.
- [22] Wernery, U., Thomas R., Raghavan R., Syriac G., Joseph S., Georgy, N., (2008). Sero epidemiological studies for the detection of antibodies against 8 infectious diseases in dairy dromedaries of the United Arab Emirates using modern laboratory techniques – Part II. J. Camel Pract. Res., 15: 139-145. DOI: 10.1002/prca.200990001.

- [23] Al-Rubayie K. M. I. (2016). Detection of bovine viral diarrhoea-mucosal disease (BVD-MD) virus in Dromedary camel in Iraq using ELISA/A preliminary study. *Mirror of Research in Veterinary Sciences and Animals*, 70-74.
- [24] Melaku S.K. (2015). Characterization of *Camelus dromedarius* in Ethiopia: Production system, reproductive performance and infertility problems. PhD Thesis, College of Veterinary Medicine and Agriculture, Addis Ababa University.
- [25] Elbayoumy M.K., Allam A.M., Albehwar A.M., Elsayed E.L. (2013). Investigation of the immune status of camels (*Camelus Dromedarius*) against some viral diseases. *Alexandria Journal of Veterinary Sciences*, 39:12-17.
- [26] Iman, A. Z. A. ; Kassem, A. ; Hussin, M. ; Zeidan, S. M. ; Elbalkemy, F. A. ; Abd-El Hamid, Y. M. ; Salama, S. A. (2013). Preliminary serological survey for detection of antibodies against some viral diseases in dromedary camels. *Proceedings of the International Camel Conference, Al-Hasa, Saudi Arabia*, 17-20 February 2013, 2015 pp.95-100 ref.46.
- [27] Zaghawa A. (1998). Prevalence of antibodies to bovine viral diarrhoea virus and/or border disease virus in domestic ruminants. *Zentralbl Veterinär Medicine B.*, 45(6): 345–351.
- [28] Peter I.D., El-Yuguda A.D., Mshelia G.D., Dawurung J.S. (2015). Detection of bovine viral diarrhoea virus antibodies in camels (*Camelus dromedarius*) in Maiduguri, Nigeria. *Sokoto Journal of Veterinary Sciences*, 13(3): 49-52.
- [29] El Bahgy, H., Abdelmegeed, H. K., Marawan, M. (2018). Epidemiological surveillance of bovine viral diarrhoea and rift valley fever infections in camel. *Veterinary World*. 11. 1331-1337.
- [30] Intisar, K.S., Ali, Y.H., Khalafalla, A.I., Mahasin, E.A/Rahman, Amin, A.S. (2010). The first report on the prevalence of pestivirus infection in camels in Sudan. *Trop Anim. Hlth Prod*, 42: 1203- 1207.