

Detection of Antibodies to Bovine Viral Diarrhea Virus (BVDV) Disease in Imported Camels (*Camelus dromedarius*)

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Abstract:

This serological study was carried out to detect antibodies in dromedary camels against BVD virus in Aswan governorate. A total of 92 serum samples, were collected from camels from Abo-Sembel Quarantine in Aswan governorate and examined for BVDV antibodies, using the indirect ELISA. Twenty five of the 92 camels (27.2%) were positive for BVDV antibodies. This study indicated an increased frequency of infection rate with increasing age of camels, as it was 32.4% in age group from 5- 10 years and 9.5% in 1-5 years old, and the degree of positivity varied from one positive to five positive.

Keywords: Camel, BVDV antibodies, Indirect ELISA, Serology.

Introduction:

Camel is an important multipurpose animal and since the old times, it has been used for transportation and produce milk, wool and meat in arid and semi-arid areas of the world. Nowadays, according to industry development and technology in all fields, this animal has lost its former importance and now the main target of camels breeding for production of meat [1].

Studies have shown that camels are susceptible to common diseases affecting other animal species such as brucellosis and bluetongue [2,3,4,5]. Bovine viral diarrhea virus (BVDV), a member of the genus Pestivirus is characterized by a wide spectrum of clinical manifestations from mild infections to severe clinical signs resulting in

respiratory, reproductive or immunosuppressive diseases [6, 7]. The virus is maintained in animal population by persistently infected animals that become infected in-utero prior to development of immune-competence and thus shed BVDV for life [8].

Bovine viral diarrhea virus (BVDV) infection is not exclusively a disease of cattle, but affects sheep [9], rabbits [10], camels [11] and goats [12]. It has been reported that BVDV can produce cases of diarrhea, ill thrift; reproductive losses as well as respiratory disease in camelids [13]. The virus has recently been described as an emerging disease in camelids [4] but the distribution globally is yet to be determined. The objective of the current study is to detect the

presence of antibodies of BVDV in imported camels in Aswan Governorate.

Materials and methods:

Area of study and animals: Abu-Simbel Veterinary quarantine in Abu-Simbel city at southern of Aswan Governorate which representing the South border of Egypt and considered the major point of entry of the imported camel (*Camillus dromedarius*) particularly from Sudan and Ethiopia into Egypt. A total number of 92 imported camels (*Camillus dromedarius*) were studied between June and August, 2016. All imported Camels were male in relation to sex.

Sample collection: Blood samples from ninety two (92) dromedary camels were randomly collected from Abu Simbel Quarantine in Aswan governorate from a total number of 4250 imported camels from Sudan which were clinically healthy and transferred into plain vacutainer tubes. Serum was separated by centrifuging at 3000 rpm for 15 minutes and stored in identifiable vials at -20° C until tested.

Serological test: Sera were tested for antibodies specific for BVDV using an indirect Enzyme Linked Immunosorbent Assay (ELISA) Kit (Bio-X Diagnostics, Belgium, Batch: BVD 16C31). The test was

performed according to the instruction of the manufacturer. Both positive and negative control sera were included in the assay. The results were read by a micro plate reader, where the optical density (OD) of the positive and negative sera and those of all the samples were measured at 450 nm wavelength.

Conjugate: Protein G horseradish peroxidase conjugate (Molecular Probes by Life Technologies Corporation, Catalog No.P21041, Lot: 1495870, USA) was used. The use of protein G conjugate has previously been demonstrated to be an effective means of serological testing in domestic animals [14]. Protein G conjugate was received as lyophilized powder and was diluted 1:20,000 with phosphate buffered saline (pH 7.2) prior to use [15].

Interpreting the results: We Subtract from each value recorded for the odd columns the signal of the corresponding negative control well and divided the signal read for each sample well by the corresponding positive control serum signal and multiply this result by 100 to express it as a percentage.

$$\text{Value} = \frac{\text{Delta OD Sample} * 100}{\text{Delta OD positive}}$$

Then we used the following table to determine each serum's degree of positivity.

0	+	++	+++	++++	+++++
Val <= 20 %	< Val <= 40 %	< Val <= 60 %	< Val <= 80 %	< Val <= 100 %	< Val

Results:

Table (1) shows that 25 samples from 92 (27.2%) were positive for BVDV antibodies. Regarding the rate of infection, the highest was detected in age group ranged from 5- 10 years with percent of 32.4%

(23 out 71). Moreover, low infection rate found in age group from 1- 5 years 9.5% (2 out 21), as showed in table (2). Furthermore, the degree of positivity was showed in table (3).

Table (1): Detection of BVDV antibodies in camel sera using indirect ELISA:

Number of examined camel sera	Positive	% of infection
92	25	27.2%

Table (2): Detection of BVDV antibodies among different age group of examined camel sera by using indirect ELISA:

Age group	Number of examined sera	positive	% of infection
1- 5 years	21	2	9.5%
5 - 10 years	71	23*	32.4%
Total	92	25	27.2%

Chi- square= 4.284*

significant at p value<0.05

Table (3): The results of serum's degree of positivity.

Degree of positivity	Number of samples	Percent
+	10/92	10.9%
++	4/92	4.3%
+++	8/92	8.7%
++++	0/92	0%
+++++	3/92	3.3%
Total	25/92	27.2%

Discussion:

Camels have long been imported to Egypt from Sudan for slaughter, for human consumption, for use as draught animals or as mounts by the Frontier Police. The numbers have varied annually owing in part to

economic and political considerations and the boldness of smugglers. Between 50,000 and 100,000 Sudanese camels enter Egypt each year [16]. Camels are susceptible to many viral diseases and play an important role in the

epizootiology of the diseases and also play a role in amplification of some viruses.

In this study, a BVDV antibody has been detected in 25 out of 92 tested sera (27.2%) collected from Abu Simbel Quarantine in Aswan governorate. The rate of detection of BVDV antibodies in camels in the present study is similar to the 23% reported by [17] who used serum neutralization test and higher than 1% reported by [18] and 4.3% detected by [19] in a seroepidemiological survey carried out on serum samples collected from healthy camels and explained that camels can be infected subclinically with BVD. In another Egyptian survey, [20] found that camels from Egypt, exhibited higher prevalence 52.5% of neutralizing antibodies to BVDV. Variable percentages of BVDV antibodies were detected previously in camels in different countries, 3.9% positive cases from Tunisia [21], 6.7% in Oman [22], from Somalia with 3.4% positive cases [23]. [24] did not identify any antibodies, from Sudan, 15.5 and 15.7% positive cases [25,26]; 9.2% and 3.6% in racing and breeding camels, respectively, in United Arab Emirates [27]. Newer seroepidemiological studies from Saudi Arabia and the United Arab Emirates showed a high seroprevalence with 18% [28] in Saudi Arabia and a low seroprevalence in the UAE, with 1.6% in dairy dromedaries [29] and

no reactors in 812 sera by [30]. In Iran, BVDV seroprevalence in camels was found to be 19.7% [31]. In Sudan BVDV seroprevalence rate is higher 84.6% [32].31.1% [33] in Maiduguri, Nigeria. Our results are differing from other studies. This may be due to differences in the assay techniques used or may be related to the differences in management, environmental variation, size of herds, and existence of PI animals in these herds [34, 35] and increased the spread of infection amongst this species as a result of cross infection from other animal species as they are found grazing together freely.

Concerning the relationship between the presence of BVDV antibodies and different age group of examined camel sera in the current study, the results revealed that the highest infection rate of BVDV found in age group ranged from 5 to 10 years with percentage reached 32.4%. This results may attribute to that this age group are more likely to be subjected to risk factors that affecting the presence of a disease such as heavy stress through their use for large scale transportation of goods and poor management. Moreover, Higher infection in old camels than the younger ones may due to more exposure to the source of infection. On the other hand, the lowest infection rate of BVDV in the present study found in age group (1-5 years) with 9.5%. This may

attributed to good management from owners, may kept indoor with relatively low exposure to the source of infection.

The antibodies detected in this study may likely be due to natural exposure of camel to BVDV as vaccination of animals against bovine viral diarrhea virus is not practiced in Sudan and most camels in Egypt are imported from Sudan.

Conclusion:

This study has revealed a rate of infection of BVDV (27.2%) antibodies among imported camels in Aswan governorate. the present data showed clearly that camels acquired that disease naturally, but in a mild or sub clinical form, thus the epidemiology of this virus in camel population needs to be elucidated. A larger sample size will be required to determine the true seroprevalence in this animal species. Furthermore, studies should also be carried out to isolate and genetically characterize the field strains of BVDV in other animals and to determine the disease burden caused by this virus in Aswan governorate.

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الملخص العربي

الكشف عن الأجسام المضادة لمرض الإسهال الفيروسي البقري في الإبل المستوردة
(*Camillus dromedarius*)

*صفاء سيد حسن حسنين مالك, *بهاء الدين السيد عبدالعزيز مذكور
*قسم الأمراض المعدية , كلية الطب البيطري, جامعتي أسيوط ** وأسوان

أجريت هذه الدراسة المصلية للكشف عن الأجسام المضادة في الجمال ضد فيروس BVD في محافظة أسوان. 92 عينة مصل جمعت من الإبل من محجر أبوسمبل بمحافظة أسوان وفحصت باستخدام الاليزا غير المباشر. خمسة وعشرين من الإبل كانت ايجابية للأجسام المضادة لمرض BVD من 92 بنسبة (27.2%). وأشارت هذه الدراسة زيادة معدل الإصابة في الجمال مع التقدم في السن، بنسبة 32.4% في الفئة العمرية من 5- 10 سنوات و 9.5% في 1-5 سنوات من العمر، ودرجة من الإيجابية تتفاوت من واحد إلى خمسة ايجابية .