

Research Article

Field Study on Abortion Storm in Dromedary Camel Farm in Saudi Arabia with Emphasis to Chlamydiosis

Hashim Mohamed Abdullah^{1*} and Osman A Hameed²¹Camel Research Center, King Faisal University, AL-Ahsa, Saudi Arabia²Central Veterinary Laboratory, Khartoum Sudan***Corresponding author:** Hashim Mohamed Abdullah, Camel Research Center, King Faisal University, AL-Ahsa, Saudi Arabia; **Email:** hmabdullah@kfu.edu.sa**Received:** May 20, 2021; **Accepted:** May 28, 2021; **Published:** June 07, 2021

Abstract

In a semi - intensive farm system for *Camelus Dromedarius*, native Saudi camel breeds were kept for milk purpose in north area of KSA. Mijaheem subspecies was dominant in number due to the believe that they are the highest in milk production. In December 2018 sudden continuous abortions were encountered without any apparent causes. Abortions were in the last trimester and were very high compared to previous years' records. Samples were collected and sent to laboratories locally and abroad, ELISA and PCR real - time were conducted accordingly and farm field measures were implemented intensively. The study summarizes the whole investigation been conducted and the results been stated with clear evidence of *Chlamydia abortus* as a cause of the abortion storm.

Keywords: *Chlamydia*, PCR real time, north of Saudi Arabia, *Camelus dromedarius*, Abortion

Introduction

Abortion refers to pregnancies that terminate with the expulsion of fetus with recognizable size prior to the period of viability, which is arbitrarily defined as 260 days for cow and 290 days for mare. Also fetal death is not an essential prelude to abortion. Abortion may be spontaneous or induced, infectious or noninfectious [1]. As for *Camelus dromedarius* Saeed Basmael found that 389 days are the maximum number of days that camel fetus can stay viable inside the uterus of his dam [2]. The authors have applied this information to declare abortion in *Camelus dromedarius* is the expulsion of fetus of recognizable size prior to 389 days of gestation.

Chlamydia has a worldwide distribution causing a wide range of disease in human hosts, livestock, companion animals and even wild and exotic species. *Chlamydiosis* in animals can range from asymptomatic infection to severe disease with life-threatening illness [3]. *Chlamydial* taxonomy lately settled to describe order *Chlamydiales* consisting of nine families, first famous family is *Chlamydiaceae*. This family *Chlamydiaceae* consist of one single genus *Chlamydia* which include 11 (Eleven) species: these species are *C. abortus*; *C. caviae*; *C. felis*; *C. muridarum*; *C. suis*; *C. pecorum*; *C. avium*; *C. psittaci*; *C. pneumonia*; *C. trachomatis*; *C. gallinacea* [4]. Virtually *chlamydial* species might easily cross all body host barriers. Members of *chlamydiales* order are obligate intracellular Gram negative bacteria which are transmitted as metabolically inactive and must differentiate, replicate and re-differentiate within the host cell to carry out their life cycle. It is obvious that due to science development *Chlamydiales* order life cycle is being greatly understood [5].

In Saudi Arabia the first record of serological evidence of camel

chlamydiosis was reported by Mansour F. Hussein, ELISA test was performed by *Chlamydia abortus* enzyme immunoassay kits (IDEXX LAB. USA). 19.4% of the tested camel were positive for anti-*chlamydial* antibodies which was more prevalent in females than males and also higher in adult than young camels [6]. Abdelmalik Kalafalla was the first to use PCR real-time technique for detection of *chlamydiosis* in indigenous camels of Saudi Arabia using uterine swabs and reported 10.3% positive for *chlamydiosis* [7]. Also I Al Khalifa reported *chlamydiosis* in 10.05% samples from 378 Mijaheem camels been tested using indirect enzyme-linked immunosorbent assays [8]. These above 03 *chlamydiosis* prevalence reports in Saudi Arabia camels are great evidence for scientists to continue research in this field especially with the high rate of abortions encountered in Saudi Arabia now. There are also reports of camel *chlamydiosis* in nearby countries such as in UAE [9]; Egypt [10]; Tunisia [11]; Libya by [12] and in Algeria by [13]. Moreover, scientists declared that ticks can carry viable *chlamydia* and can transmit it to other animals [14,15]. Zoonotic infections due to *chlamydia abortus* and *chlamydia psittaci* are reported and well known and more prevalent than other *Chlamydia* species [3]. Vertical transmission, which promotes the persistence of infection in ruminant herds, also occurs in birds, venereal transmission of *C. abortus* is possible since the bacteria are found in the semen of bulls, rams and goats [16].

Materials and Methods

Farm Management System

The location case farm is highly organized and have a very large space area which reach 30000 Hecter, in far north of Saudi Arabia. There is a well-built management system with ear tags electronic

identification (SHEARWELL Co.) and the camel have been kept in an isolated area of more than 6000 Hecter which give them good area to practice natural grazing and also as natural barrier against contacts with other camel herds around, so eliminating different diseases contacts possibilities. The farm has a simple model of camel milking parlor and also a milk processing plant is located 15 KGM from camel zone serving camel and goat milk. The rearing management system is mainly divided into two major units:

- a. Unit one: Mating, grazing and calving
- b. Unit two: Milking

Unit One: Mating, Grazing and Calving

After mating, primitive tail rising method of pregnancy diagnosis is practiced and positive ones ate separated into specific and been fed an according to the farm policy waiting for a second pregnancy check. Mating and tail checking is going on during the winter season which is between October up to April of next year and also the separation process of positive pregnant and rechecking are continuing on. In the end of the winter season all the group of she camels are drove out to the grazing unit (mainly to decrease the feed cost). Negatives are kept alone for more investigations. In the camel area of the project also there are many central water pivots which belong to the company agricultural dept. and are always grown barley, Alfa-Alfa, corn or industrial tomato so a good chance of grazing in these pivots after harvesting are well utilized and of high benefit. A daily check of animal health and feeding are done perfectly and all necessary programmed and interventions are practiced. The well clear pregnant ones are drove back to calving pens on approaching the coming season and calving and calf management is done, then they transferred to milking unit and the cycle is repeated.

Unit 2: Milking

On receive of dams with their calves after spending 15 days in calving pens and been naturally direct udder feeding been practiced, all dams with their calves will start a training programmed of machine milking procedures. After some time, the dam will be trained and will come alone to the parlor without her calf. Usually dams are milked twice a day and kept for one milking season, but sometimes it will continue milking for up to 18 months. Animal health and feeding depts. are available according to the procedures.

Case Report

In 2018 and while the calving season was going smoothly as previous seasons (season usually between Oct. and April of next year), calving attendants report a series of abortions in the last trimester stage of pregnancy without any reason or prior symptoms, they only had found aborted foeti and may found some links to a certain dam due to drooled placenta or some fluids and blood on the outer dam gentilia. More procedures were implemented and night supervisors appointed with instruction to call veterinarian to attend all deliveries or abortions any time night or noon. Three management approaches were implemented which are:

- a. Effective quarantine of the calving area was done, closing of the camel area also implemented and separate labors for the calving area was strictly observed and controlled. We build a new calving area for new comers from grazing area to deliver calves.
- b. Disinfections were applied to pens, feeders, drinkers and the camels in daily basis. Vitamins and minerals mixers were applied to camels feed and water as recommended by manufacturers. Mass antibiotic water soluble treatment was practiced for all adult females whether aborted or not with Doxycycline-200 W.S. powder at a dose of 05 Grams per 200KG body weight for 05 consecutive days in drinking water. The treatment programmed continued monthly for 03 days with the same drug and dose till end of parturition season.
- c. Importantly samples from recent aborted attended cases were collected, preserved and been sent to local and aboard laboratory. We had taken from 20 aborted she camels blood for serum for ELISA testing in ARASCO Co. in KSA (Table 1). From other 08 aborted she camels, we had collected amniotic fluids, blood for serum, part of placenta tissue and a preputial wash from one male camel and been sent to aboard laboratory (Table 1).

Results

Closely we trace the abortion rate of the concerned location from the records of year 2014 up to year 2018 season in which sudden sharp rising abortion incidents were noted and recorded. Also we have the data of 2019-year season which the abortion rate come back to normal like rates of previous years before the abortion storm of year 2018. In Table 2 below we can check easily the rates of the abortion in the location from year2014 up to end of year 2019 calving season.

From Table 2 it clearly indicated how it was serious and difficult situation to encountered suddenly a continuous silent abortion in year 2018 which finally reached 33.80% of the total pregnant she camels. But lucky enough in year 2019 the abortions came back normal after a tremendous effort were excreted to deal with the storm outbreak of abortions.

Table 1: Samples details.

Samples and specimen	Quantity	Laboratory and intended test
1. Blood for serum	20	KSA ARSCO Co. for ELISA test
2. Amniotic fluid, blood for serum, placenta tissue and preputial wash	08	Aboard laboratory for PCR

Table 2: Abortions % from year 2014 to year 2019.

Year	Total pregnant she	Total calves alive	Total aborted calves	Abortion rate
2014	204	199	05	02.45%
2015	246	244	02	00.81%
2016	132	132	00	00.00%
2017	142	142	00	00.00%
2018	210	139	71	33.80%
2019	152	146	06	03.95%

ELISA Results

20 frozen serum samples were prepared and been sent to ARASCO Co. which usually do testing (customer services) in King Saud University at faculty of animal and food science (Table 3).

The ELISA technique was performed according to manufacturer's procedure using CHEKIT enzyme immunoassay kits from IDEXX Laboratories Inc., USA.

PCR – Real Time Results

The following samples have been collected from 07 attended aborted she camels, which were blood sera, amniotic fluids and placenta tissue. One male preputial wash also was collected and all samples been frozen and sent aboard to a known laboratory and the following results were being received from them (Table 4).

The samples for PCR real-time were prepared in cooled ice box and immediately been sent via road to Jordan University of Science and Technology, veterinary laboratory in faculty of veterinary science, (Jordan is only about 170 KMs from the farm). Results were posted via Email to the farm management in Dec 19,2018. As in Table 4, 6 samples were positive for *C. abortus* and all samples were negative to *T. gondii*, *Cox burnetti*, *Br. Abortus* and *M. ovium*.

Discussion

Low reproduction performance in camels is mainly ascribed to old age at first calf. Long calving intervals and limited breeding season [17]. Camels birthing rates rarely exceed 40% in nomadic herds and 70% in semi or intensive herds and neonatal mortality is huge and may reach epizootic proportions [18]. Tibary also stated that abortions in *Camelus dromedarius* due to infectious diseases vary from 10% to 70% and Brucellosis and Trypanosomiasis represent the major causes of infectious abortions in the Middle East and Africa (Tibary 2016). In Saudi Arabia the first record of serological evidence of camel chlamydiosis was reported by Mansour F. Hussein [6].

In this study an unexpected storm of abortions in pregnant female

Table 3: ELISA results.

Disease Antibodies tested	Total samples	Positive samples
Toxoplasma	20	20
Q – Fever	20	16
Chlamydia	20	04
Brucella spp	20	08
JOHNE'S disease	20	14

Table 4: PCR – real time results.

Disease tested	Total samples	Positive samples
<i>Toxoplasma gondii</i>	08	00
<i>Coxiella burnetti</i>	08	00
<i>Chlamydia abortus</i>	08	06 (05 female+01 male*)
<i>Brucella spp</i>	08	00
<i>Mycobacterium ovium</i>	08	00

*The male revealed positive in PCR and was removed from the herd permanently.

camels in the third trimester period of gestation occurred without any previous signs of illness neither before abortion, nor after it. As it is clear from the Table 2 it was the first time to report an outbreak of abortions (33.80%) of the total pregnant females that year aborted. The location is an intensive farming system of dromedary camels designed for milk production and have a commercial automatic milking parlor and a dairy plant. From farm records abortion rates were never exceeded 02.45% for the last five years (2014-2018). PCR – real time have detected positive cases of females and one male infected with *Chlamydia abortus*. ELISA results of the incident indicate presence of antibodies for five infectious diseases namely *Toxoplasma*, Q. Fever, *Brucella spp.*, JOHNE'S disease and *Chlamydia* which agree with Abdelmalik study who was the first to use PCR real-time assays for detection of uterine infections indigenous camels of Saudi Arabia. Chlamydiosis, toxoplasmosis and Brucellosis were detected in this study and Abdelmalik [7].

More investigations are needed especially when there is a clear abnormal rate of abortions or reproductive failures. This study should direct the attention of owners, farm veterinarians and research centers to the importance of *Chlamydia* as one of serious emerging causes of abortions in *Camelus dromedarius*. The Elisa results indicate the presence of antibodies against *Toxoplasma*, Q-fever, *Brucella* and JOHNE'S disease so more care should be alert for more investigations and further studies. The intensive management care and treatments been practiced in the farm had led to stop abortions at a rate of 33.80%. In second reproduction season (2019-2020) the abortion rate was only 3.95%. From the field attendance, abortion nature, data collected and laboratory results the authors have great confidence it is a Chlamydiosis outbreak incidence and should be a corner stone in any future investigations of *Camelus dromedarius* abortion cases.

Conclusion

Chlamydiosis should be considered as a major emerging cause of abortions in *Camelus dromedarius* in Saudi Arabia, Middle East and Africa due to increased studies done recently and have proved its importance as a cause of abortions and reproductive failures in camel production. Prevention of infectious causes of reproductive losses and abortions in camelids should be based on sound biosecurity measures designed to prevent the introduction and spread of disease in population, herd or group of camelid in specific area. These measures can simplify in vaccination programs of specific diseases, pre-breeding reproductive examinations like uterine culture and cytology, males also must be tested physically and microbiologically, quarantine of recently introduced camels, breeding hygiene should be strictly observed, pre-parturient monitoring and personnel attending parturient females should be practiced to recognize any abnormalities.

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