

Camel Abortion Status in Iran- A Mini Review

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Abstract

About 180,000 old world camels (OWCs) including one-humped (*Camelus Dromedarius*) and two-humped (*Camelus Bactrianus*) camels (only 100–300 individuals) live in Iran. Abortion is one of the problems of camel breeders in Iran at various aspects, i.e. economical, animal healthcare or zoonotic. So far, some epizootological studies have been conducted on infectious diseases of Iranian camels. However, there is the absence of comprehensive information on the camel abortion status in Iran. We aimed at collecting all the available information on abortion in Dromedary and Bactrian camels in Iran to have a better picture of the situation in the country. Based on studies that examined the causes of abortion of dromedary camels in different provinces; Brucellosis, trypanosomiasis, leptospirosis, salmonellosis, bovine viral diarrhea, infectious bovine rhinotracheitis and aspergillosis are common factors of abortion in the country. This review can provide baseline information for future research and give significant contributions to figuring the disease control strategies.

Keywords: Abortion, Dromedary camel, Bactrian camel, Iran.

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INTRODUCTION

Abortion is defined when the mother animal expels the fetus before it is due at any time during pregnancy. The diagnosis of abortions is challenge to the farmers and veterinarians and may be missed in the early stages, since there is little to be seen. The main signs of abortion include a placenta protruding from the vulva, presence of a dead fetus in a paddock or pen, or indications of receptivity to a male (Fowler, 2011). knowledge on the incidence and etiology of abortion in camelids are limited and various infectious, traumatic or toxic factors have been associated with abortion in camels (Tibary et al. 2006). Abortion can cause huge economic losses to camel breeding industry including frank abortion losses, uterine infections, reduce productive rate, increased camel calving interval and infertility, veterinary cost, reduce milk production and culling or death of animals. In addition to this the cost of human disease given that many of the agents of abortion are zoonotic (Hassani et al. 2019; Hassani and Hamed, 2019).

Iran is home to two species of Old-World Camels (OWCs): *Camelus dromedarius* and *Camelus bactrianus*. The populations of Dromedary and Bactrian camels are estimated to be approximately 180,000 and 100-300, respectively. Camel husbandry is a common practice in deserts of Iran in a traditional way for its milk, meat, wool and also as work power in agriculture and a pack animal in transportation (Iranian Ministry of Agriculture, 2018). So far, some epizootological studies have been conducted on infectious diseases of Iranian camels. However, there is the absence of comprehensive information on the camel abortion status in Iran. We aimed at collecting all the available information on

abortion in Dromedary and Bactrian camels in Iran to have a better picture of the situation in the country.

CAMEL ABORTION STATUS IN IRAN

There is little information about the abortion in Dromedaries and none about Bactrian camels in Iran. In 2014, The outbreak of abortion storm in camel herds have been documented in Qom province, where 494 pregnant camels from total of 846 (58.4%) and 35 herds from 45 (77.8 %) was aborted. The rate of abortion in herds was from 14 to 100% (Barani et al. 2017). In Iranian dromedary camels, reported infectious causes of abortion include brucellosis, trypanosomiasis, leptospirosis, salmonellosis, bovine viral diarrhea, infectious bovine rhinotracheitis and aspergillosis (Table 1).

Based on the serological tests, camels are highly susceptible to *Brucella* spp., with the prevalence up to 12.6% but so far clinical signs haven't been documented (Hassani and Nayeri Fasaei, 2019). Some researchers (Dehkordi & Taghizadeh, 2012 and Dehkordi et al. 2012) believe that brucellosis may act as an important causative agent of abortion in camels, as *Brucella* spp. DNA (*B. abortus* and *B. melitensis*) was isolated in 11.4% and 32.5% of aborted fetuses in different regions of Iran.

Prevalence rates between 0 and 19.5% for *Trypanosoma* infections have been reported in dromedary camels of Iran (Sazmand and Joachim, 2017). Abortion associated with outbreaks of trypanosomiasis have been documented in dromedary herds of Iran; however, there is only one report on the role of *T. evansi* infection in camel abortion (Zakian et al, 2016; Mirshekar et al, 2017). Nazem et al. (2020) examined 244

abomasal contents of aborted fetuses were collected from eastern provinces and showed that 41 (16.8%) aborted fetuses

Mosleh (2017) examined 10 gallbladder content and amniotic fluid of aborted fetuses from dromedaries in Khorasan

Table 1. Infectious causes of abortion in Dromedary camel fetal samples in Iran

Pathogen	Study area	Sample type	No. of sample	Method(s): No. of positive (%)	Reference
<i>Brucella</i> spp.	Isfahan	Abomasal contents	35	Bacterial culture: 4 (11.4) Multiplex PCR: 4 (11.4)	Dehkordi & Taghizadeh (2012)
	Different regions	Abomasal contents	618	Conventional PCR: 201 (32.5)	Dehkordi et al. (2012)
<i>Typanosoma evansi</i>	Different regions	Abomasal contents	244	PCR: 41(16.8)	Nazem et al. (2012)
<i>Leptospira interrogans</i>	Isfahan	Abomasal contents	35	Bacterial culture: 7 (20) Multiplex PCR: 8 (22.8)	Dehkordi & Taghizadeh (2012)
<i>Salmonella</i> spp.	Khorasan Razavi	Gallbladder content, amniotic fluid	10	Bacterial culture: 2 (20)	Muhammadi & Mosleh, (2017)
Bovine viral diarrhea virus	Different regions	Abomasal contents	214	Antigen capture ELISA: 27 (12.6) Real-Time PCR: 32 (14.9)	Dehkordi, (2011)
Bovine herpes virus type 1	Different regions	Abomasal contents	79	Conventional PCR: 8 (10.1) Real-Time PCR: 10 (12.6)	Dehkordi et al. (2013)
<i>Aspergillus</i> spp.	Different regions	Abomasal contents	161	Real-Time PCR: 19 (11.8)	Dehkordi et al. (2012)

were infected with *T. evansi*.

Razavi and isolated the pathogen from 2 cases.

Rafiei and Maghami (1959) detected anti- *Leptospira icterohemorrhagiae* antibodies in a female camel, which suffered from hematuria that later led to abortion. Infection to *Leptospira* was reported in range 2 to 27.9% in dromedaries from different parts of Iran (Hassani and Nayeri Fasaei, 2020). In a bacterial culture and PCR survey, *Leptospira* as an agent of abortion in camels, detected from 20-22.8% of aborted fetuses in Iran (Dehkordi and Taghizadeh, 2012).

In the only report on *Salmonella* outbreak in camels in Iran, Muhammadi and

In 2010, a study on camel sera from Tehran province by serum neutralization test (SNT), showed that bovine viral diarrhea virus (BVDV) was prevalent (27/137) in camels of the region (Raooft et al. 2010). Afterwards, Dehkordi (2011) revealed 27 (12.6%) and 32 (14.9%) of 214 aborted camel fetuses from some parts of Iran are BVDV positive using antigen capture ELISA and Real-Time PCR respectively.

So far antibodies to Bovine Herpes Virus-1 (BoHV-1) causing infectious bovine rhinotracheitis, have been detected range from 0 to 7.3% in Iranian camels

(Raooft et al. 2012; Sazmand et al. 2014; Baghbanian, 2017). In Dehkordi et al (2013) work from parts of Iran, 8 (10.1%) and 10 (12.6%) of 79 aborted camel fetuses were positive for BoHV-1 based on conventional and real-time PCR respectively.

In the only study on mycotic abortion in camels in Iran, *Aspergillus* species (*A. fumigatus*, *A. flavus*, *A. niger* and *A. terreus*) were detected in 11.8% (19/161) of aborted fetuses (Dehkordi et al. 2012).

Other camel infectious factors causing abortion including *Coxiella burnetii*, *Anaplasma* spp. and Bluetongue virus have been documented in Iran but now, we don't know whether they act as a causative agent of abortion in Iranian camels or not (Hassani et al. 2019; Hassani and Hamedi, 2019; Hassani and Madadgar, 2020).

Although occurrence of abortion in the camels of this country has multifactorial etiologies, but the present study could represent infectious diseases as a serious risk factor in predisposing the camels to abortion. The current strategy for control of camel abortion in Iran is voluntary and relies on individual producers to decide if abortion is a significant problem in their own herds and need aggressive control efforts (Hassani et al. 2019; Hassani and Hamedi, 2019). A well-defined control strategy for preventing and controlling infectious abortion in camels of Iran should be based on further epidemiological studies on causes of abortion, control of animal trafficking from neighboring countries, employing good biosecurity practices that inhibit the introduction and spread of infectious causes of abortion in the herd and using vaccination programs.

ABBREVIATIONS

spp.: species; BVDV: bovine viral diarrhoea virus; BoHV-1: Bovine Herpes Virus-1

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CONFLICT OF INTEREST

The author declares that he has no conflict of interest.

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