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Epidemiological study of hydatidosis in the dromedaries (Camelus dromedarius) of different regions of Iran

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PEER REVIEW

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Comments

Because hydatidosis is an important zoonotic disease as mentioned above, this research is a valuable research work. The results of this study show that hydtidosis control strategies in the last year's such as education of farmers and destroying offal containing hydatid cysts, deworming domestic dogs and control of homeless feral dog was not effective for decreasing of hydatidosis in camels in Iran.
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ABSTRACT

Objective: To determine the prevalence of hydatidosis in dromedaries.
Methods: 438 dromedaries were examined in five regions of Iran from 20 March, 2010 to 19 March, 2011. The relationship between host age and the mean number of hydatid cysts, and prevalence and fertility rates was analyzed using chi-square test.
Results: One hundred and thirty five out of 438 (30.82%) camels harboured hydatid cysts of *Echinococcus granulosus*. Number of cysts was 700 with 72.5% lung cyst. The highest rate of infection was that 54 (40%) of camels was found in the Khorasan Razavi region (in the north-east part of Iran) while the lowest 6 (4.4%) of camels was found in Semnan province. Infection was higher in >15 years age group. The most commonly infected organs were lungs (72.5%) followed by liver (12.6%). Both liver and lungs together constituted 14.8% of infection. A comparison found that hydatid cysts of liver had a higher fertility rate (32.57%) than that of lung (19%); while most of cysts of lung were calcified (24.42%). The mean number of protoscoleces per mL in the lung fertile cysts was higher than that of liver cysts. Fertile or sterile might be due to the different species or genotypes. The mean number of cysts in infected liver and lungs was 1-5 cysts. The intensity of infection increased with age.
Conclusions: The results of current study can make a background data for implementing hydatid control programs and warrant the importance of camel in public health.

KEYWORDS
Camelus dromedaries, Hydatidosis, Iran, Prevalence

1. Introduction

Iran with an area of 1 648 195 square kilometers and having a variety of climate is one of the important regions of the livestock industry in the Middle East. The population of camels in Iran was 154 000 in 2008 and they were distributed in 22 of the 31 provinces. Of the total camel population, 69.7% (107 350) is distributed in the eastern half of Iran including Khorasan Razavi, South Khorasan, Semnan, Sistan-Baluchestan and Yazd, where is mainly hot and arid or semiarid[1]. Because of its physiological attributes, the camel is the most suitable domestic mammal for use in these climatic extremes. Free grazing pattern of the camels with their common grazing regions and water resources with other animals, shepherds and villagers makes the infected camels a potential source of infection to canidae and from they to human. G6 genotype was reported from Iranian patients[2].

One of the diseases that are not apparent to farmers, but are of notable economic and public health importance is hydatidosis. Hydatidosis is one of the most significant zoonoses all around the world[3]. In Iran, high prevalence of parasite have been reported in different animals including

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Table 1
The prevalence (%) of hydatid cysts in camels in five regions of Iran in 2010-2011.

Regions	No. examined	No. infected (prevalence) (%)	Lung hydatid prevalence (%)	Liver hydatid prevalence (%)	Lung-liver hydatid prevalence (%)
Khorasan Razavi	136	54 (40.40)	62.0%	18.0%	20%
Yazd	80	25 (31.20)	62.5%	12.5%	25%
South Khorasan	120	32 (26.60)	75.0%	15.0%	10%
Semnan	27	6 (22.20)	79.0%	10.0%	11%
Sistan and Blouchestan	75	18 (24.00)	84.0%	12.0%	4%
Total	438	135 (30.82)	72.5%	13.5%	14%

sheep, goats, cattle, and camels as intermediate hosts as well as dog and other canids as definitive hosts[2,4,5]. There are few data about prevalence of hydatidosis in dromedary from Middle East countries including Iran[6,7]. Nonetheless, information on epidemiology of hydatidosis in the dromedaries in different regions of Iran is very limited.

Therefore, the main objective of the present study was to determine the prevalence and characterization of hydatidosis in camels of different regions of Iran and to analyze the association between the prevalence rates with epidemiological factor.

2. Materials and methods

2.1. Sampling

The study was performed in five main regions where camels are mainly harboured (Figure 1). From each region, an abattoir where camels were slaughtered was selected. These abattoirs were visited from 20 March, 2010 to 19 March, 2011. At each visit, Liver and Lung of slaughtered camels were carefully checked for the presence of hydatid cysts. Host age based on dentition formula and the number of cysts on each organ was also recorded.

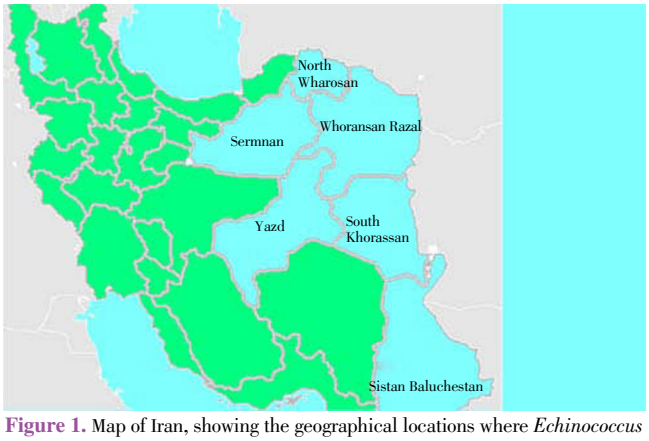

Figure 1. Map of Iran, showing the geographical locations where *Echinococcus granulosus* samples were collected from camels.

2.2. Parasitological examination

The cyst fluid was aspirated from each infected organ using a sterile syringe, and 0.3 mL of each sample of cyst fluid were examined for the counts of protoscoleces using Mac-master slide. Those cysts which had protoscoleces were considered fertile. Cysts with fluid only and without protoscoleces were considered sterile, and all hard cysts were classified as calcified.

2.3. Data analysis

Data were analyzed by SPSS software package, version 16. The relationship between host age and the mean number of hydatid cysts, and prevalence and fertility rates was analyzed using chi-square test. $P \leqslant 0.05$ was considered significant.

3. Results

Out of 438 dromedaries examined from five regions, 135 (30.82%) were found to be infected with hydatid cysts (Table 1). Number of all of cysts from five province was 700 (300 cysts from Razavi Province, 125 cysts from Yazd, 160 cysts from South Khorasan, 30 cysts from Semnan, and 85 cysts from Sistan Baluchestan). The prevalence of hydatidosis in Khorasan Razavi (in the north-east part of Iran) was significantly higher than that in other regions ($P<0.05$). Host age (only in 300 camels) and prevalence were correlated in the camels as shown in Table 2. Age-prevalence (only in 300 camels) profiles showed that 10.0% of camels less than 3 years old had hydatid cyst, which rose to 48.0% in camels aged 15 years or older (Table 2).

Table 2
The prevalence (%) and site of infection of Iranian camels with cystic echinococcosis, relative to host age in 300 camels.

Host age (years)	No. examined	Lung only (%)	Liver only (%)	Lung + Liver (%)
<3	60	10.0%	7.0%	8.0%
3-7	60	16.5%	7.0%	11.5%
7-10	60	19.0%	10.0%	12.0%
10-15	60	20.0%	12.5%	35.0%
>15	60	27.0%	13.7%	48.0%

3.1. Analysis of location in dependence of the intensity of infection

Lungs were the most commonly infected organs. Overall, 72.5% of infected camels harboured cysts in the lungs alone, while only 12.6% having cysts in the liver and 14.8% having cysts in both liver and lungs (Table 1). Lung infections were significantly more common than those in the liver ($P<0.05$). Table 2 shows the location of cysts relative to age groups (only 300 camels).

3.2. Cyst fertility

A total of 361 (51.5%) of the 700 cysts were fertile. Of the remaining infected camels, 151 (21.5%) had sterile and 188 (26.8%) had calcified cysts. The proportion of fertile cysts in the liver was higher [228 (32.57%)] than that in the lung [133 (19%)].