Journal of Helminthology (2011) **85,** 478–479
doi:10.1017/S0022149X10000933

An abattoir-based study of hydatidosis in the dromedary (*Camelus dromedarius*) in Mashhad, Iran

H. Borji[1]*, M. Azizzadeh[2] and A. Afsai[1]

[1]Department of Pathobiology, School of Veterinary Medicine, Ferdowsi University of Mashhad, Iran: [2]Department of Clinical Science, School of Veterinary Medicine, Ferdowsi University of Mashhad, Iran

(Accepted 20 December 2010; First Published Online 21 January 2011)

Abstract

A 6-year retrospective study based on abattoir records was carried out to determine the prevalence of hydatidosis in dromedaries in Khorasan province in north–eastern Iran. Between 20 March 2004 and 19 March 2010, 25,255 dromedaries were slaughtered in the study area and the livers of 2791 (11.1%) and the lungs of 3289 dromedaries (13.2%) were discarded due to hydatidosis. The annual prevalence of liver condemnations due to hydatidosis decreased from 24.1% in 2004–2005 to 13.3% in 2009, and finally to 6.8% in 2010. The corresponding features for lung condemnation due to hydatidosis were relatively higher than liver, declining from 28.7% in 2004–2005 to 14.9% in 2009, and finally to 7.1% in 2010. Liver and lung condemnations due to hydatidosis were significantly higher in the spring. This could be attributed to various factors such as sources of slaughtered animals, changes in management practice and ecological factors. The present survey provides baseline data for the future monitoring of this potentially important parasitic disease in the region.

Introduction

The camel (*Camelus dromedarius*) is an important multi-purpose animal in Iran, and more than 200,000 dromedary camels are living in the arid and semi-arid deserts of the eastern part of Iran, including Khorasan and Sistan and Blouchestan provinces (Borji *et al.*, 2009). Due to its physiological attributes, the camel is the most suitable domestic mammal for use in these climatic extremes.

Among diseases that are not apparent to farmers, but are of considerable economic and public health importance, is hydatidosis. Hydatidosis is endemic in Iran and is maintained in three distinct cycles, a livestock/dog domestic cycle, a desert cycle between dogs and camels, and a sylvatic cycle between wild carnivores and wild ruminants (Dalimi *et al.*, 2002; Rokni, 2009).

There are few data about the prevalence of hydatidosis in dromedaries from Middle Eastern countries including Iran (Abdul-Salam & Farah, 1988; Ahmadi, 2005), and information on the prevalence of hydatidosis in the dromedaries in this region's abattoirs is very limited. The main aims of the present study were to determine the prevalence and possible trends of hydatidosis in dromedaries of this area.

Materials and methods

The study was based on a retrospective survey covering data of a 6-year period (20 March 2004 to 19 March 2010) from abattoirs in Khorasan province, in north-eastern Iran. Meat-inspection records from these abattoirs were used as the sources of data from which prevalence of liver and lung condemnations due to hydatidosis were extracted on a monthly basis.

Data were analysed by SPSS software package, version 16 (SPSS Inc., Chicago, Illinois, USA). The 6-year period trend was analysed using the chi-square test and the odds ratio was calculated (odds of condemnation due to hydatidosis in successive years). The seasonal pattern was investigated with the chi-square test. A P value of ≤ 0.05 was considered significant.

*E-mail: hborji@um.ac.ir

Table 1. Proportions of liver and lungs condemned due to hydatid disease and adjusted odds ratios (ODs) for the number of liver and lung condemnations, after controlling for seasonal variation between 20 March 2004 and 19 March 2010. *N*, number of camels infected; %, prevalence of infection.

	No. of camels slaughtered	Liver hydatid *N* (%)	ODs for liver condemnations	Lung hydatid *N* (%)	ODs for lung condemnations
2004–2005[a]	3870	911 (24.1)	1	1085 (28.7)	1
2005–2006	2274	317 (13.94)	0.51	391 (17.2)	0.51
2006–2007	2916	202 (6.9)	0.3	283 (9.7)	0.34
2007–2008	4866	252 (5.1)	0.17	362 (7.4)	0.2
2008–2009	4779	636 (13.3)	0.48	716 (14.9)	0.44
2009–2010	6640	452 (6.8)	0.24	473 (7.1)	0.18
Total	25,255	2791 (11.1)		3289 (13.2)	

[a] Assuming the 2004–2005 year ODs = 1.00 as the basis for comparison.

Results

Over the 6-year study period, 25,255 dromedaries were slaughtered in the surveyed abattoirs and a total of 2791 livers (11.1%) and 3289 lungs (13.2%) of dromedaries were condemned due to hydatidosis.

Rates of annual prevalence of infection in the 6-year period are shown in table 1. The overall trend showed a significant decline in the prevalence of hydatidosis over the study period except for 2008–2009. The annual prevalence of liver condemnations due to hydatidosis was decreased from 24.1% to 13.3% in 2009 and to 6.8% in 2010. The corresponding figures for condemned lungs due to hydatidosis were relatively higher than for liver, declining from 28.7% in 2004–2005 to 14.9% in 2009 and to 7.1% in 2010. Condemnation of livers was significantly more prevalent in spring than other seasons. Moreover, lungs were condemned significantly more than livers, and had relatively more seasonal fluctuation.

Discussion

Although abattoir surveys have limitations, they are an economical way of gathering information on livestock diseases. A feedback from the slaughterhouse to the individual farm is of great value in the field of preventive medicine. The prevalence of *Echinococcus granulosus* infection recorded in the present study, in the slaughtered dromedaries, was, in general, higher than that reported from Jordan (Abdel-Hafez & Al-Yaman Said, 1986) and Morocco (Azlaf & Dakkak, 2006) but lower than that reported from the neighbouring countries of Kuwait (Abdul-Salam & Farah, 1988), Libya (Ibrahem & Craig, 1998) and from other regions of Iran (Ahmadi, 2005; Rokni, 2009). Recent improvement in the health of dromdaries may be the result of greater awareness of echinococcosis among farmers and the increasing likelihood that offal containing hydatid cysts is destroyed and not left accessible to dogs. It may also be associated with a national programme, undertaken in recent years, to control rabies, which included the elimination of stray dogs.

Unfortunately, although the prevalence of echinococcosis is known to be highly dependent on the age of the potential host (Torgerson *et al.*, 1998), the abattoir records analysed in the present survey had no data on the ages of the dromedaries at slaughter. A higher significant prevalence of liver and lung hydatidosis in spring was observed. The epidemiological implication of this finding might be attributed, at least partly, to the sources of slaughtered dromedaries. It may be due to changes in management practices and ecological factors. The odds ratio showed that the chance of liver and lung hydatidosis was increased in dromedaries in the year 2008–2009 as compared to the period from 2007–2008. In conclusion, in the present study, hydatidosis was found to be prevalent in this area. The present survey provides preliminary baseline data for the future monitoring of these potentially important parasitic diseases.

Acknowledgements

This study was supported financially by Ferdowsi University of Mashhad.

References

Abdel-Hafez, S.K. & Al-Yaman Said, F.M. (1986) Further studies on prevalence of hydatidosis in slaughtered animals from North Jordan. *Parasitology Research* **72**, 89–96.

Abdul-Salam, J.M. & Farah, M.A. (1988) Hydatidosis in camels in Kuwait. *Parasitology Research* **74**, 267–270.

Ahmadi, N.A. (2005) Hydatidosis in camels (*Camelus dromedarius*) and their potential role in the epidemiology of *Echinococcus granulosus* in Iran. *Journal of Helminthology* **79**, 119–125.

Azlaf, R. & Dakkak, A. (2006) Epidemiological study of the cystic echinococcosis in Morocco. *Veterinary Parasitology* **137**, 83–93.

Borji, H., Razmi, G.H. & Parande, S. (2009) Epidemiological study on haemoparasites of dromedary (*Camelus dromedarius*) in Iran. *Journal of Camel Practice and Research* **16**, 217–219.

Dalimi, A., Motamedi, G.H., Hosseini, M., Mohammadian, B., Malaki, H., Ghamari, Z. & Ghaffari, F. (2002) Echinococcosis/hydatidosis in western Iran. *Veterinary Parasitology* **105**, 161–171.

Ibrahem, M.M. & Craig, P.S. (1998) Prevalence of cystic echinococcosis in camels (*Camelus dromedarius*) in Libya. *Journal of Helminthology* **72**, 27–31.

Rokni, M.B. (2009) Echinococcosis/hydatidosis in Iran. *Iranian Journal of Parasitology* **4**, 1–16.

Torgerson, P.R., Williams, D.H. & Abo-Shehada, M.N. (1998) Modelling the prevalence of *Echinococcus* and *Taenia* species in small ruminants of different ages in northern Jordan. *Veterinary Parasitology* **79**, 35–51.