

# Comparative prevalence of hepato-pulmonary hydatidosis among native and imported cattle in north of Sistan and Baluchestan: Iran

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Received: 7 December 2012 / Accepted: 5 February 2013 / Published online: 13 February 2013  
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**Abstract** The objective of present study was comparison of hepato-pulmonary hydatidosis among imported and native cattle. The present study was performed during 2011–2012. 2,657 and 525 imported and native cattle were inspected in slaughter house of Zahedan and Zabol respectively. The present and number of hydatid cysts were evaluated. Also the fertility rate of cysts has been estimated. The prevalence of infection in imported and native cattle were 15.1 and 5.3 % respectively and the statistical correlation was significant ( $P$  value  $<0.001$ ). Also the fertility rate of hydatid cysts in the imported and native cattle were 16 and 18.2 % respectively and the statistical correlation was not significant ( $P$  value  $>0.05$ ). The results of present study shows significant differences in hydatidosis rate between native Iranian and imported cattle in Sistan and Baluchestan provinces of Iran. Slaughtering of imported livestock should be done in industrial centers to prevent potential increasing in canine echinococcosis and consequently human and farm animals hydatidosis.

**Keywords** Hydatidosis · Cattle · Sistan and Baluchestan · Iran

## Introduction

Hydatidosis caused by *Echinococcus granulosus* is one of the most important parasitic diseases could affect different kind of mammals such as human and farm animals as intermediate hosts (Eckert and Deplazes 2004). The distribution of this parasitic infection in Iran is all over and is considered as endemic (Sadjjadi 2006; Rokni 2009). In recent years the large number of cattle is imported from Pakistan in response to meat request of Iranian population. The slaughtering of many of these cattle is being done in industrial centers in Zahedan and Zabol. Further more the illegal slaughtering in rural areas is common. At this condition many parasitic infections such as hydatidosis could distribute among native farm animals with foreign sources. The present study was conducted to study on the prevalence of infection among native cattle in Sistan and Baluchestan province of Iran and imported cattle from Pakistan.

## Materials and methods

This cross sectional study was carried out between December 2010 and 2011 in industrial slaughter houses in Zahedan and Zabol cities of Sistan and Baluchestan province of Iran. 2,657 and 325 numbers of imported and native cattle were inspected for presence of hepato-pulmonary hydatidosis respectively. A questionnaire contains kind of animals as native or imported, infected organs and number of cysts, was completed for every cattle. In order to determine the intensity of infection number of cysts was counted. Intensity of infection was divided in two types: light infection (one–ten cysts) and intense infection (more than ten cysts).

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## Examination of cysts

The founded hepato-pulmonary cysts were grossly evaluated for degeneration and calcification, thereafter according to the size and form of cysts, almost 20 % of cysts has been randomly selected for fertility study. The surface of each cyst was sterilized with alcoholic iodine solution then the cyst wall was penetrated using a large size needle. The contents were transferred into a sterile container and were examined by light microscope (40×) for the presence of protoscolices. The cysts which contained no protoscolex were considered as unfertile cysts.

## Statistical analysis

The data were analyzed using  $\chi^2$  test then unadjusted odds ratios were calculated (95 % CI). All statistical analyses were performed using SPSS statistical software (IBM® PASW/SPSS® Statistics 18.0—2009).

## Results

During the study, the liver and lungs of 2,657 (imported) and 525 (native) cattle were examined for the presence of hydatid cysts. The prevalence of hydatidosis in imported samples (15.1 %) was higher than natives (5.3 %) significantly ( $X^2 = 35.00$ ,  $df = 1$ ,  $P < 0.001$ ). The prevalence and intensity of hydatidosis in different organs are presented in Table 1. The cysts were found mostly in lungs and fertility rate of examined cysts in imported and native groups was 16 and 18 percent respectively ( $P$  value  $>0.05$ ). The majority of the cattle had one–ten cysts in their lung and liver. In all animals heavy infection (more than ten cysts) in lung was higher than liver (Table 2). The most and the least total offal condemnation was seen in lungs of imported cattles (6.97 %) and kidney and heart of the natives (0.19 %) respectively.

The odds of having hydatid cyst in imported cattle were 3.16 (95 % confidence interval 2.13–4.70) fold higher than those in native.

The odds of hydatidosis in liver were 1.63 (95 % confidence interval 1.36–1.97) fold higher than those in lung

**Table 2** Fertility of hydatid cysts from different organs of slaughtered cattle in Zahedan and Zabol, Iran, 2011

Cattles	Infected organs examined	No. of cysts examined	Sterile cysts		Fertile cysts	
			No.	%	No.	%
Imported	Liver	95	77	81.1	18	18.95
	Lungs	102	88	86.3	14	13.7
Native	Liver	30	25	83.3	5	16.7
	Lungs	32	25	78.1	7	21.9

(reference of comparison) however the odds ratio of hydatidosis in heart and kidney to that in liver was 0.08 (95 % confidence interval 0.05–0.13).

## Discussion

Hydatidosis is a common parasitic infection in the Middle East especially in Iran as one of the endemic area (Budke et al. 2006). The geographical distribution around the country is all over but in some area in northwest and west such as Ardabil (38.3 % in cattle) and Hamadan (25.9 % in cattle) the veterinary importance are higher than other provinces (Arbabi et al. 1998; Daryani et al. 2007). Sistan and Baluchestan is the widest province in southeast of Iran with desert climate. In some districts with convenient pastures such as Zabol, the livestock production especially sheep, goat and cattle are prevalent. Unfortunately there is not any published manuscript about hydatidosis rate in human and animal population of Sistan and Baluchestan but the mean prevalence of cattle hydatidosis in other provinces of Iran is 12 % (Dalimi et al. 2002). In recent years the large number of cattle is imported from Pakistan in response to meat request of Iranian population. The nature of the life cycle of *Echinococcus granulosus* and its widespread distribution in the neighboring counties of Iran means that there will always be a risk of re-introducing the parasite as long as live animals are imported (Daryani et al. 2006). In Pakistan the incidence of the disease in adult animals has been reported in 34.88, 30.35, 35 and 33.4 percent in buffaloes, cows, sheep and goats respectively (Altaf et al. 2005). Also in another study the mean

**Table 1** Prevalence, intensity and offal condemnation rate of hydatid cyst in different organs from slaughtered cattle in Zahedan and Zabol, Iran, 2011

Cattles (No.)	Liver				Lung				Co-infection of liver and lung		Kidney and heart	
	<10 Cysts		>10 Cysts		<10 Cysts		>10 Cysts		No.	No.	No.	No.
	No.	(%)	No.	(%)	No.	(%)	No.	(%)				
Imported (2,657)	125	4.7	57	2.1	185	6.97	106	3.9	136	5.12	16	0.6
Native (525)	10	1.9	6	1.14	16	3	5	0.9	12	2.3	1	0.19

prevalence of cattle hydatidosis in Pakistan has been estimated 35.0 % (Anwar et al. 2000). The result of present study showed 15.1 % hydatidosis in imported cattle from Pakistan. This large contrast between prevalence of disease in resident cattle in Pakistan and exported cattle to Iran could be related to proper management of Pakistanian veterinary organization to export younger and healthier livestock to foreign countries. However the presence of hydatid cysts in Sistan and Baluchestan native cattles (5.3 %) is significantly lower than imported sources (15.1 %) ( $P < 0.001$ ). In such condition there could be a risk of re-introducing parasite to Iranian livestock. One of territories from which Tehran (capital city of Iran) imports live ruminants is northwest of Iran where hydatidosis is widespread in domesticated farm animals (Daryani et al. 2006).

The fertility rate of hydatid cysts in the imported and native cattle was 16 % and 18.2 % respectively but this difference was not statistically significant. The present status is completely according to results of other investigations around the world that have estimated 15–20 % fertility rate in hydatid cysts from cattle (Dalimi et al. 2002).

In the present study, the lungs of slaughtered animals were found to be more commonly infected than livers. This is similar to the findings of Khan et al. (2001) but the statistical analysis didn't show differences in fertility rate of cysts in liver and lungs. However some scientists believed that fertility of cysts in lung is higher than liver (Gusbi et al. 1987).

The results of present indicated that slaughtering of imported livestock should be done in industrial centers to prevent potential increasing in canine echinococcosis and consequently human and farm animals hydatidosis.

**Conflict of interest** The authors declare that they have no conflict of interests.

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