Hydatic cyst prevalence in slaughtered animals, A neglected health problem

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ABSTRACT

Lorestan and other part of Iran are one of the important endemic focuses for the major zoonotic parasitic diseases like cystic hydatid disease where several species of intermediate host are commonly infected with *Echinococcus granulosus*. Meat inspection records in a slaughtered house were used to determine the prevalence of Hydatidosis in sheep, cattle, and goats in Lorestan province (Aleshtar) located in South-West of Iran. The data were collected during a 5 year period from 2002 to 2006. A total of 40,431 animals (cattle 6993; sheep 14084; goats 19354) slaughtered in the 5-year period and overall 2885 (7.13%) lungs and 2885 (7.13%) livers and 1598 (3.95%) peritoneal cavity were contaminated by hydatid cyst. One thousand and eight hundred sixty eight (26.71%) out of 6993 of cattle, 2989/14084 (21.22%) of sheep and 2511/19354 (12.97%) of goats were infected by hydatid cyst in liver, lung and peritoneal cavity respectively. This study indicates that the highest prevalence of Hydatidosis was found in Aleshtar, Lorestan as compared to the rest of Iran ($p<0.05$). The annual prevalence of lung condemnations due to hydatidosis was increased from 8.3, 5 and 1.3% in Sep 2002 to Sep 2003 to 20.5, 8 and 5.5 % in Sep2005 to Sep2006 for cattle, sheep, and goats, respectively. An urgent attention is required to work on lack of awareness among farmers, lack of a policy to destroy the infected organs, prevention of access of dogs to raw offal's and other responsible factors.

Keyword: Hydatid cyst, slaughtered animals, Aleshtar

INTRUDUCTION

Echinococcosis is one of the major zoonotic parasitic diseases that occurs throughout the world and causes considerable economic losses and public health problems in many countries. [1]. Both cystic and alveolar Echinococcosis has been reported from many areas. However, cystic Echinococcosis is more prevalent and has been reported from all countries in the Middle East and Arabic North Africa [2-5]. This disorder has been recognized as a major public health problem in sheep raising regions of the world [6-8] like Iran especially in rural and nomadic communities. Around half of the Iranian population lives in rural areas as farmers and shepherds. Given that sheep act as intermediate and dogs as definitive hosts of *Echinococcus granulosus*, hydatidosis poses both a human health risk and an economic loss to the country [9]. Humans contamination take accidentally place through close contact with an infected dog and humans are usually a "dead- end" for the parasite [10]. Hydatid cysts are maintained in three distinct cycles in Iran, a livestock/dog domestic cycle (sheep, cattle, goats and equines), a desert cycle between dogs and camels, and a wild cycle between wild carnivores and wild ruminants [11].

Information resulting from meat inspection records has been used as useful sources of data for evaluation of the epidemiological aspects of certain diseases in several countries [12-15]. Therefore, this study was undertaken to estimate the prevalence and possible trends of hydatidosis in livestock in Aleshtar Lorestan (South-West of Iran) using slaughterhouse data.

MATERIALS AND METHODS

This study is a retrospective survey covering a period of 5-year from 2002 to 2006. The numbers of slaughtered domestic animals during 2002-2006 were: 6993 cattle, 14084 sheep, and 19354 goats. All daily condemnation records for cattle, sheep and goats were used to evaluate the prevalence of hydatidosis in liver, lung and peritoneal cavity in the slaughterhouse in Aleshtar Lorestan a province in South-West of Iran. The prevalence was collated on a monthly basis. Secular trend for 5-year period was obtained for both raw data, and when removing the effect of seasonal variation, using χ^2-test for trend analysis and calculating the odds ratio (odds of condemnation due to hydatidosis in successive years). The P-value less than 0.05 considered statistically significant.

RESULTS

A total of 40,431 animals 6993 (17.3%) cattle, 14084 (34.8%) sheep and 19354 (48%) goats were slaughtered in the 5 year period from 2002 to 2006. From this number 2885 (7.13%) lung, 2885 (7.13%) livers, and 1598 (3.95%) peritoneal cavity were contaminated by hydatid cysts.

The total number of animals slaughtered, and the percentage of liver, lung and peritoneal cavity affected by hydatid disease during this period are shown in Table 1-3.

In order to explore the actual trend in the annual prevalence rate, adjusted odds ratios (OR) was calculated, assuming the first year's OR equal to 1.00 as the basis for comparison. As it is seen, the overall similar trend was still observed for sheep, however, the details was slightly varied. According to odds ratio, it seems that prevalence of hydatidosis in cattle has decreased in 2003 (OR = 0.52) comparing with other years and is statistically significant ($P < 0.05$).

Also hydatidosis observed increases were significant in goat ($P < 0.05$). The results are shown in Table 4.

Prevalence of hydatid cyst in lung and liver of cattle is significantly greater than peritoneal cavity ($p<0.05$). Also found that Liver hydatidosis had a higher prevalence than other organs for sheep, and relatively more seasonal fluctuation ($p<0.05$). Overall, we found that cattle has the highest infection rate ($p<0.05$) subjects.

DISCUSSION

Hydatidosis distribute in the most area of the world and it is one of the most important zoonotic diseases prevalent in different parts of Iran [16, 17]. Widespread recovery of adult worms has been reported from dogs, jackals and wolves throughout Iran [18-23]. Many cattle, sheep and goats were slaughtered in the desirable condition and some of them in non desirable and illegally condition in slaughterhouses for consumption by humans [24]. Some of the slaughterhouses, like in Aleshtar do not have even primary equipments to carry out the correct disposal procedures for contaminated organs and these organs would be easily accessed by definitive hosts. This factor seems to be the major path to establish the contamination and cause of high prevalence in this community.

Various surveys have indicated that hydatid cysts are commonly found in sheep, cattle and goats throughout the country [11, 20, 25, 26]. Studies on 844,039 animals (131,716 cattle, 577,090 sheep and 135,233goats) slaughtered in the 5-year period in Shiraz city showed that 4.1% livers and 14.62% lungs were condemned [21].

Studies at Sari slaughterhouse during 1999 showed the infection rate of 14.7% in sheep, 2.7% in goats and 6.3% in cattle [26]. Studies in the western parts of Iran showed that 11.1% of the sheep, 6.3% of the goats, 16.4% of the cattle and 12.4% of the buffaloes were infected with hydatid cyst [11]. The percentage of hydatid cysts prevalence in different parts of Iran is shown in table 6.

Table 1. The proportion of liver, lung and Peritoneal cavity affected by hydatid disease slaughtered Cattle's during 2002 to 06

Year	2002	2003	2004	2005	2006	Total
Slaughtered Animal	482	1405	1801	1976	1329	6993
Lung hydatid	40(8.3)	89(6.3)	174(9.6)	205(10.3)	273(20.5)	781(11.1)
Liver hydatid	55(11.4)	64(4.5)	165(9.1)	193(9.7)	154(11.5)	631(9)
Peritoneal cavity	32(6.6)	82(5.8)	127(7)	129(6.5)	86(6.4)	456(6.5)
Total	117	181	466	527	513	1868

Table 2. The proportion of liver, lung and Peritoneal cavity affected by hydatid disease slaughtered Sheep during 2002 to 06

Year	2002	2003	2004	2005	2006	Total
Slaughtered Animal	792	2083	3193	4622	3394	14084
Lung hydatid	40(5)	136(6.5)	281(8.8)	392(8.5)	273(8)	1122(7.9)
Liver hydatid	103(13)	224(10.7)	322(10)	346(7.5)	305(8.9)	1300(9.2)
Peritoneal cavity	35(4.4)	166(7.9)	115(3.6)	165(3.5)	86(2.5)	567(4)
Total	158	506	718	903	629	2989

Table 3. The proportion of liver, lung and Peritoneal cavity affected by hydatid disease slaughtered Goats during 2002 to 06

Year	2002	2003	2004	2005	2006	Total
Slaughtered Animal	832	1738	3596	6904	6281	19351
Lung hydatid	11(1.3)	15(0.8)	143(4)	464(6.7)	349(5.5)	982(5)
Liver hydatid	44(5.2)	27(1.5)	182(5)	341(4.9)	360(5.7)	954(4.9)
Peritoneal cavity	6(0.7)	27(1.5)	113(3.1)	244(3.5)	185(2.9)	575(3)
Total	39	69	438	1049	894	2511

Table 4. Adjusted odds ratios (ORs) for number of liver and lung condemnations due to hydatidosis, after controlling for seasonal variation during 2002 to 06

Years	2002	2003	2004	2005	2006
Cattle	1.0	0.52*	1.003	1.17	1.45
Sheep	1.0	1.14	1.06	1.03	0.84
Goats	1.0	0.80	2.53*	3.35*	3.06*

*Significant at P<0.05

Table 5. the percentage of hydatid cysts infection in different part of Iran

	Shiraz	Sari	Ahwaz	Kashan	Shahrekord	Mazandaran	Aleshtar
Cattle	10.97	6.3	16.4	3.7	NA	15.23	26.7
Sheep	5.58	14.7	11.2	2.8	1.72	20.93	21.2
Goat	4.53	2.7	6.3	3.9	1.06	15.65	12.9

NA: not available

In conclusion, using abattoir based data, this study indicates that Aleshtar, Lorestan has the highest prevalence of Hydatidosis among different Iranian population and the rate of hydatid cysts increase in cattle and goat ($p<0.05$) according to this data analysis by ANOVA. Also we found a high prevalence of liver and lung condemnations in sheep, cattle, and goats during a 5- year period study due to hydatid disease. On the other hand, the general lack of the hygiene in rural and urban areas, the high level of the environment, the high infection rate of dogs, water and food contamination with Eg eggs, and the people ignorance make the human infection risk very high. This study bring in light a high and underestimated degree of contamination in farm animals (cattle, sheep and goat) that could result in major health and economical damages.

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