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Original Article

The Trend of Hydatidosis in Kermanshah Province, Western Iran (1986-2008)

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ABSTRACT

Background: Hydatidosis is the larval stage of the *Echinococcus granulosus*. This disease is endemic in Iran. There are many studies about hydatidosis in different regions of the country, but there is not any information about the disease in Kermanshah Province. This article will review all available data about hydatidosis in this province.

Methods: Using web based search engines and a survey on medical student's theses, all the information about hydatid cysts in the province from 1986 -2008 was collected.

Results: During these twenty years, at least 482 proven cases of hydatid cyst have been identified in the province. Accordingly, the trend of hydatid cyst operation in the province has been growing and the average annual number of cases has reached 1.41/100,000. Frequency of disease in urban areas was slightly higher than rural areas and the rate of infection in housewives was more than others.

Conclusion: Because of the growing trend of hydatid cyst operation in Kermanshah Province, which may be due to many different reasons, this province should be considered as one of the important endemic regions of hydatidosis in Iran.

Keywords: Hydatidosis, Hydatid Cyst, Operation, Epidemiology, Iran

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Introduction

Hydatisidosis / cystic echinococcosis is a zoonotic disease caused by larval stage of the genus *Echinococcus*. The habitat of the worm is in the intestine of some of the carnivores including candies. Hydatidosis is common in areas with continuous contact between humans and certain carnivores, such as dogs and some ungulates including sheep. The disease is endemic in many parts of the world, particularly the Mediterranean countries, the Middle East (including Iran), South America, Africa, New Zealand, Russian Federation, Central Asia, and Australia (1-3).

In Iran *E. granulosus* and *E. multilocularis* are two causative agents of human hydatidosis (4). Alveolar echinococcosis is less prevalent around the world and has been reported only from Iran, Turkey, Iraq and Tunisia (5). Hydatidosis is endemic in Iran and is responsible for approximately 1% of admission to surgical wards (6). Based on the number of operated hydatid cysts in Iran, it is estimated that during 1985-2004 the rate of disease was about 4.8 per hundred thousand people. It might be an underestimate of the real prevalence of the infection, due to the weakness of statistical systems at the country; this estimation should be assumed as the lowest rate of infection (7).

On the other hand, seroprevalence of disease in different parts of the country has been reported as 4.42% (7). Hydatidosis in livestock of the country was 6.73% during 2001-2007, which showed an increasing trend. Among all of the provinces, the highest rate of infection in livestock (18.71%) was seen in Khorasan Province (8), which recently was separated to three provinces: Northern, Razavi and Southern Khorasan.

Kermanshah Province is located in the west of Iran. The neighbors are Kurdistan in the

north, Lorestan in the southeast, Ilam in the south and Hamadan in the east. It also has borders in the west with Iraq. The province with an area of 24,361 square kilometers contains almost 1.6% of the total land of the country, and with population of 1,938,060 has about 2.5% of total population of the country. About 61.75% of the population is in urban areas, 37.7% in rural areas and less than 1% are nomadic (9) (Fig.1).



Fig. 1: Location of Kermanshah province within Iran

The rate of infection in livestock in Kermanshah province has been reported as 2.41% (8). Rokni in a literature review has reported that the rate of infection with *E. granulosus* in stray dogs of Iran is about 5-49% (4). Because there is not enough information about human hydatidosis in Kermanshah Province, this article explains the statue of disease in this province from 1986 to 2008.

Materials and Methods

For collection of any information about hydatidosis in Kermanshah province, a web based search of Medline, Embase, Cctr, Google, and most of the national search en-

gines such as Scientific Information Database, Iran medex, Magiran and IranDoc until 2011 were used. The search was performed using the following terms: cystic echinococcosis, hydatidosis, hydatid disease, and Kermanshah. English and Persian are two language restrictions. We included all types of study about cystic echinococcosis in Kermanshah district, but case reports were omitted from the study. We also searched all of the medical students' theses in central and faculty of medicine libraries of Kermanshah University of Medical Sciences (KUMS) about this subject. Different factors such as age, sex, location of involvement, and hospital course of the operated patients were collected. All the collected data were analyzed and results were compared with the similar studies done earlier in other provinces.

Results

Using the web based search engines; we did not find any information concerning the status of hydatidosis in Kermanshah Province. But there was more information about hydatidosis in medical students' theses of KUMS.

55.7% of the cases were female (Table 1). From 1986 to 2008 (accept the years 2000-2002), the average number of operated cysts per year was 24.1 (1.41/100,000 of population).

18.91%, 17.90% and 16.27% of the patients belonged to the age groups of 51-60, 11-20 and 31-40 yr respectively. The lowest number of operation was seen in the age groups of ≥ 70 years and the oldest patient was an 83 years old man (Table 2).

68.81% of the patients with hydatidosis were from urban areas and 31.19% from rural areas (Table 3). Fifty eight percent and 24% of the patients were operated for liver and lung cysts respectively. Also 2% of the patients had combined liver and lung cysts. The remaining 16% had hydatid cyst/cysts in other parts of the body.

Review on occupation of patients with hydatidosis indicates that approximately 47% of them were housewives. The rate of infection among farmers that usually have animal husbandry was 25%. Also about 20% of the patients were students. The hospital course in 42% of cases was between 10-20 days. But this time in 30% of the cases was less than 10 days. From 1993 to 1998, this hospital course in 14% of the patients was between 40-60 days.

Table 1: Distribution of Patients with hydatid cysts according to the year and sex

| Years | Female (%) | Male (%) | No. of Patients | Average number / year | No. of Patients / 100,000 population |
|-----------|------------|----------|-----------------|-----------------------|--------------------------------------|
| 1986-1992 | 56.5 | 43.5 | 84 | 12.0 | 0.75 |
| 1993-1999 | 59 | 41 | 107 | 15.3 | 0.90 |
| 2003-2008 | 51.5 | 48.5 | 291 | 48.5 | 2.55 |
| Total | 55.7 | 44.3 | 482 | 24.1 | 1.41 |

Table 2: Distribution of patients with hydatid cysts according to the age groups

| Age groups (yr) | 1986-1992 (%) | 1993-1999 (%) | 2003-2008 (%) | Mean (%) |
|--------------------|------------------|------------------|------------------|-------------|
| 01-10 | 5 | 10.9 | 6.22 | 7.37 |
| 11-20 | 20 | 26.6 | 7.21 | 17.90 |
| 21-30 | 22.5 | 10.9 | 13.4 | 15.60 |
| 31-40 | 12.5 | 18.76 | 17.52 | 16.27 |
| 41-50 | 10 | 10.9 | 14.43 | 11.79 |
| 51-60 | 22.5 | 18.75 | 15.46 | 18.91 |
| 61-70 | 7.5 | 3.19 | 8.24 | 6.32 |
| >70 | - | - | 17.52 | 5.84 |

Table 3: Distribution of patients with hydatid cysts according to their residence in rural and urban areas

| Years | Rural Population (%) | Urban Population (%) |
|-----------|----------------------------|----------------------------|
| 1986-1992 | 17.5 | 82.5 |
| 1993-1999 | 33.8 | 66.2 |
| 2003-2008 | 42.26 | 57.74 |
| Total | 31.19 | 68.81 |

Discussion

Iran is one of the endemic areas of hydatidosis. Between 2001 and 2005 about 2083 cases of cystic echinococcosis were recorded in Iran (10). The annual incidence of hydatid cyst surgery in Iran is about 4.8 per hundred thousand (7). Among all of the provinces, Khorasan Province has the highest percentage (29.52%) of operated cysts (8).

In 2002 the average contamination of livestock was about 6.07%, which reached 8.01% in 2006, while human cases of hydatidosis from 0.72 /100,000 in 2002 reached 0.54

/100,000 in 2006. So an increase in the rate of livestock infection in the whole of the country was seen, but human cases experienced a decline (8). However, in Turkey human hydatidosis is about 18-20/100,000(11,12).

Many original and review articles have been published about the statuses of hydatidosis in different provinces of the country. But unfortunately almost in none of them, there is any information about statuses of this disease in Kermanshah Province. Survey on

unpublished sources like Medical students' theses of KUMS during 1986 and 2008 (except 2000-2002), shows that in this twenty years, at least 482 cases of hydatid cyst surgeries were done in Kermanshah Province (13-16). According to the data in Table (1) in this province, the number of operated cases of hydatid cyst during 1986 to 1993 was 12 cases per year (0.75/100,000) (13, 14), which reached 48.5 cases per year (2.55/100,000) during 2003-2008 (16). This finding shows that the number of hydatid cyst surgeries in the province has been growing very rapidly in recent years.

It is important to note that about 65% of cases of hydatid cyst are asymptomatic and can not be diagnosed for a long time (17). So not only in this study, but also in other similar studies about epidemiology of human hydatidosis, we must note that the true prevalence of disease is more than those reported. It should also be noted that this study concluded only operated patients in educational hospitals of KUMS. However only in one study conducted in the years 2003-2008, in addition to the data of educational hospitals, data of other hospitals in Kermanshah were used (16). Perhaps this is one of the reasons for the significant increase in the number of cysts surgery during these years. In addition, other factors that can be responsible for this increase are increase in the quality and quantity of skilled manpower, instruments and diagnostic possibilities, and finally, establishment of the greatest educational hospital of West and Northwest of the country in Kermanshah in recent years.

The population of Kermanshah Province is about two million. By assuming that all surgical patients are related to the native population of Kermanshah Province, it seems that in recent years the incidence of disease in the province reached 2.55/100,000. This is more than the average rate in the country but is comparable with

the rate of hydatidosis in Turkey (18-20 / 100,000) (11, 12). In our opinion, further studies are required for clarifying the status of hydatidosis in this province.

Interestingly, in Hamadan and Zanjan provinces, an increase in the trend of hydatid cyst surgery had been reported previously, but of course with lower intensity than Kermanshah. In Hamadan Province, from 1982-1992 (10 years) totally 55 cases were reported while from 1999-2006 (7 years), 179 cases were reported (4). In Zanjan Province from 1984 to 1993 altogether 56 cases of hydatid cyst were operated. The trend of the disease in Zanjan was normal until 1991. But from 1992 to 1993 it saw a sudden increase in the number of disease cases, perhaps because of the development projects of Zanjan University of Medical sciences (18).

Our data are in contrast with the findings of other researchers in the country saying that the rate of human hydatidosis has decreased in comparison to a decade ago (4). For example, Tavakoli in 2002 reported that the incidence of human hydatidosis in Iran was 0.72/100,000, but it decreased to 0.54/100,000 in 2006 (8). However as Rokni mentioned about Hamadan (4), we do not know if the rate of hydatidosis is increasing in Kermanshah Province or the improvement of facilities caused patients in neighboring provinces to go under surgery in Kermanshah.

Seroepidemiological studies are very important for determination of status of hydatidosis in each region. Only two seroepidemiological studies have been conducted in Kermanshah province. Amiri in 2001 by studying on 1072 human serum samples, using IFA and ELISA methods identified specific antibodies against hydatid cyst in 8.02% of them. (19). In another study in 2005, Nik-Khahan, using ELISA method in 1,625 human serum samples of urban and rural areas, reported the specific antibodies

against hydatid cyst only in 0.12% of them (20).

The rate of seroprevalence in two neighboring provinces of Kermanshah is 3% in Hamadan (21) and 3.3%- 9.5% in Kurdistan Provinces (22). Over all, the rate of seroprevalence of hydatidosis in different parts of the country is 1.2-21.4% (4) with an average of 4.42%. Because of the different results of two studies carried out in Kermanshah and an increase in the number of hydatid cyst surgeries in recent years, it is necessary that a comprehensive and exact seroepidemiological study be done in the province. A study for detecting the rate of infection in dogs with *E. granulosus* is also recommended.

In the present study, 55.7% of patients were female. This rate has been reported as 57.1% in Zanjan (18), 62% in Kashan (24), 66.7% in Yasuj (25) and 52.5% in Turkey (11). Further contamination of women can be associated with their more contact with the sources of infection such as unwashed vegetables, close contact with livestock during milking (especially in rural areas), eating soil (especially in pregnant women), breathing dust during sweeping the house, and contact with dogs . Dalimi and colleagues also studied intestinal parasites in 115 dogs in the west of Iran, including Kermanshah province, and the rate of infection with *Echinococcus granulosus* was reported as 19.1% (26).

The lowest rate of disease was seen in the age groups of ≥ 70 , 61-70 and ≤ 10 years old. About 61.5% of operated cases had the age between 11-50 years old. The most infection to hydatidosis in Iran has been reported in third and fourth decades of life (4). In Turkey, the most rate of infection has been reported in ages 20-44 years and 42.55% of patients were under 30 years old (11).

In Iran the most cases of hydatid cyst has been reported in rural areas (4). In Turkey, most cases have been reported in rural areas

(11). But in our study, most cases (65.36%) introduced themselves as urban residents. Similarly, most patients In Kashan (58%) were from urban areas (24). About 61.75% of the population in Kermanshah Province is urban residents. Perhaps this is an important reason for more frequency of hydatidosis in urban areas. On the other hand, in urban areas the probability of contact with domestic dogs and livestock is less than rural areas. So it appears that other ways of contamination such as eating raw vegetables contaminated with the eggs of worm may play a more important role in infecting citizens.

In this study, 47% of patients were housewives. In Iran, the housewives encompass the highest rate of infection (51.3% -75%). Housewives, especially in rural areas have the highest chance of contact with the sources of infection (4). Hospital course in 42% of patients was between 6-12 days. Similarly in Yasuj the average time was 6-10 days (25). The most cases of hydatid cyst involved the liver (58%), and lung (24%) respectively. Due to the natural circulation of parasite in the body it is expected that most of the cysts involve the liver and lungs. In many reports from various regions of the country liver involvement has been reported between 39.4% -90.5% (4). Overall, results of the present study in comparison with reports from other provinces of Iran emphasize a particular attention to cystic hydatidosis as a very important zoonotic disease in Kermanshah Province.

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