An Analysis of Cystic Echinococcosis Surgeries in Patients Referred to Imam Khomeini Hospital in Ilam Province, Iran (1999-2012)

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Cystic echinococcosis (CE) is a neglected zoonotic disease caused by the larval stage of a small taeniid-type tapeworm named Echinococcus Granulosus. Humans can accidentally get infected by ingesting the eggs of the tapeworm through consuming contaminated food or water or from direct fecal contact of infected dogs. Although CE have been found all around the world, generally high infection rates are seen where domestic livestock is raised in association with dogs[1-3].

Epidemiological studies have shown that echinococcosis is endemic in Iran, particularly in the rural regions[4, 5]. During the period 2000-2009, the annual incidence of surgical cases of CE was estimated to be 1295 in Iran[6]. Costs incurred because of CE in human and livestock has been calculated to be of approximately US$93.39 million (95% CI US$6.1-222.7 million) and US$132 million (95% CI US$61.8-246.5 million) respectively [6].

Stray dogs play a key role in transferring infection to humans. Several investigations showed that 2.2% to 48% of Iranian stray dogs are infected with E. granulosus[5]. Molecular analysis has also demonstrated that dominant strain of E. granulosus in sheep and cows slaughtered in Ilam are E. granulosus sensu stricto (G1-G3)[7]. Any appropriate control and prevention plan against this disease requires adequate and accurate information on the prevalence of echinococcosis in humans of every endemic area.

Hydatidosis is prevalent in Ilam province as was demonstrated by a survey done in Ilam by Abdi et al (2013) which showed that 9.96%, 4.67% and 3.43% of cattle, sheep and goat were infected with E. granulosus respectively[8].

The aim of this study is to evaluate the epidemiology of hydatid disease among diagnosed patients admitted to a large governmental hospital during a 13 year period in Ilam, the center of Ilam province in western of Iran.
MATERIALS AND METHODS

Study Area:
Ilam, the capital of Ilam province, is located in west of Iran (33°38′15″N 46°25′22″E) on the south of Kermanshah, north of Khuzestan, west of Lorestan and east of Iraq. According to the census published by Statistical Centre of Iran, Ilam’s population in 2011 was 172213. The area is characterized by its torrential rains and snows in the winter, and dry, dusty, and brutally hot summers. The average annual temperature and rainfall are 23°C and 620 mm respectively.

Fig. 1: A (Left) Location of Ilam province within Iran and B (Right) Ilam’s districts.

In this cross-sectional study, after receiving an approval from Ethics Committee of Kermanshah Medical University, medical records of patients that had been surgically treated for hydatid cysts in 13 years period of 1999 to 2012 in Imam Khomeini hospital of Ilam province in western Iran were evaluated. The Educational and Treatment Center of Imam Khomeini hospital is the largest of referral centers in Ilam province. A complete profile consisted of age, gender, residence (urban or rural), location of the cyst, duration of operation, length of hospitalization, mortality, etc. was created for each patient. Statistical analysis was carried out by using the SPSS ver. 16 software.

Results:
A total of 51 CE surgery case were analyzed. 18 (35.3%) of cases were male and 33 (64.7%) female. The age range was between 12 and 76 years (average age of 17.24 ± 40.29). The distribution of residence in patients showed 26 (51%) of them have urban origins while 25 (49%) were rural residents.

The most affected age group was 41-50 year olds (23.5% of all cases) (Table 1). Twenty six (51.0%) of the hydatid patients were housewives while the rest 25 (49%) could be divided as following: 4 (9.8%) employees, 3 (5.9%) students, 1 (2%) labor, 5 (9.8%) preschool children, and 2 (3.9%) each of the soldiers, farmers, shopkeepers, unemployed, drivers and self-employment. The liver was the most frequently infected organ (92.2%). Among liver infected patients, the majority was infected in their right lobe (31, 60.7%). Single organ infection was observed in 49 (96%) of cases while there was 2 (4%) multiple organ infection. Of 51 cases with recorded cyst numbers, 34 (66.7%) cases had only one cyst and two to five cysts were observed in 10 (19.6%), 4 (7.8%), 1 (2%) and 2 (3.9%) cases, respectively. Patients were hospitalized for different periods ranging from 1 to 14 days. The average hospitalization length was 5 days.

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Number of patients</th>
<th>Males</th>
<th>Females</th>
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<tr>
<td>10-20</td>
<td>7</td>
<td>2</td>
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<tr>
<td>21-30</td>
<td>12</td>
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<td>31-40</td>
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<td>41-50</td>
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<td>1</td>
<td>8</td>
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<tr>
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<td>5</td>
<td>1</td>
<td>4</td>
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<td>71-80</td>
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Discussion:
In Central Asia the number of population risk of cystic echinococcosis is at least 270 million people (58% of the total population)[9]. Iran is one of the endemic areas of CE. Hydatid operations in very young children
and new cases registered in medical centers in different parts of the country shows that the disease is being actively transmitted.

Based on documented reports, the annual incidents of CE in Iran is 0.6-1.2 cases in 100000 persons[5]. In this study, which was carried out in Ilam province, a total of 51 surgically confirmed cases of CE were analyzed using medical records. The real prevalence of hydatidosis could be much more than the rate suggested in surveys since infected patients could carry the CE for several years without any symptoms. Moreover, some of the patients are treated medically rather than surgically and some of them may visit supposedly better equipped hospitals of more developed neighboring cities. Serological surveys in Ilam showed that 2.25% of inhabitants were positive against E. granulosus antigens[8]. The use of ultrasound and immunological methods could also be effective for determination of the actual prevalence of undiagnosed or asymptomatic CE cases in this region.

The hydatid disease is considered a rural disease since most human infections are via the transmission of parasite’s domestic life cycle which involve dogs and other livestock. Nevertheless, in this study the highest percentage of patients were lived in urban areas. The authors propose that one reason for such phenomenon could be patients’ migration from farms to cities. The predominance of hydatidosis in urban areas found in this study is in line with other studies from Kermanshah, Iran[10] and Argentina[11]. On the contrary, Mohammadzadeh Hajipirloo et al (2013) stated that in his study, 63.1% patients were from rural districts while 36.9% were from urban residents[12].

According to the results of this study, male to female gender ratio is 1: 1.83. This result is consistent with studies done in Sevagram of India during 1996-2006 [13], Sana’a City, Republic of Yemen during 2001-2008 [14] and Tehran, Iran during a 10 year period [15]. On the other hand, Cappello et al (2013) argued that the infection rate is higher in males comparing to females in Western Sicily[16]. In another study in Diyarbakir of Turkey no gender differences were reported[17].

Our study showed that the prevalence rate increased with age. The highest rate of surgical cases of hydatidosis has been reported in the age group of 41-50 years. Cystic echinococcosis grows very slowly and is well tolerated unless they damage adjacent tissues. It seems parasites can modulate anti-parasite immune responses. In many cases cysts may be asymptomatic throughout the individual’s life, and may be found accidentally at surgeries or autopsies[18].

In this study, the average hospitalization period was 5 days, which was much lower than reports of Avergerinos et al[19] and Dopchiz et al[11] from Greece and Buenos Aires (16. 8 and 11 days respectively). The liver was found to be infected in 92.2% of all cases. The predominance of hepatic infection found in this study is also matches the findings of other studies[12, 20-22]. The higher rate of liver infection can be attributed to the fact that the liver is the first organ that oncospheres reach after they penetrate the intestinal wall and they can migrate through intraportal circulation to enter it.

To summarize the results, it can be said that echinococcosis is endemic in the studied region. The prevalence of disease rate was varied by age, gender, occupation, and living region. Like other zoonotic diseases, prevention is vital in control and management of this disease. Controlling stray dogs, timely treatment of herding dogs, proper checking of the animals which are intended to be slaughtered, careful destroying of the remains of slaughtered animals, protecting water supply, and avoiding contaminated raw vegetables can help eradicate this disease. People should be fully informed of proper disease prevention strategies through mass media such as brochures, practical demonstration and radio talks.

Conflict of interest statement:
We declare that we have no conflict of interest.

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REFERENCES


