

Original Article

Epidemiological, Clinical and Paraclinical Study of Hydatid Cysts in Three Educational Medical Centers in 10 Years

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Abstract

Background: Echinococcosis or hydatidosis, caused by the larval stage of *Echinococcus granulosus* (*E. granulosus*), is an important public health problem in many areas of the world and Iran is a country of endemic situation for hydatidosis. In the present study, we evaluated epidemiological, complications and clinical characteristics of hydatidosis at three University Medical Centers in Tehran over a 10-year period.

Materials and Methods: This is a descriptive cross-sectional study performed in patients with hydatid cysts. Information about age, gender, number of cysts, organ involvement, morbidity and mortality and relapse were collected from medical records of hydatid patients. Paraclinic information such as CT Scan, MRI, ultrasound, complete blood count, pathological diagnosis and complication of disease were collected.

Results: Overall, 81 patients, 35 (43.2%) male and 46 (56.8%) female, who were diagnosed as having hydatid cyst by clinical and radiological findings, with pathologic documentation were studied in three university medical center registries over a 10-year period (2003- 2012) in Tehran. Fourteen patients (17% of cases) had complications resulting from this disease. Patients' age ranged from 5 to 86 years, and the peak prevalence of the disease was between 20 and 40 (34% of cases).

Conclusion: Iran is a country of endemic situation for hydatidosis. Prevalence rate of hydatidosis in Iran was reported to be 0.61-2 in 100000 populations. The highest rate of infection and complications were in patients of 20-40 years age. Clinical examination revealed that abdominal pain was the most common complaint and was present in 51.7% of the cases. Other most common complain were cough, abdominal mass, dyspnea, icterus, chest pain, dyspepsia, back pain and seizure; and it was result of occupying effect of cysts in organs. This is similar with previous studies in Iran²²

Keywords: hydatidosis, Echinococcosis, Epidemiology.

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Introduction

Echinococcosis or hydatidosis, caused by the larval stage of *Echinococcus granulosus* (*E. granulosus*), is an important public health problem in many areas of the world, particularly among populations that practice sheep husbandry^{1,2}, including in Asia, Australia, South America and southern Europe^{3,5}.

Human hydatid disease is defined by the presence of a cystic lesion. This disease which is originated of ingestion of infected food with *Echinococcus* species ovum is characterized by cystic space occupying lesion in liver, lungs and rarely in other parts of the body⁵. They grow to 5 cm in size within the first year and can survive for years or even decades³. Hydatid cysts may grow faster in the lung than in the liver,

due to less the elasticity of the lungs parenchyma⁹. Echinococcosis is usually found in the liver (with prevalence of 50-70%) and lung (20-30%), although hydatid cysts can occur in any location including in the peritoneal cavity, retroperitoneum, spleen, kidney, adrenal glands, brain, spine, myocardium and abdominal wall^{3,8}.

Iran is a country of endemic situation for hydatidosis. Prevalence rate of hydatidosis in Iran was reported to be 0.61-2 in 100000 populations¹⁰. Dogs play an important role in transmitting the disease in Iran. The infection rate of *E. granulosus* was reported to range from 2% to 63% in dogs^{11,12} while in the intermediate hosts such as sheep, goats, cattle and camels it was from 1.5% to 70%^{4,13}.

Morbidity and mortality of hydatidosis together with economic losses for both of humans and livestock are considerable problems. The overall economic loss attributable to hydatidosis in humans and animals was annually estimated as about US\$ 232.3 million in Iran¹⁰ and it has been declared that the cost of the disease is about 0.03% of the country's gross domestic product¹⁴.

In Iran, the most common imaging method for detection of hydatidosis was ultrasonography (60%) and CT scan (35%), showing the volubility of ultrasonography for detecting hydatid cysts²². In addition, serological tests are also useful in detecting hydatid cysts, but only the positive results are considered valuable and many affected patients have negative serological test¹⁵. Symptoms of hydatid cyst are often absent and are related with size, location, rupture and infection of the cysts. A dangerous complication of cyst rupture is secondary seeding of daughter cysts into other areas of the body. It has been reported that, preoperative treatment with Abendazole for 1 to 3 months could significantly reduce the number of viable cysts found on surgery³. Comprehensive studies will help to evaluate the regional epidemiological situation of the disease. The information obtained from these studies in combination with other studies provides a better understanding of the disease situation and the ways with which prevention and treatment of the disease is attainable. In the present study, we evaluated epidemiological, complications and clinical characteristics of hydatidosis at three University

Medical Centers in Tehran over a 10-year period.

Methods

This is a descriptive cross-sectional study performed in patients with hydatid cysts who were hospitalized in three major university hospitals (ShohadaTajrish, Imam Hossein, and Loghman Hakim hospitals in Tehran, Iran from 2003 to 2012) and undergone surgical operation. As these are referral hospital and they have different subspecialties particularly in surgery, patients from different parts of Iran are referred to these hospitals for surgery. Information about age, gender, number of cysts, organ involvement, morbidity and mortality and relapse were collected from medical records of hydatid

Table 1: Age distribution of cystic echinococcosis cases and their complications at three medical centers in Tehran, Iran (2003-2012).

| Age (year) | Number (%) of cases | Number (%) of complications |
|--------------|---------------------|-----------------------------|
| 0-10 | 2 (2.4) | 1 (1.7) |
| 10-20 | 9 (11.1) | 2 (14.2) |
| 20-30 | 29 (34.8) | 7 (50) |
| 30-40 | 12 (14.8) | 1 (7.1) |
| 40-50 | 8 (9.8) | 1 (7.1) |
| 50-60 | 9 (11.1) | - |
| 60-70 | 7 (8.6) | - |
| 70-80 | 4 (4.9) | 1 (7.1) |
| 80-90 | 1 (1.2) | 1 (7.1) |
| Total | 81 (100) | 14 (100) |

Table 2: The location of cysts in patient who had history of hydatid cyst.

| Past location | Cyst | Present cyst location | | |
|---------------|----------|-----------------------|----------|-----------|
| | | Liver (%) | Lung (%) | Brain (%) |
| Liver | 9 (81.8) | 0 (0) | 2 (18.2) | |
| Lung | 0 (0) | 1(100) | 0 (0) | |
| Brain | 1 (100) | 0 (0) | 0 (0) | |

patients. Paraclinic information such as CT Scan, MRI, ultrasound, complete blood count, pathological diagnosis and complication of disease were collected. Cases with incomplete information were excluded.

The collected data were statistically analyzed using SPSS 18 software and the results were compared with the similar previous studies.

Results

Overall, 81 patients, 35 (43.2%) male and 46 (56.8%) female, who were diagnosed as having hydatid cyst by clinical and radiological findings,

with pathologic documentation were studied in three university medical center registries over a 10-year period (2003- 2012) in Tehran. Fourteen patients (17% of cases) had complications resulting from this disease. Patients' age ranged from 5 to 86 years, and the peak prevalence of the disease was between 20 and 40 (34% of cases, Table 1).

The involvement of liver was the most frequent 67 (77%), and the second most frequent infected organ was lung 12 (13%), followed by the vertebra, brain and pelvis (Figure 1). Six of the cases (5%) had multiple organs involvement along with liver, including four in the lung, one in the brain and one in

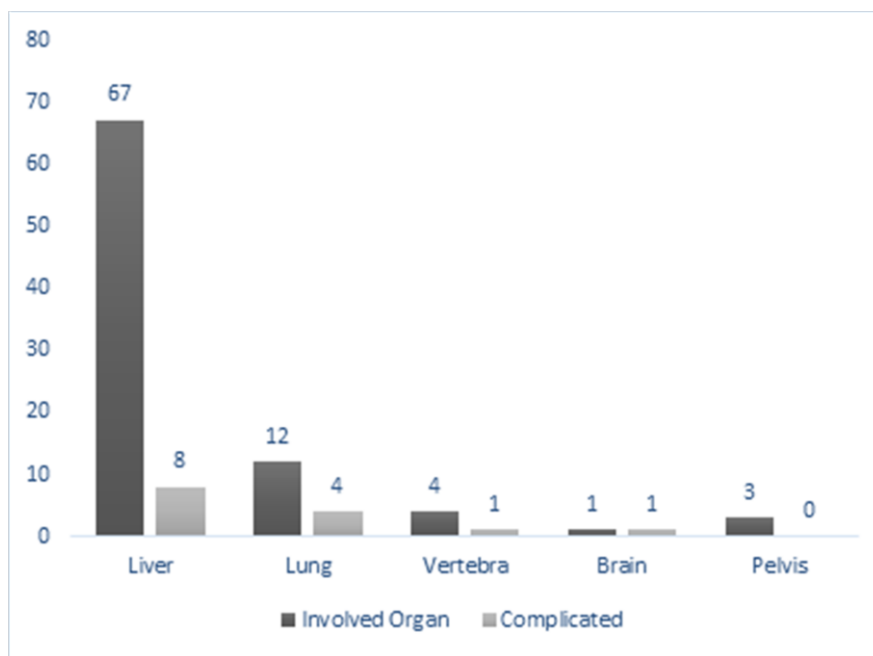


Figure 1. The incidence of cysts and complications in different organs in 81 cystic echinococcosis cases at three medical centers in Tehran, Iran (2003-2012)

Table 3: The chief complaints and location of hydatid cyst in patients at three medical centers in Tehran, Iran (2003-2012).

| Organ Complains | Liver | lung | Pelvis | Vertebra | Brain | Total |
|-----------------|-----------|-----------|----------|----------|----------|-----------|
| Abdominal pain | 45 | | | | | 45 |
| Cough | 1 | 5 | | | | 6 |
| Abdominal mass | 2 | | 1 | | | 3 |
| Dyspnea | 2 | 1 | | | | 3 |
| Icterus | 3 | | | | | 3 |
| Indigestion | 1 | | 1 | | | 2 |
| Chest pain | 1 | 1 | | | | 2 |
| Back pain | | | | 1 | | 1 |
| Seizure | | | | | 1 | 1 |
| Total | 67 | 12 | 4 | 3 | 1 | 81 |

the vertebra. In patients with liver hydatid cyst, right lobe was the most affected (80%) lobe, left lobe was affected in 16%, and 4% of the patients had hydatid cyst in the both lobes.

Among patients, 23% had a history of hydatid cyst, and data of 15 cases were available. The liver was the most frequent infected organ (11 cases), followed by lung, brain, and spleen with one case of hydatid cyst history. In 13% of these cases, the new involved organ was the same as the previous one (Table 2).

For diagnosis of the cyst, CT scan and ultrasonography were performed and revealed 12.5% of cysts were <5cm in diameter, 22.5% were between 5 and 10 cm, and 65% were >10 cm.

The chief complaint in 45 cases (51.7%) was abdominal pain. All of these patients had liver hydatid cyst, with other complains as abdominal mass in 3 (3.4%), dyspnea in 3 (3.4%), icterus in 3 (3.4%), chest pain in 2 (2.2%), dyspepsia in 2 (2.9%), cough in 6 (8.9%), back pain in 1 (2%), and seizure in 1 (2%) of cases (Table 3).

Fourteen patients (17%), including five female and nine male had complicated hydatid cyst including rupture, infection and obstruction. The most frequent complications were occurred in liver with eight cases followed by lung with four cases, and two cases in brain and pelvis (Figure 1). All of the patients were operated and the diagnosis of cyst was confirmed by surgical findings in all cases and pathologic documentation.

Hemoglobin level was accessed in three levels: less than 12, 12-14 and more than 14 g/dl. The number of patients at each level was equal. The number of WBC in two patients who had infected cyst were more than 10000/ml but in other patients was in normal rang.

Discussion

Echinococcosis is a parasitic infestation caused by *E. granulosus*. It is an important socioeconomic and public health problem in many areas of the world. Iran is known as one of the endemic regions of *E. granulosus* with high rates of infection, especially in rural communities.

In the present study, a total of 81 human hydatidosis was studied in three general hospitals in Tehran. According to the results of this study, females were

found to have a higher infection rate of hydatid cyst (56.8%) than males (43.2%). This finding is similar to other reports of hydatid cyst in Iran^{9,15,16}, and consistent with other reports from other endemic countries in Middle East^{17,18}.

The rate of infection with hydatid cyst in any given group is determined by local customs involving the housing, contact with contaminated vegetables and handling of dog's feces in contaminated soil that is relatively higher in women²¹. Hydatid disease is generally considered to be a rural disease, seemingly because Iranian women especially in rural areas have more contacts with domestic animals and infected products. They also contact more with unwashed raw vegetables which may be more contaminated with *Echinococcus* eggs. Also, genetic differences between two genders can be responsible for a part of this difference.

Although different organs of the body were involved with hydatid cyst, consistent with other reports, liver is the most affected organ (77%) followed by the lungs (13%). Other infected organs included the brain, spleen, pelvis and vertebra^{22,23}. The high rate of hepatic infection is attributed to the fact that liver acts as primary filter in the human body. Multi organs affected by hydatid cyst in this study represented 6% and most of them were hepatopulmonary, such results were reported in Iran^{24,25}.

Patients' age ranged from 5 to 86 years. The highest rate of infection and complications were in patients of 20-40 years age. In Rokni et al. study similar to other studies in Iran the peak incidence of hydatid cyst was between 20 and 40 years since these age groups have more contact with livestock's in farms on the other hand original infection might be occurred in childhood as hydatid cysts grow very slowly^{16,26}.

Clinical examination revealed that abdominal pain was the most common complaint and was present in 51.7% of the cases. Other most common complain were cough, abdominal mass, dyspnea, icterus, chest pain, dyspepsia, back pain and seizure; and it was result of occupying effect of cysts in organs. This is similar with previous studies in Iran^{22,26}.

Imaging studies revealed that 35% of the cysts had less than 10 cm in diameter. Since these cases might

be infected in one year before diagnosis, serious implementation of control and prevention programs is recommended. Also because Iran is an endemic area, hydatidosis must be considered as an important issue in health policy makers' decisions and control program should be continued.

Conclusion

Iran is a country of endemic situation for hydatidosis. Prevalence rate of hydatidosis in Iran was reported to be 0.61-2 in 100000 populations¹⁰. Hydatid disease is generally considered to be a rural disease, seemingly because Iranian women especially in rural areas have more contacts with domestic animals and infected products. They also contact more with unwashed raw vegetables which may be more contaminated with Echinococcus eggs. The highest rate of infection and complications were in patients of 20-40 years age. Clinical examination revealed that abdominal pain was the most common complaint and was present in 51.7% of the cases. Other most common complain were cough, abdominal mass, dyspnea, icterus, chest pain, dyspepsia, back pain and seizure; and it was result of occupying effect of cysts in organs. This is similar with previous studies in Iran²².

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