J Parasit Dis (Apr-June 2017) 41(2):356–360
DOI 10.1007/s12639-016-0803-4

ORIGINAL ARTICLE

Epidemiological and clinical aspects of patients with hydatid cyst in Iran

Mahmood Moosazadeh[1] · Ghasem Abedi[2] · Seif Ali Mahdavi[3] · Jalil Shojaee[4] · Ali Charkame[5] · Mahdi Afshari[6]

Received: 16 July 2015 / Accepted: 27 May 2016 / Published online: 14 June 2016

Abstract Hydatid cyst is one of the most common Zoonotic diseases occurs due to infection with larval stage of Echinococcus granulosus parasite. Based on epidemiological reasons, World Health Organization has introduced Iran as a hyperendemic region. This study aims to investigate the clinico-epidemiological characteristics of patients with hydatid cyst in Iran. We used information registered in the surveillance system of the Iranian Ministry of Health and Medical Education attributed to Mazandaran province. Data were entered into SPSS software V.20 after refinement and analyzed using percent frequency, mean, standard deviation and statistical tests such as Chi-square and Exact Fisher tests. Mean (SD), minimum and maximum ages of the participants were 42.2 (17.2), 6 and 72 years respectively. Most of them were female (63.4 %) and mean (SD) number of cysts was 1.6 ± 0.8. Of them, 51.2 % living in rural areas and 58.5 % of them were housewives. Liver was the most common organ involved. The main diagnostic procedures were radiography and CT scanning. The majority of participants (73.2 %) consumed unsterilized vegetables. This study showed women more susceptible compared to men probably because of more exposure to parasites through vegetables. We also found the liver as the most affected organ in hydatid cyst patients.

Keywords Hydatid · Echinococcusis · Epidemiologic

Introduction

Hydatid cyst is one of the most common zoonotic diseases developed following larval stage of Echinococcus granulosus infection. This agent is a tapeworm parasite mainly living in the dog's bowel and rarely in other carnivores. Human serves as a random intermediate host in the life cycle. Like sheep, goat and camel, human infection is occurred consuming parasite eggs with vegetables, dust, water and other substances contaminated with the dogs and other canines feces (Khalili et al. 2010; Fomda et al. 2015; Hamzavi et al. 2011; O'Hern and Cooley 2013; Geramizadeh 2013).

Hydatid cyst generally involves liver and lung. Clinical symptoms and pathology is depends on the degree of infection, size and the involved organ. About 1.12 per 100,000 populations is suffered from hydatid cyst but the exact prevalence is unknown because of ineffective diagnostic methods. It has been rarely found in spleen, thyroid, breast, kidney and cervical soft tissue. Most of patients are asymptomatic and incidentally diagnosed. Intra abdominal cyst rupture can lead to severe complications such as anaphylaxis and sudden death (Fomda et al. 2015; Sikó et al. 2013).

✉ Mahmood Moosazadeh
mmoosazadeh1351@gmail.com

1 Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran

2 Department of Public Health, Health Sciences Research Center, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran

3 Amol Faculty of Paramedics, Mazandaran University of Medical Sciences, Sari, Iran

4 Health Sciences Research Center, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran

5 Health Deputy, Mazandaran University of Medical Sciences, Sari, Iran

6 Department of Community Medicine, Zabol University of Medical Sciences, Zabol, Iran

Hydatic cyst has worldwide distribution, but the most contamination has been reported from Mediterranean region, Middle East, South-America, Central America, Australia, Chile, Eastern Europe, New Zealand and parts of Western Africa. Because of close contact of a large part of Iranian society with dogs and herbivores during traditional husbandry, WHO has introduced Iran as a hyperendemic region for hydatid cyst (Khalili et al. 2010; Abdi et al. 2013). This disease is most common particularly in rural areas due to unsanitary livestock slaughtering. Incidence of disease is high in mountainous areas and is rare in south of Iran because of its high temperature (Ezatpour et al. 2015; Djuricic et al. 2010).

In average, 33 % of dogs were infected in Iran. The average contamination of slaughtered sheep, goats, cows, camels and bufflehead were 18, 35, 8, 11 and 5 % respectively. These prevalences are higher than those reported from Libya, Iraq, Egypt, Sudan, Greece, Italy, Morocco and many other countries (Yousefi 2007). Khalili et al. (2010) investigated 144 patients in Chaharmahal province during 1998–2007. Of them, 68 % were female and 65 % living in rural areas. In a study conducted by Akhlaghi et al. (2009) among 1100 referring to blood transfusion organization in Tehran (capital of Iran), 11.63 % of samples were infected with Hydatid cyst indicating presence of latent hydatid cyst among healthy population in the Iran's Capital. Losses from the hydatid cyst infection are not only involved the animal products and their fertility rates, but also include different costs for diagnosis, disabilities and work absenteeism (Mousavi et al. 2012).

Due to the annual reports from northern parts of Iran and lack of relevant study in this field, this study aims to investigate the epidemiological and clinical characteristics of hydatid cyst cases diagnosed from 2009 to 2014 in Mazandaran province, Iran.

Materials and Methods

All required data in this descriptive study was obtained from the Mazandaran portal information of disease surveillance system of Iranian Ministry of Health, Treatment and Medical Education. These data included date of report (year/month), habitat (urban/rural), patient's name, age, gender, nationality, address, date of onset, clinical symptoms at presentation, history of contact with dog, method of raw vegetable consumption, diagnostic method, number of cysts, involved organs and therapeutic method.

Collected data were entered into Excel spreadsheet and SPSS ver. 20 software. Incomplete records were repaired through contact with the patients or hospital documents. This study was approved by ethics committee of Mazandaran University of Medical Sciences. Names of patients were removed based on ethical consideration.

All information was described using percent frequency, mean, standard deviation. All analyses were performed using Chi-square and Fisher exact tests.

Results

During 2009–2014, 41 hydatid cyst cases had been identified most of which (12 cases) registered in 2010. Mean (SD) age of patients was 42.2 (17.2) years. Minimum and maximum ages were 6 and 72 years. Most of patients were female (63.4 %) and had just one cyst. The average number of cysts was 1.6 ± 0.8.

Frequencies of different clinical symptoms were splenomegaly in 3(7.3 %), chest pain in 1(2.4 %), abdominal pain in 13(31.7 %), coughing in 2(4.9 %), abdominal pain and splenomegaly in 8(19.5 %), splenomegaly, abdominal pain and chest pain in 1(2.4 %), splenomegaly, abdominal pain and cough in 3(7.3 %), chest pain and cough in 3(7.3 %) of patients. Totally, splenomegaly, chest pain, abdominal pain and cough were observed in 39 % (16/41), 26.8 %(11/41) and 24.4 %(10/41) of cases.

All female patients were housewives and 100 % of male patients were livestock, farmer and employee ($p < 0.001$). No significant difference was observed between genders with regard to splenomegaly, chest pain, abdominal pain, cough, residential area, dog contact, method of washing vegetables, number of cysts and involved organs ($p > 0.05$). Patient's job, chest pain and cough, contact with dog, method of washing vegetables, number of cysts and involved organ, were not significantly differ between rural and urban residences ($p > 0.05$). Rural residences in compare with urban residences had significantly higher rates of splenomegaly (55 vs. 23.8 %; $p = 0.04$) and lower rates of ascites (55 vs. 85.7 %; $p = 0.03$). Table 1 illustrates more details of clinical and epidemiological characteristics of patients with hydatid cyst.

Discussion

Our study investigating the clinical and epidemiological features of patients with hydatid cyst in northern part of Iran (Mazandaran province), showed that this infection is more common among females, those over 30 years and housewives. In addition, most of patients had history of washing vegetables only with water without disinfectants. Radiology and computed tomography were the main diagnostic procedures and majority of patients undergone both surgery and chemotherapy. Moreover, liver was the most involved organ.

Table 1 Distribution of epidemiological and clinical characteristics of patients infected Hydatid in north of Iran

Variables		N	%
Gender	Male	15	36.6
	Female	26	63.4
Age group	<10	2	4.9
	10–19	2	4.9
	20–29	7	17.1
	30–49	16	39
	≥50	14	34.1
Area residence	Urban	20	48.8
	Rural	21	51.2
Clinical signs	Liver enlarge (of 41 persons)	16	39
	Chest pain (of 41 persons)	11	26.8
	Cramp pain (of 41 persons)	29	70.7
	Cough (of 41 persons)	10	24.4
Job	Housewife	24	58.5
	Farmer	3	7.3
	Rancher	2	4.9
	Employee	4	9.7
	Other	8	19.5
Contact dog	Yes	15	36.6
	No	26	63.4
Vegetable consumption	Washing with water	30	73.2
	Washing with water and detergent	11	26.8
Detection method	CT scan	14	34.1
	MRI	1	2.4
	Radiology	6	14.6
	During surgery	3	7.3
	Ultrasound	2	4.9
	CT scan and MRI	5	12.2
	Radiology and CT scan	10	24.4
Number of cysts	1	22	53.7
	2	7	17.1
	3	7	17.1
	Unknown	5	12.2
Member suffering	Lung	5	12.2
	Abdomen	2	4.9
	Liver	26	63.4
	Liver and Lung	6	14.6
	Liver, Lung and abdomen	1	2.4
	Brain	1	2.4
Method treatment	Surgery	5	12.2
	Medicinal	9	22
	Surgery and medicinal	27	65.9
Total		41	100

Several studies carried out in Chaharmahal province (southeast of Iran), West Azarbaiejan (northwest of Iran) and East Azarbaiejan (northwest of Iran) reported that Hydatid cyst infection prevalence was more in females that males (Khalili et al. 2010; Hajipirloo et al. 2013; Aslanabadi et al. 2013). Other studies in different parts of Iran

such as Isfahan (Mohajeri et al. 2011), Ardabil (Heidari et al. 2011), Kashan (Esmaeili and Arbabi 2010) reported higher rates among women. In a study conducted in Turkey among 119 patients with hydatid cyst, 52.9 % of them were male (Aksu et al. 2013).

The age pattern observed in this study was in accordance with those reported in other studies. In Qom, the age range of patients was 8–69 years (Rezaei et al. 2014). In Chaharmahal (Khalili et al. 2010), North-Khorasan (Salehi et al. 2013) and Ardabil (Mirzanejadasl and Fasihi Herandi 2008) provinces, the most prevalences were found among 27–41, 31–40, 40–59 years age groups respectively. Mean age of patients in Isfahan province was 34.3 years (Mohajeri et al. 2011). Studies conducted in other countries showed that young people were the most infected groups. The peak of incidence in Romania was occurred among people aged between 11 and 14 (Cobzaru et al. 2013). In China, seropositive rates of Echinococcus among children and adults were reported as of 0.9 and 0.5 % respectively (Huang et al. 2013).

Results of the current study showed higher rates of infection among housewives. That was similar to those reported by Khalili et al. (2010) in Chaharmahal province (60 %) and Rezaei et al. (2014) in Qom (center of Iran). Prevalence of disease among rural residences in Chaharmahal (Khalili et al. 2010), West Azarbaiejan (Hajipirloo et al. 2013) and Romania (Cobzaru et al. 2013) were 65, 63.1 and 79 % respectively which are in accordance with our results, while, 90 % of patients in Qom province living in urban areas (Rezaei et al. 2014).

Most of studies investigated the prevalence of hydatid cyst, showed liver as the most organ involved (Khalili et al. 2010; Hajipirloo et al. 2013; Rezaei et al. 2014; Salehi et al. 2013; Cobzaru et al. 2013; Talaiezadeh and Maraghi 2006) similar to the current study. Only two studies carried out in North West of Iran and Bulgaria indicated that, lungs had been affected more than the other organs (Aslanabadi et al. 2013; Jordanova et al. 2015). Although, these studies were conducted among children. In Isfahan, among 47 patients undergone computed tomography, radiologic characteristics of simple cysts were observed in the results of 25 cases (Mohajeri et al. 2011).

We did not find any association between hydatid cyst and dog contact. Conversely, in Meshkin-shahr of Ardabil, incidence of disease among those were in contact with dogs were higher (Heidari et al. 2011). In another study carried out in Moghan of Ardabil, prevalence of developing hydatid cyst was higher in dog sites than other places (Mirzanejadasl and Fasihi Herandi 2008). Moreover, in Bulgaria, it has been shown that 90 % of affected children had been exposed to dogs (Jordanova et al. 2015). In China, seropositive rate of Echinococcus antigen among dogs was 0.9 % (Huang et al. 2013).

The present study provided evidences of epidemiological and clinical of patients infected hydatid cyst in North of Iran with using of existence data.

Small sample size is one of the main limitations of our study. It caused that the differences were not statistically significant in spite of considerable variations between the distributions of variables. Another limitation was lack of risk factor assessment due to the absence of control group.

This study showed than women were at higher risk of developing hydatid cyst maybe due to more exposure to parasite through vegetables. Also, present study indicated the liver as the most affected organ in hydatid cyst patients.

According to the above results, it is recommended to disinfect vegetables before use. Hands should not be in contact with mouth during disinfection and should be completely washed after sterilization. Humans are better to prevent unprotected exposure to dogs and children be prevented from permanent play with dogs. It is also suggested for dogs to be screened regularly regarding echinococcal infection.

Acknowledgments The authors would like to thank the Research Deputy of Mazandaran University of Medical Science and all the managers and personnel of Mazandaran Universities of Medical Sciences who provided the data required for this project. This research was supported by a grant from Mazandaran University of Medical Science (Grant Code: 1800).

References

Abdi J, Taherikalani M, Asadolahi Kh, Emaneini M (2013) Echinococcosis/hydatidosis in Ilam province, western Iran. Iran J Parasitol 8(3):417–422

Akhlaghi L, Ourmazdi H, Sarvi SH, Razmjoo E, Shokrabi M, Siavoshi MR et al (2009) Using Dot-ELISA Method to Study the Prevalence of Human Hydatidosis in People Referred to Blood Transfusion Center in Tehran, 2005–2006. J Iran Univ Med Sci 16(67):52–58

Aksu M, Sevimli FK, Ibiloğlu I, Arpacı RB (2013) Cystic echinococcosis in the Mersin province (119 cases). Turkiye Parazitol Derg 37(4):252–256

Aslanabadi S, Zarrintan S, Abdoli-Oskouei Sh, Salehpour F, Zarrintan A, Beheshtirouy S et al (2013) Hydatid cyst in children: A10 year experience from Iran. Afr J Paediatr Surg 10(2):140–144

Cobzaru RG, Dumitrescu AM, Ciobotaru M, Rîpă C, Leon M, Luca M et al (2013) Epidemiological aspects of hydatidosis in children, in some areas of north-eastern Romania. Rev Med Chir Soc Med Nat Iasi 117(3):754–757

Djuricic SM, Grebeldinger S, Kafka DI, Djan I, Vukadin M, Vasiljevic ZV (2010) Cystic echinococcosis in children—the seventeen-year experience of two large medical centers in Serbia. Parasitol Int 59(2):257–261

Esmaeili N, Arbabi M (2010) Seroepidemiology of hydatidosis among adult human at Kashanregion, Iran in 2008. J Kashan Univ Med Sci 13(4):321–326

Ezatpour B, Farhadi SJ, Azami M, Alirezaei M, Ebrahimzadeh F (2015) Importance of cystic echinococcosis in slaughtered herbivores from Iran. J Parasit Dis 39(2):234–237

Fomda BA, Khan A, Thokar MA, Malik AA, Fazili A, Dar RA et al (2015) Sero-epidemiological survey of human cystic echinococcosis in Kashmir, North India. PLoS One 10(4):e0124813

Geramizadeh B (2013) Unusual locations of the hydatid cyst: a review from Iran. Iran J Med Sci 38(1):2–14

Hajipirloo HM, Bozorgomid A, Alinia T, Tappeh KhH, Mahmodlou R (2013) Human cystic echinococcosis in west azerbaijan, northwest Iran: a retrospective hospital based survey from 2000 to 2009. Iran J Parasitol 8(2):323–326

Hamzavi Y, Vejdani M, Nazari N, Mikaeili A (2011) The Trend of Hydatidosis in Kermanshah Province, Western Iran. Iranian J Parasitol 6(4):33–40

Heidari Z, Mohebali M, Zarei Z, Aryaipour M, Eshraghian MR, Kia EB et al (2011) Seroepidemiological study of human hydatidosis in Meshkinshahr district. Iranian J Parasitol 6(3):19–25

Huang XM, Lv LF, Liu JP, Huang LZ, Xie YQ, He MZ et al (2013) Surveillance of echinococcosis in Liyang City from 2008 to 2012. Zhongguo Xue Xi Chong Bing Fang Zhi Za Zhi 25(5):521–523

Jordanova DP, Harizanov RN, Kaftandjiev IT, Rainova IG, Kantardjiev TV (2015) Cystic echinococcosis in Bulgaria 1996–2013, with emphasis on childhood infections. Eur J Clin Microbiol Infect Dis 34(7):1423–1428

Khalili B, Shahrani M, Moradi MT (2010) Study of hydatid cyst in hospitalized patients with operation in Chaharmahal va Bakhtiary province (1988–2007). J Shahrekord Univ Med Sci 12(1):69–74

Mirzanejadasl H, Fasihi Herandi M (2008) Serological Survey of Human Cystic Echinococcosis with ELISA Method and CHF Ag, in Moghan Plain, Ardebil Province, Iran. Res J Biol Sci 3(1):64–67

Mohajeri G, Safaei M, Hghighi M, Tabatabaei A, Hashemi SM, Emami M et al (2011) Frequency of radiological findings and clinical symptoms in patients with pulmonary hydatid cyst. J Isfahan Med Sch 28(113):759–766

Mousavi SR, Samsami M, Fallah M, Zirakzadeh H (2012) A retrospective survey of human hydatidosis based on hospital records during the period of 10 years. J Parasit Dis 36(1):7–9

O'Hern JA, Cooley L (2013) A description of human hydatid disease in Tasmania in the post-eradication era. Med J Aust 199(2):117–120

Rezaei F, Saghafipour A, Sheikholeslami NZ, Jooshi MK (2014) Investigation of demographic and clinical status of sufferers of hydatidcysts referred to hospitals affiliated to Qom University of Medical Sciences during a 12-Year Period (2002–2013(, Iran. Qom Univ Med Sci J 8(5):63–67

Salehi M, Adinezade A, Khodajo R, Saberi Z, Yousefi A (2013) The epidemiologic survey of operated patients with hydatid cyst in hospitals of North Khorasan province during 2010–2011. J North Khorasan Univ Med Sci 4(4):623–629

Sikó SB, Deplazes P, Ceica C, Tivadar CS, Bogolin I, Popescu S et al (2013) Echinococcus multilocularis in south-eastern Europe (Romania). Parasitol Res 108(5):1093–1097

Talaiezadeh A, Maraghi Sh (2006) Hydatid disease in children; A different pattern than adults. Pak J Med Sci 22(3):329–332

Yousefi H (2007) Review of hydatid cyst situation in Iran during 1985–2005. J Shahrekord Univ Med Sci 10(1):81–82