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Hydatid cyst in children: A 10-year experience from Iran

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ABSTRACT

Background: Hydatid disease is one of the major world-wide health problems especially in endemic countries. Due to lack of statistics about this disease, various aspects of hydatidosis in children in North-West of Iran have been studied in this study. **Materials and Methods:** We studied 59 children with hydatidosis referring Tabriz Children Hospital, Tabriz, Iran from 2001 up to 2011. We surveyed chief complaint of patients, number, size and location of cysts in children and also we studied cysts as if they are infected or ruptured or not. **Results:** Average age of 59 patients (32 [54.2%] males and 27 [45.8%] females) was 7.93 ± 3.0. The most common chief complaints were cough and pain. Number of cysts was higher in females (2.00 ± 2.8 vs. 1.52 ± 1.0). The most common locations of cysts are lung and liver (52 patients); however, other organs had been also affected. **Conclusions:** Lung hydatidosis is more common than hepatic hydatidosis in children than adults and it is more frequent in males. Hydatid disease should be considered in differential diagnoses of liver and lung cystic lesions in children.

Key words: Echinococcus granulosus, hydatid cyst, liver, lung mass

INTRODUCTION

Hydatidosis or cystic echinococcosis (CE) is one of the major world-wide health problems especially in countries where dogs are being kept. The primary hosts for *Echinoccus granulosus* tapeworm, the cause of hydatidosis, are dogs and canines. Humans are accidental hosts by eating tapeworm eggs.[1-4] CE is endemic in the Mediterranean, Middle East and North Africa zones. In Iran, as an endemic region, several provinces such as Khorasan, Hamadan, Markazi, West and East Azerbaijan are considered as the most important endemic places for CE.[2] Human hydatid disease is responsible for approximately 1% of admissions to surgical wards of hospitals in Iran.[1]

The most common location for hydatid cysts in children is the lung while adults mostly have hepatic cysts. Furthermore, combined lung and liver cysts are more frequent in children than adults. Some other studies, assume that high elasticity and compressible tissue of lungs in children leads to faster growing of hydatid cysts in lungs than liver.[4-6]

Pulmonary hydatidosis may be discovered incidentally or it can be symptomatic due to its location and a size.[5,6] Several studies have indicated that major symptoms of hydatidosis are cough, fever, chest pain, dyspnoea and mucopurulent sputum following cough.[4-12]

Pulmonary hydatid cysts are more common in males than females.[12] The lung cysts can be unilateral or bilateral. Usluer *et al*.[13] found that right lung is involved more than left lung and also right lower lobe is the most common location for cysts. The liver is the second important organ for hydatid cysts. Cysts can also be found in both lungs and liver simultaneously.[14,15] Abdominal masses are the most important symptoms of liver hydatidosis,[3] other symptoms are fever, hepatomegaly, etc.[11] Hepatic cysts are significantly more frequent in females than males while other studies showed controversial results.[3,14] Right lobe of the liver is more involved than left lobe.[16]

Considering all the literature review on hydatid disease and due to necessary need to pay attention to hydatidosis as an infectious and surgical disaster, which demands urgent treatment, there is a necessity in endemic regions to fully understand this entity. Since, there is a lack of knowledge on hydatiodsis in Iran as an endemic country

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for this disease, we conducted this descriptive study in order to evaluate the number of patients referring from the endemic cities in East Azerbaijan and Ardabil provinces of Iran and also we survey the distribution of this disease among genders and also its characteristics like size and location of cysts in children body referring to Children Hospital of Tabriz, Iran.

MATERIALS AND METHODS

In this cross-sectional study, we studied all children with a hydatidosis referring Tabriz Children Hospital, Tabriz, Iran in the period of 10 years from 2001 to 2011. Totally 59 patients (32 males and 27 females) from East Azerbaijan and Ardabil provinces of Iran, with a hytadid cysts were enrolled in our study.

Patients were diagnosed of having hydatid cysts instantly at the first visit or even during/after surgery. Chief complaint and symptoms of referred patients were varying from a pain or abdominal masses to asymptomatic ones, so we surveyed the symptoms and their distribution among patients and then we classified them into five groups consisting of: (a) Pain, (b) abdominal mass, (c) productive cough and dyspnoea, (d) with no sign, and (e) other signs.

In order to evaluate size, number and location of cysts, computed tomography was taken before and after surgery. Considering previous studies, we surveyed location of cysts in different organs including lung, liver, both liver and lung, peritoneum, lesser sac, left kidney, right kidney and retroperitoneal pelvic mass. Due to the high prevalence of lung and liver cysts, we surveyed the location of these cysts in smaller subgroups.

Lung hydatid cysts were classified as right lung cysts, left lung cysts and bilateral cysts. These cysts were also studied in smaller subgroups as which lobe of each lung has been involved.

We also studied detailed location of liver cysts and divided them into right lobe of liver cysts, left lobe of liver cysts and cysts involving both lobes of the liver. During and after the surgery of hydatid cysts, cysts were studied as if they are ruptured or infected.

All the extracted data were recorded and analysed by Statistical Package for the Social Sciences (SPSS) 19.0 software, property of SPSS, Inc., an IBM (International Business Machines Corporation) company, by using descriptive statistics and Chi-square test.

RESULTS

In this study, we studied all children with hydatid cyst referring Tabriz Children Hospital, Tabriz, Iran from 2001 up to 2011. Totally 59 children including 32 males (54.2%) and 27 females (45.8%) from East Azerbaijan and Ardabil provinces with hydatid cysts referred to this centre in the period of 10 years. The average age of patients was 7.93 ± 3.0, which in males it was 7.38 ± 2.7 and in females it was 8.59 ± 3.2.

The endemic cities for hydatid disease are Parsabad, Ahar, Varzegan, Heris and Meshkinshahr in East Azerbaijan and Ardebil provinces. Of 59 patients referring to the centre, 2 (3.4%) of them were from Parsabad, 11 (18.6%) of them were from Ahar, Varzegan and Heris and 3 (5.1%) of them were from Meshkin shahr while patients from Tabriz and other non-endemic cities for hydatid disease were 43 people (72.9%).

Chief complaints of 59 patients were pain in the thorax or abdominal region of body in 21 patients (36.2%), abdominal masses in 7 patients (12.1%), productive coughs and dyspnoea in 26 patients (44.8%) and 3 patients (5.2%) have no sign of hydatid cyst and it is diagnosed during the examination by the physician and one patient (1.7%) has an irrelevant sign. Chief complaints of males and females are shown in Table 1. In 46 patients (83.6%), the disease was diagnosed before surgery, in the rest of patients the cyst was known during or after the surgery.

The number of cysts in patients was varying from the minimum of 1 to the maximum of 15 in each patient and the average was 1.74 ± 2.0. The average number of cysts in males was 1.52 ± 1.0 and in females were 2.00 ± 2.8 in each person.

The biggest dimension of cyst in the smallest cyst was 20 mm and in the biggest cyst was 200 mm. The average

Table 1: Chief complaints

Gender	Pain (%)	Abdominal mass (%)	Productive coughs and dyspnoea (%)	With no sign (%)	Other signs (%)	Total
Male	15 (46.9)	3 (9.4)	13 (40.6)	1 (3.1)	0 (0)	32
Female	6 (23.1)	4 (15.4)	13 (50.0)	2 (7.7)	1 (3.8)	26
Total	21 (36.2)	7 (12.1)	26 (44.8)	3 (5.2)	1 (1.7)	58

size of biggest dimension of cysts between all patients was 86.88 ± 38.0 (between males it was 78.4 ± 29.3 and between females it was 97.22 ± 45.1).

The most common locations of the hydatid cyst in patients were the lungs and liver. A total of 40 patients (67.8%) had hydatid cysts in their lungs (31 patients had cysts only in lungs [52.5%] and 9 patients had cysts in both lungs and liver [15.3%]). 21 patient (35.6%) had hydatid cysts in their liver (12 patients had cysts only in liver [20.3%] and 9 patients had cysts in both lungs and liver [15.3%]). Table 2 shows the information of cysts locations.

Lungs were the main location for hydatid cysts in children in this study. Average number of lung hydatid cysts was 1.38 ± 0.8. This number in males was 1.25 ± 0.7 and in females was 1.53 ± 0.9. Detailed information about location and number of lung hydatid cysts are presented in Table 3.

Liver was the second major location for hydatid cysts. Average number of liver hydatid cysts in patients was 2.05 ± 2.5. This number in males was 1.67 ± 0.9 and in females was 2.63 ± 3.8. Table 4 shows the liver hydatid cysts location and numbers.

Of 59 children having hydatid disease 9 of them (15.3%) had an infected hydatid cysts while 50 of them (84.7%) did not have an infected hydatid cyst. Among 32 male patients, 5 males (15.6%) had an infected hydatid cyst while others (84.4%) did not. And among female patients, 4 females (14.8%) had an infected hydatid cyst and the rest of them (85.2%) did not.

Seven patients (11.9%) had a ruptured hydatid cyst among all the patients. Of 32 male patients, 4 of them (12.5%) had a ruptured cyst while 28 of them (87.5%) did not. These results among females were similar to males; 3 females (11.1%) had a ruptured cyst and the rest of females (88.9%) did not.

Table 2: Location of cysts

Gender	Lung (%)	Liver (%)	Both liver and lung (%)	Peritoneum (%)	Lesser sac (%)	Left kidney (%)	Right kidney (%)	Retroperitoneal pelvic mass (%)	Total
Males	17 (53.1)	8 (25.0)	5 (15.6)	0 (0)	0 (0)	1 (3.1)	0 (0)	1 (3.1)	32
Females	14 (51.9)	4 (14.8)	4 (14.8)	1 (3.7)	1 (3.7)	2 (7.4)	1 (3.7)	0 (0)	27
Total	31 (52.5)	12 (20.3)	9 (15.3)	1 (1.7)	1 (1.7)	3 (5.1)	1 (1.7)	1 (1.7)	59

Table 3: Lung hydatid cysts

Lobes of the lung	Males (%)	Females (%)	Total (%)
Right lung hydatid cysts			
Upper LRL	1 (4.5)	2 (11.1)	3 (7.5)
Middle LRL	1 (4.5)	2 (11.1)	3 (7.5)
Lower LRL	8 (36.4)	2 (11.1)	10 (25.0)
Middle and lower LRL	1 (4.5)	0 (0.0)	1 (2.5)
Upper and middle LRL	2 (9.1)	1 (5.6)	3 (7.5)
Other right lung cysts	2 (9.1)	2 (11.1)	4 (10.0)
Left lung hydatid cysts			
Upper LLL	1 (4.5)	0 (0.0)	1 (2.5)
Lower LLL	0 (0.0)	1 (5.6)	1 (2.5)
Upper, lower and lingua LLL	1 (4.5)	0 (0.0)	1 (2.5)
Other left lung cysts	1 (4.5)	0 (0.0)	1 (2.5)
Both right and left lung hydatid cysts			
Middle LRL and lower LLL	1 (4.5)	0 (0.0)	1 (2.5)
Middle and lower LRL and lower LLL	0 (0.0)	1 (5.6)	1 (2.5)
Lower LRL, upper and lingua LLL	0 (0.0)	1 (5.6)	1 (2.5)
Missing location of lung hydatid cysts	3 (13.6)	6 (33.3)	9 (22.5)
Total	22	18	40

LRL: Lobe of right lung, LLL: Lobe of left lung

Table 4: Liver hydatid cysts

Gender	Right lobe of liver (%)	Left lobe of liver (%)	Both lobes of liver (%)	Missing location of liver hydatid cysts (%)	Total
Males	10 (76.9)	1 (7.7)	1 (7.7)	1 (7.7)	13
Females	4 (50.0)	2 (25.0)	1 (12.5)	1 (12.5)	8
Total	14 (66.7)	3 (14.3)	2 (9.5)	2 (9.5)	21

DISCUSSION

CE or hydatidosis is one of major problems in countries where this disease is endemic. It is caused by *E. granulosus* and dogs play an important role in transmitting the tapeworm and so disease to a human being. The CE affects various organs of the human body by developing hydatid cysts in them and the progression of disease is different between children and adults.[1-5] However, cysts can be infected or ruptured before diagnosis.[17] Treatment of choice for hydatidosis is surgery.[3,17]

Some provinces of Iran are an endemic region for this disease.[1-4] Human hydatid disease is responsible for approximately 1% of admissions to surgical wards of hospitals in Iran.[1] In this study, we studied all children with hydatid cyst referring Tabriz Children Hospital, Tabriz, Iran from 2001 up to 2011 from endemic cities of West North of Iran (Parsabad, Ahar, Varzegan, Heris and Meshkin).

According to previous studies and ours, in contrast to adults' hydatidosis, lungs are more affected in hydatidosis in children, also simultaneous involvement of lungs and liver can be found in children hydatidosis.[5] However, in another study carried out by Talaiezadeh and Maraghi,[15] it is stated that there is an equal incidence in the lung and liver cysts in children. Djuricic *et al*. studied 149 children with 272 hydatid cysts; most of the cysts were located in the liver.[18]

In Montazeri's study, it was revealed that pulmonary hydatidosis of children is more common in males than females, and the main symptoms of disease is mentioned to be coughs,[4] several other studies also supported this comment.[5,7,11] We also found that pulmonary hydatidosis in more common in males than females, but the main symptoms of patients with hydatidosis referred to hospital in our study was chest pain and cough. Other symptoms of disease are fever, dyspnoea, mucopurulent sputum.[4-12] It is discussed in Santivanez and Garcia[5] study that symptoms are usually caused by mass effect of cysts which leads to pain in patients and complications (cyst rupture or infection) leads to coughing, hemoptcysis, etc. In this study, it is also declared that hydatidosis may remain asymptomatic when the cyst is not big enough to cause symptoms.

Lung hydatid cysts can be unilateral or bilateral.[15] Results of our study showed that right lung is more frequently affected that left lung in pulmonary hydatidosis and the most common affected lobe is lower lobe of the right lung. Solak *et al*.,[7] Montazeri *et al*.[4] and Usluer *et al*.[13] studies also confirm our results. In a study carried out by Mirshemirani *et al*.,[6] it is mentioned that posterior basal segment of right lower lobe is the most common location for lung cysts.

Liver is the second usual location for hydatid cysts. The study of Mirshemirani *et al*.[3] as our study showed that liver hydatidosis is more current in males than females; in contrast study of Djuricic *et al*. suggested completely a different result, stating liver cysts are more common in females.[14] Our results showed that abdominal masses are the major symptom of hepatic hydatidosis, these results are supported by other studies.[3] In Mamishi *et al*.[11] study, fever and hepatomegaly were stated as the main symptoms of the liver study. Right lobe of the liver is more involved in hepatic hydatidosis according to Lewis *et al*.[16] study, which is in compliance with results of our study.

Rarely hydatid cysts can be found in other regions of the body such as kidney, heart brain, peritoneum, lesser sac and extremities.[19-22] We found cysts in patients of our study in the peritoneum, both kidneys, lesser sac and as retroperitoneal pelvic mass.

Of all patients in our study, 15.3% have secondary infection of hydatid cyst and 11.9% have a ruptured cyst. Rupturing of cyst into the peritoneal cavity may result in peritonitis and metastatic seeding.[16]

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