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Türk Hijyen ve Deneysel Biyoloji Dergisi

Cystic echinococcosis cases in a tertiary hospital between 2006 and 2016

Üçüncü basamak bir hastanede 2006-2016 yılları arasında kistik ekinokokkozis vakaları

Arif Dogan HABILOGLU[1], Duygu MERT[2], Niyazi KARAMAN[3], Guray TOGRAL[4], Mustafa ERTEK[2]

ABSTRACT

Objective: Echinococcosis is a zoonotic disease caused by *Echinococcus* species. *Echinococcus granulosus* is the most frequent factor of disease. It is the cause of significant morbidity and mortality. The aim of this study was to compare the clinic and laboratory findings in hepatic and extrahepatic involvement of hydatid cysts cases and to determine whether there was a significant difference in terms of serological, biochemical and recurrence in both group.

Methods: The study was planned retrospectively. Total of 82 patients were evaluated. Patients were divided into two groups as hepatic and extrahepatic involvement. Hepatic involvement was detected in 45 patients and extrahepatic involvement was detected in 37 patients.

Results: In group of hepatic involvement, 20 patients were male and 25 patients were female. The mean age of the patients was 47 years. In the laboratory examination; in 25% of patients leukocytosis and in 4% of patients eosinophilia were detected. In 8% of patients increase of globulin fraction, in 44% of patients increase of C-reactive protein (CRP), in 35% of patients increase

ÖZET

Amaç: Ekinokokkoz, *Echinococcus* türlerinin neden olduğu zoonotik bir hastalıktır. *Echinococcus granulosus* hastalığın en sık etkenidir. Önemli oranda mortalite ve morbiditeye neden olmaktadır. Bu çalışmada hepatik ve ekstrahepatik tutulumu olan kist hidatik vakalarının klinik ve laboratuvar bulgularını karşılaştırarak serolojik, biyokimyasal ve rekürrens açısından anlamlı bir fark olup olmadığını tespit etmek amaçlanmıştır.

Yöntem: Çalışma retrospektif olarak planlandı. Toplam 82 hasta değerlendirildi. Hastalar, hepatik ve ekstrahepatik tutulumu olanlar olarak iki gruba ayrıldı. Hepatik tutulum 45 hastada, ekstrahepatik tutulum ise 37 hastada saptandı.

Bulgular: Hepatik tutulumu olan grupta 20 erkek ve 25 kadın hasta vardı. Hastaların ortalama yaşı 47 idi. Laboratuvar tetkiklerinde; %25'inde lökositoz ve %4'ünde eozinofili belirlendi. Hastaların %44'ünde C-reaktif protein (CRP), %8'inde globulin fraksiyonu, %35'inde karaciğer fonksiyon testleri (KCFT) veya bilirubin değerlerinde artma saptandı. Hastaların %60'ında indirekt hemaglutinasyon antikor (IHA) testi pozitif bulundu. 20 hastada rekürrens saptandı. Ekstrahepatik tutulumu olan grupta 14 erkek

[1]Hacettepe University Faculty of Medicine, Department of Internal Medicine, Intensive Care Unit, Ankara
[2]University of Health Sciences, Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital, Department of Infectious Diseases and Clinical Microbiology, Ankara
[3]University of Health Sciences Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital, Department of General Surgery, Ankara,
[4]University of Health Sciences, Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital, Department of Orthopedics, Ankara

İletişim / Corresponding Author : Duygu MERT
Ankara Onkoloji EAH. Enfeksiyon Hastalıkları Kliniği Ankara - Türkiye
Tel : +90 506 648 62 79 E-posta / E-mail : drduygumert@hotmail.com

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of liver function test (LFT) or bilirubin were found. Indirect hemagglutination antibody (IHA) test was positive in 60% of patients. 20 patients had recurrence. In group of extrahepatic involvement 14 patients were male and 20 patients were female. The mean age of the patients was 48. In the laboratory examination; in 16% of patients leukocytosis and in 5% of patients eosinophilia were detected. In 8% of patients increase of globulin fraction, in 16% of patients increase of CRP, in 38% of patients increase of LFT or bilirubin were detected. In 50% of patients IHA test positivity were found. 17 patients had recurrence.

Conclusion: In the group with hepatic involvement, leukocytosis, CRP increase, diabetes mellitus (DM) comorbidity, IHA test positivity and recurrence development were higher compared to the extrahepatic patients. The increase in globulin fraction, LFT or bilirubin increase, eosinophilia, gender distribution, mean age and underlying malignancy were similar in both groups. No statistically significant difference was found between the findings of the hepatic involvement and extra hepatic involvement.

Key Words: Echinococcosis, hepatic involvement, extrahepatic involvement

ve 20 kadın hasta vardı. Hastaların ortalama yaşı 48 idi. Laboratuvar tetkiklerinde; hastaların %16'sında lökositoz ve %5'inde eozinofili saptandı. Hastaların %16'sında CRP, %8'inde globulin fraksiyonu, %38'inde KCFT veya bilirubin artışı vardı. Hastaların %50'sinde IHA testi pozitif bulundu. 17 hastada rekürrens saptandı.

Sonuç: Karaciğer tutulumu olan grupta; lökositoz, CRP artışı, diabetes mellitus (DM) komorbiditesi, IHA test pozitifliği ve nüks gelişimi ekstrahepatik tutulumu olan gruba göre daha yüksek saptandı. Her iki grupta da globülin fraksiyonu, KCFT veya bilirubin artışı, eozinofili, cinsiyet dağılımı, yaş ortalaması ve altta yatan malignite yönünden sonuçlar benzer bulundu. Hepatik ve ekstrahepatik tutulumu olan hastalar arasında istatistiksel olarak anlamlı fark saptanmadı.

Anahtar Kelimeler: Ekinokokkozis, hepatik tutulum, ekstrahepatik tutulum

INTRODUCTION

Echinococcosis is a zoonotic disease caused by *Echinococcus* species of the cestode class. It is an infectious disease seen in many parts of the world, which is the cause of significant morbidity and mortality (1). There are four main *Echinococcus* species which are *Echinococcus granulosus, Echinococcus multilocularis, Echinococcus oligarthrus* and *Echinococcus vogeli*. *Echinococcus* needs an intermediate and a definitive host to continue his life cycle (1). *Echinococcus granulosus* is the most frequent factor of disease (2). The definitive host for all species is the carnivorous animals fed by the intermediate host and after oral ingestion intermediate hosts are mammals in which parasitic larvae form can be placed (3). Humans are not intermediary hosts, but as random hosts they take place in the life cycle of parasite (1). The aim of this study was to compare the clinic and laboratory findings in hepatic and extrahepatic involvement of hydatid cysts cases and to determine whether there was a significant difference in terms of serological, biochemical and recurrence in both groups.

MATERIAL and METHOD

The study was planned as a retrospective study.

University of Health Sciences Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital Education Planning Board approval was obtained (Approval date: 16.06.2016).

The data of 82 patients who were followed up and treated the diagnosis of cystic echinococcosis and who were analyzed during the period from 01/01/2006 to 01/01/2016.

Results of the patients were recorded electronically from the health records. The demographic data of the patients and their other informations were recorded in a pre-prepared form.

18 years and older patients with cystic echinococcosis, and who had clinical, laboratory and serological were included in the study. Patients who were under 18 years old, pregnant patients and without cystic echinococcosis were excluded from the study.

The following information were recorded. Age, sex, leukocyte, eosinophil, C-reactive protein (CRP), liver function test (LFT), bilirubin, indirect haemagglutination antibody (IHA) test, presence of immunosuppressive chronic disease and recurrence. The laboratory findings of patients were evaluated.

SPSS (IBM SPSS Statistics 24) program was used in the comparison of statistical data. The data were entered into statistical software program and analyzed by using the same comptuer software program. In order to interpret the findings, frequency tables and descriptive statistics were used. In the analysis of the relations between two qualitative variables, “x2-cross tables” were used according to the expected value levels (Pearson, Yates-continuity correction).

RESULTS

A total of 82 patients were evaluated in this study. We found hepatic involvement in 45 patients (55%), lung involvement in 6 patients (7%), muscle involvement in 6 patients (7%), spleen involvement in 3 patients (4%), kidney involvement in 4 patients (5%), bone involvement in 13 patients (16%), adrenal involvement in 1 patient (1%) and multiple organ involvement in 4 patients (5%). Patients were examined in two groups as hepatic and extrahepatic involvement. 20 patients (45%) were male and 25 patients (55%) were female in group of hepatic involvement (Table 1). The mean age of the patients was 47 years (Table 1). In 25% of patients leukocytosis, in 4% of patients eosinophilia, in 8% of patients increase of globulin fraction, in 44% of patients increase of CRP, in 35% of patients increase of LFT or bilirubin and in 60% of patients IHA test positivity were found (Table 2). In 13% of patients malignancy and in 11% of patients diabetes mellitus (DM) were found to be underlying diseases. The cystic echinococcosis recurrence was found as 7% (Table 1).

In group of extrahepatic involvement 14 patients (55%) were male and 20 patients (55%) were female. The mean age of the patients was 48 (Table 1). In 16% of patients Leukocytosis, in 5% of patients eosinophilia, in 8% of patients increase of globulin fraction, in 16% of patients increase of CRP, in 38% of patients increase of LFT or bilirubin and in 50% of patients IHA test positivity were found (Table 2). In 11% of patients malignancy and in 6% of patients diabetes mellitus (DM) were found to be underlying diseases. The disease recurrence was found as 3% (Table 1). No statistically significant difference was found between the findings of the two groups (Table 3).

DISCUSSION

Echinococcosis is endemic in our country. Mostly the liver is involved, but other organ involvement may also occur (4, 5). In Kaplan’s study, isolated hepatic and extrahepatic involvement rates were found as 79.8% and 16.7% respectively (6). In the study of Gavidia et al in the rural Peruvian population, they found the ratio of hepatic involvement of the lung as 5/1 and rates were between 3/1 and 13/1 in different studies (7). Menghebat et al in their study with 15,289 patients, found the involvement of the liver as 75.2%,

Table 1. The comparison of patients with extrahepatic and hepatic involvement in laboratory findings

	The hepatic involvement (45 patients)	The extrahepatic involvement (37 patients)
Leukocytosis	11	6
Eosinophilia	2	2
Increase in Globulin Fraction	3/37	2/24
CRP	4/9	1/6
LFT or bilirubin increase	16/45	14/37
IHA test	17/28	11/22
Malignancy	6	4
DM	5	2
Recurrence	3	1
The mean age	47	48
Gender	20 M 25 F	17 M 20 F

Table 2. The comparison of patients with extrahepatic and hepatic involvement in positive laboratory findings (%)

	The hepatic involvement: 45 patients (55%)	The extrahepatic involvement: 37 patients (45%)
Leukocytosis	25%	16%
Eosinophilia	4%	5%
Increase in Globulin Fraction	8%	8%
CRP increase	44%	16%
AST/ALT GGT/ALP BIL. increase	35%	38%
IHA +	60%	%50

Table 3. The statistical analysis in comparison of some findings

Variable	Involvement			Statistical analysis * Probability
	Hepatic	Extra hepatic	Total	
Gender				
Male	20 (%44,4)	17 (%45,9)	37 (%45,1)	x^2=0,018
Female	25 (%55,6)	20 (%54,1)	45 (%54,9)	p=0,892
Leukocytosis				
Yes	11 (%24,4)	6 (%16,2)	17 (%20,7)	x^2=0,837
No	34 (%75,6)	31 (%83,8)	65 (%79,3)	p=0,360
Eosinophilia				
Yes	2 (%4,4)	2 (%5,4)	4 (%4,9)	x^2=0,040
No	43 (%95,4)	35 (%94,6)	78 (%95,1)	p=0,841
Globulin fraction elevation				
Yes	4 (%10,5)	1 (%4,3)	5 (%8,2)	x^2=0,138
No	34 (%89,5)	22 (%95,7)	56 (%91,8)	p=0,711
CRP Elevation				
Yes	5 (%50,0)	-	5 (%31,2)	x^2=2,347
No	5 (%50,0)	6 (%100,0)	11 (%68,8)	p=0,126
LFT/Bilirubin elevation				
Yes	16 (%35,6)	13 (%35,1)	29 (%35,4)	x^2=0,002
No	29 (%64,4)	24 (%64,9)	53 (%64,6)	p=0,968
IHA positivity				
Yes	17 (%60,7)	10 (%47,6)	27 (%55,1)	x^2=0,832
No	11 (%39,3)	11 (%52,4)	22 (%44,9)	p=0,362
Malignancy				
Yes	7 (%15,6)	3 (%8,1)	10 (%12,2)	x^2=0,471
No	38 (%84,4)	34 (%91,9)	72 (%87,8)	p=0,492
Recurrence				
Yes	3 (%6,7)	1 (%2,7)	4 (%4,9)	x^2=0,099
No	42 (%93,3)	36 (%97,3)	78 (%95,1)	p=0,753

***In the examination of relations of two qualitative variables, "x2-cross tables" were used according to the expected value levels.

lung as 22.4%, abdominal and pelvic area as 5.2%, spleen as 1%, kidney and brain as 0.4% (8).

Esgin et al showed that the most frequent locations of hydatid cysts in human are 65% in the liver, 13% in the lungs, 17.4% in the lung-liver and 4,4% in the spleen (9). In the study of Demirci et al 459 cases were diagnosed pathologically and 61% hepatic involvement, 32.7% extrahepatic involvement and 6.3% both hepatic and extrahepatic involvement were found (10). In 131 serologically proven cases of echinococcosis by Force et al, 87 patients (66.5%) had developed liver involvement, 18 patients (13.8%) had developed lung involvement, 14 patients (10.6%) had developed other single organ involvement (11). In our study; 45 patients (55%) had hepatic involvement, 6 patient (7%) had lung involvement, 6 patients (7%) had muscle involvement, 3 patients (4%) had spleen involvement, 4 patients (5%) had kidney involvement, 13 patients (16%) had bone involvement, 1 patient (1%) had adrenal involvement, 4 patients (5%) had multiple organ involvement. Since our study was performed in an oncology center, the rate of extra hepatic involvement was higher than most studies, but it was in similar proportions with the literature.

In other studies, it was reported that the sensitivity of IHA ranged from 54% to 94% (12). In the study of Isitmangil et al 128 of 174 patients (74.4%) with thoracic hydatid cyst IHA was serologically positive (13). Agacfidan et al reported IHA positivity incidence as 60% in hepatic hydatid cyst and this rate was 12.5% in extrahepatic hydatic cyst cases (14). In the study of Kaplan et al 34,5% IHA positivity was detected in 67 hepatic and 17 extrahepatic cases (6). In the study of Erkan, IHA positivity was detected as 75% for the liver echinococcus and 42% for the lung echinococcosis (12). Gavidia et al, in the serological evaluation of the radiologically diagnosed echinococcus patients found the highest positivity rate as 32.7% in entire group and reported that the size, location, stage, and immunological status of the cyst was influential in the development of serological response (15).

In our study, 60% of the patients with hepatic involvement had IHA positivity and in the group with extrahepatic involvement IHA positivity was detected as 50%.

Leukocytosis, particularly associated with eosinophilia, may be seen as an inflammatory response in early infection (15). Leukocytosis and eosinophilia can develop in liver involvement (1). In the study of Sahin et al, high gamma glutamyl transferase (GGT) was detected in 117 patients with hepatic involvement and in 19 patients with extrahepatic involvement, leukocytosis was detected in 4 patients and eosinophilia was detected in 1 patient (16). In the study of Pitt et al, in 24 patients with hepatic involvement, 43% of patients had eosinophilia, 17% of patients had leukocytosis, and 50% of patients had high LFT which was predominantly alkaline phosphatase (17). In study of Behrns et al with 23 hepatic hydatid cysts patients, eosinophilia was detected in 55% of patients and high alkaline phosphatase (ALP) was detected in 29% of patients (18). In the study of Safioleas et al eosinophilia was detected in 34% of cases and high ALP was detected in 34% of 132 liver cyst hydatic cases, including 12 extrahepatic involvement (19). Uysal et al, in their study with 15 patients with liver, lung, kidney, spleen and intraabdominal echinococcus found leukocytosis in 46.7% of cases, eosinophilia in 20%, GGT elevation in 26%, ALP elevation in 13% (20).

In our study, in patients with hepatic involvement; we found leukocytosis in 25% of patients, eosinophilia in 4% of patients, increase of globulin fraction in 8% of patients, increase of CRP in 44% of patients, increase of LFT or bilirubin in 35% of patients and IHA test positivity in 60%. In patients with extrahepatic involvement; we found leukocytosis in 16% of patients, eosinophilia in 5% of patients, increase of globulin fraction in 8% of patients, increase of CRP in of 16% patients, increase of LFT or bilirubin in 38% of patients and IHA test positivity in 50% of patients.

In the literature, eosinophilia and leukocytosis have been detected in a wide range and in different ratios. The increase of LFT in this study was similar in both groups and both group had similar data to the literature.

Refik et al, in their study with 28 cystic echinococcosis patients, expressed diagnostically significant increase in CRP (21). In the study of Wellinghausen et al, the CRP elevation was found as 39.4% for 40 patients with *Echinococcus* due to *E. alveolaris* (22). In Sura's study, the CRP increase was detected in 14% of 20 cases with liver cystic echinococcosis (23). In our study, the CRP increase was detected as 44% in hepatic involvement group and as 16% in extrahepatic involvement group. The ratio of CRP increase was higher in hepatic involvement group. This result was attributed to a more intense response of inflammation in the liver, a part of the reticuloendothelial system.

In conclusion, Echinococcosis, which is seen in our country and especially in rural areas, is often accompanied by hepatic involvement, occasionally with extrahepatic involvement. In our study, laboratory and clinical findings of patients with hepatic involvement and hepatic involvement were compared. Leukocytosis, CRP increase, DM, IHA test positivity and recurrence development were more frequent in the hepatic involvement group. The increase in globulin fraction, LFT or bilirubin increase, eosinophilia, gender distribution, mean age and underlying malignancy were similar in both groups. No statistically significant difference was found between the findings of the hepatic involvement and extra hepatic involvement.

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