

Higher Seroprevalence of Hepatitis B Virus Antigen in Patients with Cystic Hydatid Disease than in Patients Referred to Internal Medicine Clinics in Turkey

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Abstract: Turkey remains an intermediate area for prevalence of hepatitis B virus (HBV) surface antigenemia. The sheep-raising areas of Turkey also pose a high risk for cystic hydatid disease (CHD). Both HBV infection and CHD are major public health issues particularly in eastern parts of Turkey; however, there is no data regarding HBV infection in patients who have had CHD. The aims of this study were to evaluate the association between HBV infection and CHD and suggest ways to reduce HBV infection which is still widespread in Turkey. A retrospective study was conducted with 94 adult patients with active CHD referred to the hepatology department, Yuzuncu Yil University School of Medicine from December 2010 to December 2012. All subjects came from rural areas of the region and underwent ultrasonography of abdomen which detected CHD of the liver. All the patients were serologically positive for *Echinococcus granulosus*. The control group consisted of 500 patients (300 men and 200 women) referred to the internal medicine clinics for other reasons. The patients with CHD and in the control group were tested for the existence of HBs antigen according to the standard procedures. The seroprevalence of HBs antigen was significantly higher in patients with active CHD than those in the control group (12.7% vs 5.2%; $P=0.0017$). Our data indicate that there is significant association between HBV infection and CHD. All patients with CHD should be screened for HBV infection.

Key words: *Echinococcus granulosus*, hydatid cyst, hepatitis B, Turkey

INTRODUCTION

Echinococcus granulosus is the agent of cystic echinococcosis, a major tapeworm zoonosis that affects humans together with a wide range of domestic and wild animals worldwide. Cystic hydatid disease (CHD) in the liver of humans or animals is caused by the larval form of *E. granulosus*. The disease is a public health problem in areas of low socioeconomic development as well in areas of sheep-raising including Eastern Turkey [1].

Hepatitis B virus (HBV) is a member of the hepadenaviridae family and is the causative agent of hepatitis B viral infection. This infection remains a major global public health problem. Despite the availability of a highly effective vaccine against hepatitis B infection, the overall burden of the disease remains enor-

mous with over 2 billion people infected worldwide and about 1 million deaths annually. The current therapies have mostly suboptimal response rates and are associated with a high cost of healthcare [2]. Information concerning the sequence of events is particularly important for the diagnosis of hepatitis B virus infection. The detection of the viral antigen, particularly the surface antigen (HBsAg), plays an important role in the diagnosis of both acute and chronic hepatitis B infections [3]. The prevalence of hepatitis B in the Turkish population has been estimated as 5% (intermediate prevalence), and HBV infection has been a public health problem in Turkey country-wide for decades [4].

It is unknown how many people have suffered and are suffering from both CHD and HBV infection and these 2 diseases seem to be profoundly affected by each other. However, the association between HBV infection and CHD has not been investigated on a population level. In the current study, we prospectively analyzed the demographic characteristics, clinical features, and seroprevalence of HBs antigen among patients with CHD who live in rural areas of Eastern Turkey.

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MATERIALS AND METHODS

This retrospective study consisted of 94 adult patients with active hydatid disease followed up at our gastroenterology clinic from January 2010 to December 2012. The control group consisted of 500 patients (300 men and 200 women) referred to the internal medicine clinics due to other reasons. The diagnosis of CHD of the liver was undertaken using the hydatid cyst ELISA method. An antibody titer higher than 1:160 was considered positive. The serum samples from CHD patients and the control subjects were screened for hepatitis B antigen by ELISA system (Ridascreen®, *Echinococcus* IgG, R-Biopharm, Darmstadt, Germany) and HBsAgII Cobas (Roche, Mannheim, Germany) at the time of initial diagnosis.

According to the World Health Organization (WHO) classification [5], all patients who had a positive serologic test result for *E. granulosus* should undergo a radiologic and medical examination. Ultrasonography was performed with a real-time, gray-scale ultrasound at the initial admission. Patients with type 5 of the disease (inactive cysts) were excluded from the study. Five hundred control subjects (300 men and 200 women) were selected from rural areas of the Van region. Subjects with liver disease, hepatitis B virus infection, and prior medical history of CHD were excluded from the control group. The serum samples of the CHD patients and control subjects were screened for hepatitis B antigen by ELISA at the time of initial diagnosis. The laboratory results of the blood tests of patients with CHD were also recorded. The seroprevalence of HBV infection among CHD patients as well as among control subjects was assessed by the statistical analysis using the chi-square test.

RESULTS

Ninety-four CHD patients (50 males, 44 females) were investigated, all of whom had a positive serology for *E. granulosus*. The mean age was 39.3 ± 18.0 years (range: 18-78 years). The mean age of the control subjects was 44.4 ± 17.0 years (range: 17-80 years). The abdominal ultrasonography of the patients revealed maximal cyst diameters ranging from 2 to 19 cm with a mean of 3.8 ± 1.0 (cm).

The overall prevalence of HBs antigen was 12.7% (12/94) for the patients with CHD. In control subjects, the prevalence of HBs antigen was found to be 5.2% (26/500). The seroprevalence of HBs antigen was significantly higher in patients with active echinococcal disease than the subjects in the control group

Table 1. Baseline characteristics of the CHD patients

Parameter (s)	Mean	SD	Minimum	Maximum
Age (years)	39.3	18.0	18	78
AST (U/L)	36.6	27.5	4	81
ALT (U/L)	34.6	29.5	7	146
Alkaline phosphatase (U/L)	452.7	497.8	117	2,211
LDH (U/L)	437.4	153.3	263	1,065
WBC ($10^9/L$)	9,195.6	5,007.8	4,280	39,100
Platelet ($10^9/L$)	292,037	116,146,453	97,000	770,000
Eosinophils (mm^3)	310.8	485.0	0	3,500
Lymphocytes ($10^9/L$)	1,938	907,767	6	5,060
Maximal cyst diameter (cm) on ultrasonography	8.1	4.6	2	19
Albumin (g/dl)	3.9	0.8	2	5
Globulin (g/dl)	3.8	1.0	2	7
IgE (IU/ml)	1,031	2,255	66	8,450
Sedimentation rate (mm/hr)	33.0	19.1	7	72

($P=0.017$). There were no significant differences between groups with respect to sex, age, and inhabitation. The characteristic features of the patients are summarized in Table 1.

DISCUSSION

The prevalence of CHD of the liver is found to be 0.15% in Western Turkey [6]. However, in the east, the prevalence of CHD has been reported to be higher with the ultrasonography-based prevalence being 0.2% [4]. As the current study has shown, people living in rural areas of the eastern part of the country continues to face the threat from both hepatitis B and CHD. Therefore, CHD of the liver is still an important public health issue particularly for those who live in eastern part of the country.

Over the last few decades there has been a marked reduction of the prevalence of hepatitis B in Turkey. However, based on recent data, Turkey is still an intermediate prevalent area for hepatitis B virus infection despite massive vaccination efforts [7].

The prevalence of HBV infection in Turkish population differs by subpopulation, with the highest prevalence among those from southeastern part of the country. In Eastern Turkey, the prevalence of hepatitis B has been estimated at 6% [8]. According to AASLD guidelines, all individuals born in areas of high and intermediate prevalence areas for HBV infection should be screened [9]. Therefore, all patients with CHD of the liver

have also been screened for HBV infection as a part of the diagnostic procedure in our hospital. However, some shortcomings existed in our study. First, only a small number of patients with CHD were included in the study. Second, we did not evaluate the HBV load by PCR, and finally, the serum transaminase levels were not examined throughout the study period.

The barriers to early recognition of HBV infection in persons who live in rural areas of Turkey mostly result from cultural, socioeconomic, and accessibility issues. Similarly, subjects who have CHD may also have HBV infection due to lack of infrastructure, low socioeconomic status, and poor hygiene behaviors.

Thirteen years ago, HBV prevalence was reported to be 9.5% in Van city and its environs [10]. As shown in the current study, there was a reduction in the prevalence of HBV infection toward an intermediate endemicity. However, patients with CHD who mostly originated from rural areas of Van province still had a high seroprevalence for HBs antigen. While this report did not focus on that issue specifically, we suggest that the presence of concomitant hepatitis B infection could make a serious problem in patients with CHD. We also conclude that a short term expenditure on a national immunization program against HBV may reduce the long-term health costs in the sheep-raising areas of Turkey.

To the best of our knowledge, this is the first study to describe the higher seroprevalence of HBs antigen in CHD patients. The long-term effects of this phenomenon on clinical outcomes in CHD patients are unknown and need further study. It is also concluded that all patients with CHD should also be tested for hepatitis B infection.

CONFLICT OF INTEREST

We have no conflict of interest related with this study.

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