PO Box 2345, Beijing 100023, China
Fax: +86-10-85381893
E-mail: wjg@wjgnet.com www.wjgnet.com

World J Gastroenterol 2004;10(3):452-454
World Journal of Gastroenterology
 ISSN 1007-9327

• BRIEF REPORTS •

Frequency of toxoplasmosis in patients with cirrhosis

Sebnem Ustun, Umit Aksoy, Hande Dagci, Galip Ersoz

Sebnem Ustun, Department of Gastroenterology, School of Medicine, University of Ege, 35100 Bornova, Izmir, Turkey
Umit Aksoy, Department of Parasitology, School of Medicine, University of Dokuz Eylul, Izmir, Turkey
Hande Dagci, Department of Parasitology, School of Medicine, University of Ege, Izmir, Turkey
Galip Ersoz, Department of Gastroenterology, School of Medicine, University of Ege, Izmir, Turkey
Correspondence to: Sebnem Ustun, MD, Department of Gastroenterology, School of Medicine, University of Ege, 35100 Bornova, Izmir, Turkey. sustun@med.ege.edu.tr
Telephone: +90-232-3881969-181
Received: 2003-08-26 **Accepted:** 2003-10-23

Abstract

AIM: It is known that toxoplasmosis rarely leads to various liver pathologies, most common of which is granulomatose hepatitis in patients having normal immune systems. Patients who have cirrhosis of the liver are subject to a variety of cellular as well as humoral immunity disorders. Therefore, it may be considered that toxoplasmosis can cause more frequent and more severe diseases in patients with cirrhosis and is capable of changing the course of the disease. The aim of this study was to investigate the frequency of toxoplasmosis in patients with cirrhosis.

METHODS: Serum samples were taken from 108 patients with cirrhosis under observation in the Hepatology Polyclinic of the Gastroenterology Clinic, and a control group made up of 50 healthy blood donors. IFAT and ELISA methods were used to investigate the IgG and IgM antibodies, which had developed from these sera.

RESULTS: Toxoplasma IgG and IgM antibody positivity was found in 74 (68.5%) of the 108 cirrhotic patients and 24 (48%) of the 50 people in the control group. The difference between them was significant ($P<0.05$).

CONCLUSION: In conclusion, it was found that the toxoplasma sero-prevalence in the cirrhotic patients in this study was higher. Cirrhotic patients are likely to form a toxoplasma risk group. More detailed studies are needed on this subject.

Ustun S, Aksoy U, Dagci H, Ersoz G. Frequency of toxoplasmosis in patients with cirrhosis. *World J Gastroenterol* 2004; 10(3): 452-454
http://www.wjgnet.com/1007-9327/10/452.asp

INTRODUCTION

Toxoplasmosis is a protozoan disease that infects 35-40% of the adult population of the world and demonstrates varying clinical manifestations. Its active agent is *Toxoplasmosis gondii* (*T. gondii*). In man tissue parasitism during the proliferative phase may occur without signs of symptoms. It may lead to a transient illness characterized by lymadenopathy, fever and fatigue, or a severe disease. Severe manifestations of the disease most commonly occur in patients with impaired immunity[1].

In most countries, seroprevalence of toxoplasma ranges between 20% and 60%. The prevalence is quite low in extremely dry and cold regions. It has been reported that the prevalence is rather high in warm and humid areas[2].

Cats, small mammals and birds take place in the usual life cycle of *T. gondii* in nature. Humans join this chain as a result of their close relationship with cats. Toxoplasmosis is never encountered in the small Pacific islands where there are no cats. In the group investigated for toxoplasmosis, the prevalence in Turkey ranged between 44% and 55%[3,4].

Toxoplasmosis may rarely cause various liver pathologies due to granulomatose hepatitis in patients with normal immune systems[1,5-8].

Patients with cirrhosis of the liver demonstrate various cellular and humoral immunity disorders[9-12]. For this reason, it may be thought that toxoplasmosis may lead to more frequent and more severe diseases in patients with cirrhosis and change the course of the disease.

What was investigated in this study was the frequency of *T. gondii* antibodies in the cases of cirrhosis associated with various reasons.

MATERIALS AND METHODS

One hundred and eight patients with cirrhosis from the Hepatology Polyclinic of the Gastroenterology Clinic, and a control group comprising 50 healthy blood donors of similar age and sex were taken in the study. Serum samples were taken from the patients and control group and kept at -20 ℃ until toxoplasma serological tests were performed.

IgM and IgG antibodies from the sera were investigated by IFAT and ELISA methods.

ELISA method

Dissolved antigen was prepared based upon literature data provided by Herlow *et al*, Naot *et al*[13,14]. Serum samples were diluted up to 1/64, 1/256, 1/1 024, 1/4 096 to determine IgM antibodies and up to 1/256, 1/1 024, 1/4 096, 1/8 000, 1/32 000 to determine IgG antibodies. The sera were read at a 405λ wavelength ELISA reader (Titertek II). The mean absorbance values of negative controls were added to the 2 standard deviation values of these absorbance values. Those above the cut-off value obtained were accepted as positive and compared with the values expressed by the control sera to assess the suspected sera. For IgG 1/1 024 and above and for IgM 1/256 and above were accepted as significant titers with regard to active disease[15].

IFAT method

Particle antigen was prepared according to data from Garin *et al*, Remington *et al*[16,17]. Serum samples were diluted and assessed semiquantatively. The dilution of the sera within the scope of the study was 1/16, 1/64, 1/128, 1/256, 1/512, 1/1 024, 1/4 096 for both IgG and IgM. The results obtained were assessed by a fluorescence microscope (Nikon) at 490 nm stimulation, 510 nm barrier filter wavelength and 20×10 magnification. For IgG 1/256 and above and for IgM 1/16 and above were accepted as significant titers with regard to

Table 1 Cirrhosis etiology of 108 patients

	Number of patients	%
Hepatitis B	37	34.3
Hepatitis C	27	25
Autoimmüne hepatitis	5	4.6
Alcoholic cirrhosis	18	16.7
Primary biliary cirrhosis	12	11.1
With unknown etiology	9	8.3
Total	108	

Table 2 Toxoplasma IgG and IgM positivity of patients and control groups

	Number of patients	Sex W / M	Age	IFAT and ELISA IgG(+)	IFAT and ELISA IgM(+)	Active disease significant with respect to	
						Ig G(+)	IgM(+)
Cirrhosis	108	38 / 70	51.5±10.2	74 (%68.5)[a]	2	31(%28.7)[a]	2
Control	50	19 / 31	40±6.7	24 (%48)	-	4 (%8)	-

[a]$P<0.05$.

active disease[15].

Comparisons between the cirrhotic patients and the control group pertaining to antibody positivity and sex were performed according to Fisher exact age distribution *t* test.

RESULTS

Cirrhosis etiology in patients is shown in Table 1. The cirrhotic patients and the control group demonstrated similar sex and age distributions (Table 2). Toxoplasma IgG and IgM antibody positivity was determined in 74 (68.5%) of the 108 cirrhotic patients and 24 (48%) of the 50 individuals in the control group. The difference was significant ($P<0.05$). Significant titers were found with respect to active disease (IgG 1/1 024 and above, IgM 1/256 and above for ELISA, and IgG1/256 and above, IgM 1/16 and above for IFAT) were found in 31 (28.7%) of the cirrhotic patients and 4 (8%) of the control group. The difference was significant (Table 2).

DISCUSSION

Toxoplasmosis is a protozoan disease that is widespread all over the world and demonstrates varying clinical manifestations. Determination of its incidence in various risk groups in the society and establishment of these risk groups play a significant role in taking the necessary precautions against this disease.

In this study toxoplasma IFAT and ELISA antibody positivity was significantly higher in cirrhotic patients. Besides, the significant titers were found to be higher with regard to active disease.

Toxoplasmosis can be frequently found in the general population all over the world. It has been reported that it was encountered at a higher rate in warm and humid regions compared to cold and dry places[2]. No sero-epidemiologic studies that would properly demonstrate the toxoplasmosis prevalence in the whole population in Turkey have been reported so far. The studies carried out merely reflect the results of those that have been brought to and evaluated in various laboratories with suspicion of toxoplasmosis. In a study carried out in Elazıg, a region of Turkey that is comparatively underdeveloped from the socio-economic point of view, Asci *et al*. found toxoplasma antibodies in 55% of 1 641 serum samples[3]. In a study covering the Aegean region between 1991-1995, Altintas *et al*. determined toxoplasma seropositivity in 4 651 (49.4%) of 9 410 individuals in their study[18]. Sutcu *et al*. found the toxoplasma IgM positivity was 10% and IgG positivity was 44% in Konya province between 1993 and 1997[4]. The seroposivity rate in Turkey generally varies between 44% and 55%. These values are quite close to the rates we have determined in our control group (48%), but lower than those in cirrhotic patients (68.5%). No other study has investigated the toxoplasma antibody frequency in cirrhotic patients. This study is probably the first one investigating the toxoplasma seroprevalence in cirrhotic patients.

The reasons why both the antibody positivity and titers were significant with regard to active disease are not known. Could toxoplasma, known to cause partial damage to the liver, have a role in the onset and clinical course of cirrhosis?

This study did not contain any research into the activity of toxoplasma. Nevertheless, the fact that antibody titers are higher in cirrhotic patients leads one to think that these people might have an active disease. We are also planning another study to determine whether active disease develops in cirrhotic patients by monitoring the changes in the long-term toxoplasma titers.

To sum up, the toxoplasma sero-prevalence in cirrhotic patients in our study was found to be higher. Cirrhotic patients may well form a risk group for toxoplasma. More detailed studies need to be carried out on this particular subject.

REFERENCES

1 **Jones TC**. Toxoplasmosis. In *Cecil Textbook of medicine* Neeson PB, McDermott W, Wyngaarden JB, (Eds), part X, 15th ed. London: *W.B. Saunders Co* 1979: 594-598

2 **Beaman MH**, Mccabe RE, Wong S, Remington JS. *Toxoplasma gondii*. In *Principles and Practice of Infections Diseases*. Mandell GL, Benett JE, Dolin R (eds). Fourth edition, New York: *Churchill Livingstone* 1995: 2393-2525

3 **Asci Z**, Seyrek A, Kizirgil A, Doymaz MZ, Yilmaz M. Toxoplazma supheli hasta serumlarýnda anti-*Toxoplasma gondii* IgG ve IgM antikorlarinin arastirilmasi. *Turkiye Parazitoloji Dergisi* 1997; **21**: 245-247

4 **Sutcu A**, Tuncer I, Kuru C, Baykan M. Konya ve cevresinde *Toxoplasma gondii* IgM ve IgG prevalansi. *Turkiye Parazitoloji Dergisi* 1998; **22**:5-7

5 **Duvic C**, Herody M, Didelot F, Nedelec G. Acute toxoplasmic hepatitis in an immunocompetent adult. *Ann Med Interne*1997; **148**: 323-324

6 **Frenkel JK**, Remington JS. Hepatitis in toxoplasmosis. *N Engl J Med* 1980; **302**: 178-179

7 **Masur H**, Jones TC. Hepatitis in acquired toxoplasmosis. *N Engl*

J Med 1979; **301**: 613

8 **Schoukry NA**, Farrag SA, Makarem SS, el Nassr MS, Baddar MR, el Lamei OI, Labib MH. *Toxoplasma gondii* in acute and chronic hepatitis. *J Egypt Soc Parasitol* 1986; **16**: 531-539

9 **Fiere J**, Finley F. Deficient serum bactericidal activity against *Echerichia coli* in patients with cirrhosis of the liver. *J Clin Invest* 1979; **63**: 912-921

10 **Nouri-Aria KT**, Alexander GJ, Portmann BC, Hegarty JE, Eddleston AL, Williams R. T and B cell function in alcholic liver disease. *J Hepatol* 1986; **2**: 195-207

11 **Rajkovic IA**, Williams R. Abnormalities of neutrophil phagocytosis, intracellular killing and metabolic activity in alcoholic cirrhosis and hepatitis. *Hepatology* 1986; **6**: 252-262

12 **Trevisani F**, Castelli E, Foschi FG, Parazza M, Loggi E, Bertelli M, Meloti C, Domenicali M, Zoli G, Bernardi M. Impaired tufsin activity in cirrhosis: relationship with splenic function and clinical outcome. *Gut* 2002; **50**: 707-712

13 **Herlow ED**, Lane D. Antibodies. *A laboratory manuel*. *Cold Spring Harbour Laboratory* 1998: 561-591

14 **Naot Y**, Remington JS. An enzyme-linked immunosorbent assay for detection of IgM antibodies of *Toxoplasma gondii*: use for diagnosis of acute acquired toxoplasmosis. *J Infect Dis* 1980; **142**:757-766

15 **Garcia LS**, Bruckner DA. Serodiagnosis of Parasitic Diseases. *Diagnostic Medical Parasitology*. Washington DC: *American Soc. for Microbiology* 1993: 392-406

16 **Garin JP**, Ambroise-Thomas P. The serological diagnosis of toxoplasmosis by fluorescent antibody method (indirect technic). *La Presse Medicale* 1963; **71**: 2485

17 **Remington JS**, Mcleod R, Desmont G. Toxoplasmosis. In *Infectious diseases* of the fetus newborn infant. Remington JS, Klein JO (eds), 4th edition. Philadelphia: *WB Saunders Company* 1995: 140-268

18 **Altintas N**, Kuman HA, Akisu C, Aksoy U, Atambay M. Toxoplasmosis in last four year in Agean region, Turkey. *J Egypt Soc Parasitol* 1997; **27**: 439-443

Edited by Wang XL **Proofread by** Zhu LH