EVALUATION OF THE ANTI HEPATITIS C VIRUS SEROPOSITIVITY AND SERUM TRANSAMINASES IN OUR HOSPITALS

HASTANEMİZ ANTİ HEPATİTİS C VİRUS SEROPOZİTİLİKLİĞİNİN VE SERUM TRANSAMİNAZLARININ DEĞERLENDİRİLMESİ

HEPATIT C VIRUS

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Öz

Amaç: Hepatit C Virus (HCV) , kronik karaciğer hastalığı, siroz ve hepatoselluler karsinomaya yol açabilen önemli bir enfeksiyon hastalığı etkenidir. HCV' ye bağlı karaciğer hastalıklarının toplumu ne derece etkileyeceğinin belirlenebilmesi için HCV prevalansındaki değişimlerin bilinmesi ve izlenmesi gerekir. Çalışmamızda, hastanemize başvuran hastaların anti HCV seropozitifliğinin belirlenmesi ve serum transaminazları ile birlikte değerlendirilmesi amaçlanmıştır. Gereç ve Yöntem: Ocak 2012-Haziran 2015 tarihleri arasında hastanemize başvuran, çeşitli kliniklerden gelen 131851 hastaya ait kan örnekleri Anti-HCV pozitifliği kemiluminesans mikropartikül immunoassay tekniği ile , Serum transaminazları spektrofotometrik enzimatik yöntemleri ile çalışılmıştır. Sonuçlar anti HCV≥1 S/CO değerlerine sahip örnekler pozitif olarak değerlendirilmiştir. Veriler retrospektif olarak incelenmiştir. İstatistiksel analizler için IBM SPSS statistics 22 (IBM SPSS, Türkiye) programı kullanılmıştır. Mükerrer örnekler değerlendirme dışı bırakılmıştır. Bulgular: Çalışma da131851 olguda Anti HCV pozitif liği 868 (%0.65) olarak saptanmıştır. Anti HCV, ALT, AST eş zamanlı değerlendirilen 80507 olgunun 655(%0,8)'inde anti HCV pozitif tespit edilmiştir. Hastaların cinsiyet dağılımı 45293 (%56.3)'ü kadın, 35214(%43.7)'si erkek olmak üzere, yaşları 0-115 arasında değişmekte olup, ortalaması 43,23±19,58 yıldır. AST düzeyi yüksek olan olgularda Anti HCV pozitifliği görülme oranı (%2), ALT düzeyi yüksek olan olgularda Anti HCV pozitifliği görülme oranı (%2.2) normal olan olgulara göre, istatistiksel olarak anlamlı düzeyde yüksektir (p:0.001; p0.05). Anti HCV pozitif 655 hastanın 138(%21,06)' inde AST yüksekliği, 242(%36,94)'inde ALT yüksekliği görülmüştür. Yaş dağılımına göre Anti HCV pozitifliği 5, 6 ve 7. dekatta daha yüksek tespit edilmiştir. Tartışma: Dünyada HCV infeksiyonu prevalansının yaklaşık %2.8, Türkiye de HCV sıklığı %1-2.4 arasında değişmektedir. Hastanemize başvuran hastalarda, Türkiye geneline göre %0.65 tespit edilerek düşük bulunmuştur. Anti HCV pozitif 655 hastanın 138(%21,06)' inde AST yüksekliği, 242(%36,94)'inde ALT yüksekliği görülmüştür. AST yüksekliğinde Anti HCV prevalansı %2, ALT yüksekliğinde Anti HCV prevalansı %2.2 tespit edilmiştir.

Anahtar Kelimeler

Hepatit C Virus; Alanin Aminotrasferaz; Aspartat Aminotransferaz

Abstract

Aim: Hepatitis C Virus (HCV) is an important infectious disease agent that can cause chronic liver disease, cirrhosis, and hepatocellular carcinoma. It is necessary to follow the changes in incidence of HCV in order to determine the extent to which liver diseases caused by HCV will affect the population. Our study aimed to determine the anti-HCV seropositivity in the patients presenting to our hospital and to evaluate this in conjunction with serum transaminase levels. Material and Method: The anti-HCV seropositivity of blood samples of a total 131,851 patients presenting to various departments in our hospital between January 2012 and June 2015 was studied with spectrophotometric enzymatic methods by using chemiluminescence microparticle immunoassay technique. The samples with anti-HCV S/CO values %u22651 were considered to be positive. Data were analyzed retrospectively. The IBM SPSS Statistics 22 (IBM SPSS, Turkey) program was used for statistical analysis. Repeat specimens were excluded from the analysis. Results: Anti-HCV seropositivity was determined in 868 (0.65%) of the 131,851 patients in the study. Anti-HCV seropositivity was determined in 655 (0.8%) of 80,507 patients in whom anti-HCV, alanine aminotransferase (ALT), and aspartate aminotransferase (AST) were examined together. The mean age of the patients was 43.23±19.58 years (range: 0-115 years), of whom 45,293 (56.3%) were female and 35,214 (43.7%) were male. The prevalence rate of anti-HCV seropositivity was statistically significantly higher in the patients with higher levels of AST (2.0%) and in the cases with higher levels of ALT (2.2%) compared to the healthy individuals (p: 0.001; p<0.01). There was no statistically significant difference between incidence rates of anti-HCV seropositivity in the patients according to AST/ALT distributions (p>0.05). Higher levels of AST and ALT were observed in 138 (21.06%) and 242 (36.94%) of 655 patients with anti-HCV seropositivity, respectively. The anti-HCV seropositivity was determined to be higher in patients in their 5th, 6th, and 7th decades. Discussion: The prevalence of HCV infection is approximately 2.8% worldwide, while the prevalence of HCV infection in Turkey varies between 1% and 2.4%. The prevalence of HCV infection was determined to be 0.65% in the patients presenting to our hospital, which is lower than the overall prevalaence inTurkey. Elevated levels of AST and ALT were observed in 138 (21.06%) and 242 (36.94%) of 655 patients with anti-HCV seropositivity, respectively. Anti-HCV prevalence was determined to be 2% in those with elevated AST levels and 2.2% in those with elevated ALT levels.

Keywords

Hepatit C Virus; Alanine Aminotransferase; Aspartate Aminotransferase

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Introduction

Hepatitis C virus (HCV) infection is an important public health problem that causes mortality and morbidity throughout the world [1]. It is estimated that, worldwide, approximately 185 million people (2.8% of the global population) are infected with hepatitis C [2]. Chronic HCV infection is the leading indication for liver transplantations [3]. The primary transmission route of HCV is transfusion of blood and blood products. A marked decrease has occurred in this route of transmission with the introduction of routine screening of HCV antibodies in the blood banks [4,5]. The diagnosis of chronic viral hepatitis is made during the investigation of elevated liver enzymes, which is determined incidentally in approximately half of the patients [6]. Fatty liver disease is the cause of elevated ALT (alanine aminotransferase) levels in more than half of the cases. The result is considered to be chronic viral hepatitis in approximately 5% of the patients with elevated ALT levels [7]. Enzymes are found to be within normal limits in one-third of the patients with chronic hepatitis C infection. Anti-HCV antibody is investigated serologically for the diagnosis of the infection and HCV RNA levels are examined using a molecular method for the detection of viremia. HCV RNA viral load is monitored with liver transaminases during treatment and follow-up, while the severity of inflammation and fibrosis in the liver is determined through biopsy. Although the serum level of liver transaminases is not specific for the disease, it may contribute to the diagnosis and follow-up of the infection. The ratio of AST (aspartate transaminase)/ALT (alanine transaminase), called the De Ritis ratio, is used to discriminate between acute and chronic forms of hepatocellular injury [8]. Our study aimed to contribute to the relevant literature on this subject by evaluating the incidence of anti-HCV seropositivity in our region together with elevated ALT, AST levels, and the AST/ALT ratio.

Material and Method

The blood samples of 131,851 patients (age range: 0-115 years) sent from various departments of our hospital between January 2012 and June 2015 were studied using the chemiluminescence immunoassay method (Advia Centaur CP Bayer-Siemens (Germany), Architect i1000 Abbott ABD autoanalyzer). According to the manufacturer's instructions, specimens with an S/CO value of <1 were considered to be negative and specimens with an S/CO value of ≥1 were considered to be positive. ALT level of 0-34 U/mL, AST level of 0-40, and AST/ALT ratio of <1 were considered to be normal values. Data were evaluated regarding anti-HCV seropositivity, ALT, AST, AST/ALT ratio, and mean age. Statistical analysis was performed using the IBM SPSS Statistics 22 (IBM SPSS, Turkey) program. The Chi-Square test was used for comparison of qualitative data, in addition to descriptive statistical methods (mean, standard deviation, and frequency). Significance was evaluated at a level of $p<0.05$.

Results

Blood specimens of 131,851 patients were sent to the microbiology laboratory of our hospital. Of these, 868 (0.65%) were determined to be anti-HCV positive. Six hundred and fifty-five (0.8%) of 80,507 blood specimens examined simultaneously for anti-HCV, ALT, and AST were determined to be anti-HCV positive. There was no statistically significant difference between prevalence rates of anti-HCV seropositivity in the patients by gender ($p>0.05$) (Table I).

Prevalence rates of anti-HCV seropositivity were higher in patients in their 5th, 6th, and 7th decades (Table II). Elevated levels of AST and ALT were observed in 138 (21.06%) and 242 (36.94%) of 655 patients with anti-HCV seropositivity, respectively.

The prevalence rate of anti-HCV seropositivity was statistically significantly higher in the patients with elevated levels of AST (2%) compared to the patients with normal levels of AST (0.7%) (p: 0.001; $p<0.01$). The risk for anti-HCV seropositivity was 0.340-fold greater in the patients with elevated levels of AST (OR: 0.340; 95% CI: 0.281-0.411).

The prevalence rate of anti-HCV seropositivity was statistically significantly higher in the patients with elevated levels of ALT (2.2%) compared to the patients with normal levels of ALT (0.6%) (p: 0.001; $p<0.01$). The risk for anti-HCV seropositivity was 0.267-fold greater in the patients with higher levels of ALT (OR: 0.267; 95% CI: 0.228-0.313).

Table I. Evaluation of Anti-HCV seropositivity according to gender distributions

	Gender		p
Anti-HCV	Female	Men	
	n (%)	n (%)	
Positive	356 (%0,8)	299 (%0,8)	0,323
Negative	44937 (%99,2)	34915 (%99,2)	

Chi-Square Test

Table II. Distribution of Anti-HCV according to the age groups

Age Groups	Anti-HCV	
	Positive	Negative
	n (%)	n (%)
0-9 years	5 (0,2%)	2639 (99,8%)
10-19 years	12 (0,3%)	3982 (99,7%)
20-29 years	47 (0,3%)	14947 (99,7%)
30-39 years	67 (0,4%)	18076 (99,6%)
40-49 years	80 (0,7%)	11599 (99,3%)
50-59 years	127 (1,2%)	10845 (98,8%)
60-69 years	158 (1,8%)	8510 (98,2%)
70-79 years	101 (1,8%)	5562 (98,2%)
80-89 years	51 (1,6%)	3173 (98,4%)
90-99 years	6 (1,2%)	503 (98,8%)
100 years and over	1 (5,9%)	16 (94,1%)

Table III. Evaluation of Anti-HCV seropositivity according to distributions of ALT, AST, AST/ALT

		Anti-HCV		p
		Positive	Negative	
		n (%)	n (%)	
AST	Normal	517 (0,7%)	73213 (99,3%)	0,001**
	High	138 (2%)	6639 (98%)	
ALT	Normal	413 (0,6%)	69048 (99,4%)	0,001**
	High	242 (2,2) %	10804 (97,8%)	
AST/ALT	Normal	602 (0,8%)	72829 (99,2%)	0,527
	High	53 (0,7%)	7023 (99,3%)	

Chi-Square Test **p<0.01

There was no statistically significant difference between prevalence rates of anti-HCV seropositivity in the patients according to AST/ALT distributions (p>0.05). Anti-HCV seropositivity was observed in 602 (0.8%) of the patients with lower AST/ALT ratio and in 53 (0.7%) of the patients with higher AST/ALT ratio (Table III).

Discussion

The prevalence of HCV varies according to the geographical region and age. The prevalence of HCV infection is estimated to be 2.8% worldwide. It is estimated that approximately 185 million people are infected with hepatitis C throughout the world [2]. The regional prevalence of HCV in Africa, America, Asia, Australia and Oceania, Europe, and the Middle East are as follows: 3.2%, 1.5%, 2.1%, 1.2%, 2.3%, and 4.7% [9]. Japan, Taiwan, and Italy are among the countries with a higher prevalence of HCV infection. The prevalence of HCV infection is the lowest in North Europe, at less than 1% [10]. The prevalence of HCV infection is as high as 15-20% of the general population in Egypt [10,11]. Estimated the prevalence of HCV antibodies and HCV RNA, among the 15–59 year age group, to be 14.7 and 9.8% respectively in Egypt [11]. HCV prevalence rates are as follows in developed countries with lower prevalence rates but higher population: Germany 0.6%, Canada 0.8%, France 1.1%, and Australia 1.1%. HCV prevalence rates have been reported as follows in developed countries with larger populations and slightly lower prevalence rates: United States of America (USA) 1.8%, Japan 1.5-2.3%, and Italy 2.2% [10]. In the meta-analysis performed by Hanafiah et al., higher prevalence rates (>3.5%) were observed in North Africa/Middle East, Central and East Asia; moderate prevalence rates (1.5-3.5%) in sub-Saharan Africa, Andean, South and Southeast Asia, Central and Southern Latin America, Caribbean, Oceania, Australasia, and Central, Eastern, and Western Europe; and lower prevalence rates (<1.5%) in Asia Pacific, Tropical Latin America, and North America [12]. HCV prevalence rates in Turkey vary between 1% and 2.4%. In our study, the HCV prevalence rate was found to be 0.65% in the general hospital population, which is lower than the overall HCV prevalence rate of Turkey. Although countries like the USA, Australia, Spain, Italy, Japan, and Turkey have similar mean HCV prevalence rates (1-1.9%), the age-specific HCV prevalence patterns of these countries are very different. The highest HCV prevalence in USA is between 30-49 years of age. The prevalence is lower under 20 years of age and after 50 years of age. Similar to Australia, HCV transmission during the past 2-4 decades has occurred predominantly in young adults [10]. There are large variations in prevalence between groups with different risk factors in countries with the epidemiological characteristics of the USA, Australia, and North and Western European countries. IV drug use has been the leading transmission route of HCV in the USA over the past 40 years and also accounts for most of the newly acquired infections in the west, north, and south European regions [10]. Most of the anti-HCV positive patients in Turkey are over 50 years of age, which shows us that risk of HCV infection was higher about 40-60 years ago. Age-specific prevalence gradually increases with population age increases in countries such as Turkey, Spain, Italy, Japan, and China [10]. Studies investigating age-specific prevalence in Turkey have determined that the prevalence increases after 50 years of age [5,13]. Also in our study, anti-HCV seropositivity was observed to occur more frequently in the 5th, 6th, and 7th decades (Table II), consistent with the other studies performed in Turkey. HCV is most commonly transmitted with a percutaneous exposure to infected blood. The predominant route for transmission of HCV differs from country to country. Although blood transfusions are the most frequent route of transmission, intravenous drug use is also significant in developed countries. Transmission through sexual contact and vertical transmission are less commonly seen transmission routes [4,10,14]. Data from the blood center of the Turkish Red Crescent between 2008 and 2012 found that the rate of anti-HCV seropositivity in donors was between 0.02% and 0.004% [15,16]. The rate of anti-HCV seropositivity among hemodialysis patients and peritoneal dialysis patients in our country was reported as 9.8% and 4.7%, respectively [17]. Twenty-seven percent of cirrhosis and 25% of hepatocellular carcinoma (HCC) in the world is associated with HCV [10]. In the study performed by Okten [18], while hepatitis B virus (HBV) infection still maintains its importance in the etiology, the contribution of HCV has risen from 23% to 38.1% during the last decade. Similarly, while the contribution of HBV in the etiology of cirrhosis decreased from 56.6% to 45.9%, the contribution of HCV rose from 25.2% to 45.9% [10]. Certainly, it is critically important to develop diagnostic tests for hepatitis C virus.

Due especially to the insidious subclinical anicteric course of HCV infection, it is highly difficult to diagnose in its acute phase. In healthy individuals, the transaminases ALT and AST are normally found in lower concentrations in the serum, due to normal cell cycle and regeneration. While ALT is relatively specific to the liver, AST is found in the skeletal muscle, myocardium, kidney, brain, pancreas, and erythrocytes other than hepatocytes. Therefore, ALT reflects hepatocellular injury more specifically than AST. An elevated ALT level suggests that elevated AST level is also hepatic in origin. In our study, we observed that elevated ALT and AST levels were significantly associated with anti-HCV seropositivity (Table III). However, the possibility of false anti-HCV seropositivity results or normal ALT levels in patients with chronic HCV infection should be considered. In published studies, 30% of the patients with chronic HCV infection had continuously normal ALT levels [19,20]. Many studies investigating the relationship between serum HCV RNA levels and ALT levels in patients with chronic HCV infection have yielded contradictory results [21]. In our study, higher levels of AST and ALT were observed in 138 (21.06%) and 242 (36.94%) of 655 patients with anti-HCV seropositivity, respectively. The relationship between elevated levels of ALT and AST and anti-HCV incidence was investigated. But it remained inconclusive due to the following difficulties in the diagnosis and follow-up of the disease: anti-HCV seropositivity and AST/ALT ratio alone is not sufficient for diagnosis; false negativity and false positivity may occur; ALT levels may be normal in patients with chronic HCV infection; and, despite being considered the gold standard in the diagnosis and follow-up of the disease, serum HCV RNA levels can have a fluctuating course. In our study, anti-HCV prevalence in the patients presenting to our hospital was found to be lower than the overall HCV prevalence rate throughout the world and in Turkey.

Competing interests

The authors declare that they have no competing interests.

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