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HBsAg, Anti-HCV, and Anti-HIV Seroprevalence Among Patients Presenting to a State Hospital between 2014 and 2018

2014-2018 Yılları Arasında Devlet Hastanesine Başvuran Hastalarda HBsAg, Anti-HCV ve Anti-HIV Seroprevalansı

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Abstract

Introduction: The epidemiology of viral hepatitis and human immunodeficiency virus (HIV) infections has been changing worldwide and in Turkey. The aim of this study was to present current information about seropositivity rates in hepatitis B surface antigen (HBsAg), anti-hepatitis C virus (HCV), and anti-HIV test results according to gender, age, and other risk factors (dialysis, preoperative tests, outpatient clinics) in patients aged 1-99 who presented to the İzmir Menemen State Hospital between January 2014 and July 2018.
Materials and Methods: During the study period, 58,752 samples were tested for HBsAg, 53,649 samples for anti-HCV, and 48,162 samples for anti-HIV by chemiluminescence immunoassay method by using HBsAg 2, anti-HCV 2 and HIV combi PT kits in a Roche Modular E170 device (Roche Diagnostics GmbH, Penzberg, Germany). Data were collected retrospectively from the microbiology laboratory database.
Results: The seropositivity rates for HBsAg, anti-HCV, and anti-HIV were 4.75% (2790/58,752), 0.7% (376/53,649), and 0.02% (11/48,162), respectively. The mean age of patients with HCV seropositivity was significantly higher (57±10 years) than patients with hepatitis B virus (HBV) seropositivity (41±13 years). Hepatitis B surface antigen and anti-HCV seropositivity rates were significantly higher in dialysis patients (8.7% and 10%, respectively) than in the other groups. Of the HBsAg-positive individuals, 74 (2.65%) were born between 1999 and 2007 (HBV vaccine was added to the routine vaccination program in Turkey in 1998) and only 1 (0.03%) was born after 2007 (the year that family medicine practice was implemented in İzmir province). The other 2,715 HBsAg-positive individuals (97.32%) were born in or before 1998.
Conclusion: The seropositivity rates for HBsAg and anti-HCV in our region were found to be compatible with other regions. Monitoring changes in regional data and surveillance studies are important for HBV, HCV, and HIV infections and seropositivity rates.
Keywords: Family medicine, childhood vaccination, family physicians, seroprevalence, epidemiology

Öz

Giriş: Viral hepatit ve insan immün yetmezlik virüsü (HIV) enfeksiyonlarının epidemiyolojisi dünya genelinde olduğu gibi ülkemizde de değişmektedir. Bu çalışmada, Ocak 2014-Temmuz 2018 arası dönemde İzmir Menemen Devlet Hastanesi'nde çeşitli polikliniklere başvuran 1-99 yaş aralığındaki bireylerin hepatit B yüzey antijeni (HBsAg), anti-hepatit C virüs (HCV), anti-HIV testi sonuçlarının cinsiyet, yaş ve diğer risk faktörleri (diyaliz hastaları, preoperatif testler, ayaktan tedavi polikliniki leri) ile birlikte değerlendirilmesi amaçlanmıştır.
Gereç ve Yöntem: Mikrobiyoloji laboratuvarında 58.752 serum örneğinde HBsAg, 53.649 serum örneğinde anti-HCV ve 48.162 serum örneğinde anti-HIV düzeyleri, Roche Modular E170 cihazında (Roche Diagnostics GmbH, Penzberg, Germany) HBsAg 2, anti-HCV 2 ve HIV combi PT kitleri kullanılarak araştırılmıştır. Elde edilen sonuçlar retrospektif olarak değerlendirilmiştir.
Bulgular: Hepatit B yüzey antijeni testinde %4,75 (2790/58.752), anti-HCV testinde %0,7 (376/53.649) ve Western blot yöntemi ile doğrulama sonucunda anti-HIV testinde %0,02 (11/48.162) pozitif sonuç bulundu. Hepatit C virüs seropozitifliği saptanan olguların yaş ortalaması, hepatit B virüs (HBV) seropozitif olgulara göre anlamlı olarak daha yüksek (57±10 karşı 41±13) saptandı. Hepatit B yüzey antijeni ve anti-HCV seropozitiflik oranları (%8,7 ve %10) diyaliz birimindeki hastalarda diğer birimlerden anlamlı olarak yüksek bulundu. Hepatit B yüzey antijeni pozitif bireyler arasında, 1999 ve 2007 yılları arasında (1998, HBV aşısının Türkiye'deki rutin aşılama programına eklenme tarihi) doğan kişi sayısı 74 (%2,65) ve

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Öz

2007 sonrasında (İzmir ilinde aile hekimliği uygulamasına geçiş dönemi) doğan kişi sayısı sadece birdi (%0,03). Tüm HBsAg pozitif bireylerin 2715'i (%97,32) 1998 ve daha öncesinde doğmuştu.

Sonuç: Bölgemizdeki HBsAg ve anti-HCV seropozitiflik oranlarının diğer bölgelerle uyumlu olduğu saptanmıştır. Bölgesel verilerdeki değişikliklerin izlenmesi ve sürveyans çalışmaları HBV, HCV ve HIV enfeksiyonları ve seropozitiflik oranları için önem taşımaktadır.

Anahtar Kelimeler: Aile hekimliği, çocukluk çağı aşılaması, aile hekimleri, seroprevalans, epidemiyoloji

Introduction

Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) infections are major health problems in Turkey, as in the rest of the world[1]. Hepatitis B virus and HCV can be transmitted through mucosal contact with infectious blood and body fluids (such as semen, vaginal secretions) as well as by parenteral route and percutaneous route when there is loss of skin integrity[2,3]. In 2016, 29,307 cases of HBV were reported, which represents 5.5 cases for every 100,000 people in the 30 European Union countries[4]. Hepatitis B virus is known to be 100 times more infectious than HIV and 10 times more infectious than HCV[5,6]. There is a possibility of developing chronic conditions In 60-80% of HCV-infected patients. The risk of developing cirrhosis associated with HCV is 15-30% in 20 years[7,8]. Globally, approximately 71 million people are known to have been infected by HCV by 2015 and its seroprevalence ranges between is 0.5-2.3%[9]. The seroprevalence of HCV in Turkey is reported to range between 0.65-2.2%[10,11]. Infection rates can be controlled with knowledge of the routes of transmission and carefully adherence to protection methods.

Human immunodeficiency virus infection is most frequently transmitted through unprotected heterosexual activity, less often by sharing needles for intravenous drug use and unprotected homosexual activity, and even less frequently through blood products and mother-to-child transmission[12]. Globally in 2017, nearly 1.8 million new HIV cases were detected, 36.9 million people were surviving with HIV, and 21.7 million of them were receiving antiretroviral treatment[13]. According to data from the Centers for Disease Control and Prevention (CDC), 940,000 people lost their lives due to AIDS and related diseases in 2017. About 66% of all new HIV infections occur in sub-Saharan Africa. Other regions with significant numbers of HIV/AIDS cases are Asia, the Pacific, Latin America, the Caribbean, Eastern Europe, and Central Asia[14]. According to data from the Venereal Diseases Unit of the Institute of Public Health, Department of Infectious Diseases of the Turkish Ministry of Health, there were a total of 14,695 HIV/AIDS cases in Turkey between 1985 and 2016[15]. When HIV/AIDS cases are analysed according to routes of transmission, they were reported to result from heterosexual intercourse in 36.5%, intravenous drug use in 1.5%, mother-to-child transmission in 0.9%, and unknown causes in 46.7% of cases[16].

The objective of this study was to evaluate the hepatitis B surface antigen (HBsAg), anti-HCV, and anti-HIV serology results in patients presenting to several outpatient clinics of our hospital for various reasons over a five-year period.

Materials and Methods

This cross-sectional study included patients with 1-99 years of age that presented to several outpatient clinics of the İzmir Menemen State Hospital between January 1st, 2014 and July 31st, 2018. HBsAg, anti-HCV, and anti-HIV assays were performed in microbiology laboratories with HBsAg 2 Elecsys and cobas e analyzers, anti-HCV 2 Elecsys and cobas e analyzers, and HIV combi PT kits in an automated Roche device (Roche Diagnostics GmbH, Penzberg, Germany) operating with the chemiluminescence immunoassay method. Only the initial results from each patient were included in the study. HBsAg and anti-HCV values over the reference ranges were considered to be positive results. Positive anti-HIV tests were confirmed by sending a serum sample to the Department of Infectious Diseases in the İzmir Public Health Laboratory to be tested by immunoblot assay, in accordance with procedures in the Laboratory Diagnosis Guideline of the Ministry of Health. Approval for the study was obtained from the Ethics Committee of the İzmir Katip Çelebi University Faculty of Medicine (decree no: 2018/308).

Statistical Analysis

SPSS 22.0 package program (Chicago, IL, USA). Pearson chi-square test was used for statistical evaluation and $p<0.05$ was considered to be significant.

Results

A total of 58,752 serum samples tested for HBsAg, 53,649 samples tested for anti-HCV, and 48,162 samples tested for anti-HIV from patients presenting to our hospital during the study period were included in our analysis.

HBsAg test was positive in 4.75% (2,790/58,752) of the samples (Table 1). Of the sera tested for HBsAg, 28,693

(48.8%) were from female patients and 30,059 (51.2%) were from males. The mean age of the seropositive patients was 41±13 years and 55.7% were male. There was a significantly higher rate of HBsAg seropositivity among males (p<0.05). Of the HBsAg-positive individuals, 74 (2.65%) were born between 1999 and 2007 (the HBV vaccine was added to the routine vaccination program in Turkey in 1998) and only one (0.03%) was born after 2007 (the year that family medicine practice was implemented in the İzmir province). The other 2,715 (97.32%) HBsAg-positive individuals were born in or before 1998.

Anti-HCV test was positive in 0.7% (376/53,649) of the samples (Table 1). Of the sera tested for anti-HCV antibody, 26,280 (49%) were from females and 27,369 (51%) were from males. There was no significant difference in HCV seroprevalence according to gender (p>0.05).

Human immunodeficiency virus positivity was detected in 0.02% (11/48,162) of the tested samples (Table 1). Of the sera tested for HIV, 23,418 (48.6%) were from females and 24,744 (51.4%) were from males, and anti-HIV test was positive for 14 of the samples. Western blot confirmation was positive in 11 of those patients, 10 (90.9%) of whom were male (p<0.001) (Table 1). The mean age of HIV seropositive patients was 32±5 years. According to the patients' reports, HIV was likely contracted through unprotected heterosexual intercourse.

In terms of risk factors and outpatient clinics to which the patients applied, 61.6% (33,047) of the patients presented for preoperative examination, 4.7% (2,521) were dialysis patients, 9.6% (5,151) presented to the infectious diseases department, and 24.1% (12,930) presented to other internal outpatient clinics (Table 2). HBsAg and anti-HCV seropositivity rates were higher in dialysis patients than in other groups (8.7% and 10%, respectively) (p<0.05), while older age was a significant factor in anti-HCV seropositivity (p<0.05).

Discussion

The number of HBV, HCV, and HIV-seropositive individuals diagnosed in general health check-ups or at presentation to hospitals for various reasons is too high to undervalue[17]. A study investigating the prevalence of chronic HBV and HCV infection in European Union general population determined HBV and HCV positivity rates of 0.1-4.4% and 0.1-5.9%, respectively, in 13 countries[18,19]. Numerically, these rates corresponded to 4.7 million HBV and 5.6 million HCV patients. Comparison with other parts of the world showed that prevalence rates were lower in European countries. In a meta-analysis of numerous studies including HBsAg and anti-HCV antibody tests in 34 European cities, HBsAg prevalence was reported range between 0.1-5.6% and anti-HCV antibody prevalence between 0.4-5.2% in the general population[20]. Intravenous drug addicts, immigrants, and homosexual men were identified as risk groups with high prevalence in European countries.

The World Health Organization (WHO) estimates that 270 million people carry HCV worldwide, 94 million of whom are in Asia and 22 million are in America and Europe[21]. In a study analysing the prevalence of HCV in a population of Asian descent living in America, a statistically significant difference was noted between the 5.5% prevalence in the Asian population living in North California compared to the 2.3% prevalence in the rest of the population[22]. The prevalence was highest among those of Vietnamese (7.9%) and Chinese (6%) origin. The need for regular screening in the immigrant population was emphasized. Although there are regions in Africa with high HCV prevalence, rates of HBV, HCV, and HIV seroprevalence were determined

Table 1. Distribution of seropositivity rates by gender and years

Year	HBsAg positive n (%)		HBsAg negative n (%)		Anti-HCV positive n (%)		Anti-HCV negative n (%)		Anti-HIV positive n (%)		Anti-HIV negative n (%)	
	F	M	F	M	F	M	F	M	F	M	F	M
2014	217	240	5332	5127	25	30	4459	4570		-	3375	4232
2015	269	297	6289	5585	31	36	5696	5328		-	4964	4545
2016	294	345	6308	6034	41	39	6265	5927	1	2	5816	5505
2017	264	438	5920	6903	51	44	6020	6578		1	5785	6108
2018	192	234	3608	4856	32	47	3660	4770		7	3478	4343
Total	1236	1554	27457	28505	180	196	26100	27173		10	23418	24733
	2790 (4.75)		55962 (95.25)		376 (0.7)		53273 (99.3)		11 (0.02)		48151 (99.98)	

F: Female, M: Male, HBsAg: Hepatitis B surface antigen, HCV: Hepatitis C virus, HIV: Human immunodeficiency virus

Table 2. Distribution of patients according to presenting department

	Preoperative examination	Internal outpatient clinics	Infectious diseases	Dialysis
Number of patients, n (%)	33047 (61.6)	12930 (24.1)	5151 (9.6)	2521 (4.7)

to be 2.0%, 0.7%, and 0.3%, respectively, in a study screening 60,236 volunteer blood donors in Eritrea[23]. That study covered the years 2010-2016 and a statistically significant increase was noted in the prevalence of HCV in 2016. Similarly, according to screening test results of blood donors in 2005-2013, there was a notable increase in the incidence of HCV despite statistical decreases in the incidence of HIV and HBV[24]. In a screening study of 16,602 volunteer blood donors in Pakistan, rates of HBV, HCV, and HIV seropositivity were reported as 1.84%, 1.7%, and 0.04%, respectively[25]. In Europe, 29.5% of HBV-positive patients were reported to be in between 25-34 years of age[26]. In addition, 11% of those with acute and 12.3% of those with chronic HBV infection were under the age of 25. The male/female ratio was 1.7/1. The most common routes of transmission in acute cases were ranked as heterosexual activity in 30%, nosocomial transmission in 17%, homosexual activity in 12%, and intravenous drug use in 10%. The leading sources of chronic infection were nosocomial transmission in 33% and mother-to-child transmission in 32% of the cases. A decrease was observed in acute HBV infections. For HCV, 52% of infected Europeans were between 25-44 years of age[26]. The male/female ratio was 1.9/1. Intravenous drug use and nosocomial transmission were the most common routes of transmission.

According to WHO, Turkey is a moderately endemic region for HBV and a low endemic region for HCV[27]. Epidemiological seroprevalence studies report a rate of 2-7% for HBsAg in Turkey. Tozun et al.[28] examined 5,460 participants in a study based on populations including both rural and urban areas from 23 different cities. The average age in the study population was 41 years and 51% were female. General HBsAg positivity was 4% and 59% of positive individuals were male, with higher prevalence reported in the eastern parts of Turkey. Our findings are consistent with their results. In another study conducted in our region, Uzun et al.[29] reported 6.5% positivity in HBsAg test, 1.3% in anti-HCV test, and 0.04% in anti-HIV test. These rates were slightly higher than those in our study. In another Turkish study including a large study sample, Avcıküçük et al.[30] determined rates of HBsAg, anti-HCV, and anti-HIV positivity as 2.21%, 0.56%, and 0.0008%. As for the distributions of seropositivity rates according to sex, females accounted for 39.42% of HBsAg-positive and 53.48% of anti-HCV-positive subjects. The seropositivity rates in their study were lower than those in our study. Considering data reported by Çetinkol from the Kars region, HBsAg positivity was detected in 4.6%, anti-HCV in 1.5%, and anti-HIV in 0.009% of the subjects[31]. In a study carried out in Balıkesir, seropositivity was 2.77% for HBsAg, 0.29% for anti-HCV, and 0.004% for anti-HIV[32]. In HBsAg, anti-HCV, and anti-HIV tests conducted in Artvin, seropositivity was detected in 3.96%, 0.85%, and 0.05% of the population, respectively[33]. HBsAg seropositivity rates reported from cities in southeastern Turkey are higher than in other regions. Positivity rates for HBsAg and anti-HCV were reported as 10% and 0.62% in Siirt and 12.6% and 1.9% in Batman, respectively[34,35].

Universal vaccination programs significantly decreased the HBV infection rate among all age groups born since the program was initiated. The effectiveness of the vaccination program has been demonstrated in various studies that have reported a decrease in the HBsAg carrier rate, incidence of chronic HBV infection, and rates of mother-to-child transmission[36-38]. A study assessing the long-term efficacy of HBV vaccination based on seroprevalence and an age-period-cohort model of HBV seromarkers in Taiwan showed that the HBsAg positivity rate among university students decreased from 9.7% among those born before June 1974 to <1.0% in those born after 1992[38]. A retrospective cohort study showed that the HBV incidence was 2.5 per 100,000 persons in 1991 and 1.2 per 100,000 persons in 2014, a reduction of 52% in vaccinated cohorts[39]. In Turkey, the HBV vaccine was added to the routine immunization program in 1998. Therefore, the rates of HBsAg positivity differ in individuals born before and after 1998[40]. The seropositivity rate of HBsAg among persons younger than 12 years of age was 0.03% in our study. This finding shows that universal infant HBV immunization has a substantial impact on immunity in children.

The limitations of our study are that the data set we obtained was hospital-based and the study population was not randomly selected.

Conclusion

HBV, HCV, and HIV are viral pathogens that require diligent surveillance due to their tendency to cause chronic disease. Seropositive individuals should be identified as early as possible to prevent further spread of these infections in the population. Follow-up and surveillance studies of temporal differences in regional data are important.

Ethics

Ethics Committee Approval: Approval for the study was obtained from the Ethics Committee of the İzmir Katip Çelebi University Faculty of Medicine (decree no: 2018/308).

Informed Consent: Retrospective cohort study.

Peer-review: Externally and internally peer-reviewed.

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