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Research Article

HBsAg Seroprevalance and Affecting Factors in Patients Attending Emergency Department

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Abstract

Aim: To determine the seroprevalence of HBsAg in the emergency unit while determining risk for transmission and associated sociodemographics.

Method: In this study, we accessed the records of 693 patients with various complaints, who had their HBsAg checked in the emergency department, retrospectively. Binominal logistic regression and chi-square test was used for data analysis to determine predictors of HBsAg seropositivity.

Results: Of the total 693 patients, 57.3% (n=397) of the patients were male and the mean age was 53.8±21.6 (4-99). 58.6% (n=405) of the patients lived in the urban area while 95.5% (n=662) had health insurance. 41.1% (n=288) of the admitted patients had at least one chronic disease. The HBsAg seroprevalence of those included in the study was 3.3%. The highest prevalence of HBsAg seropositivity was recorded in the 41-60 age group with a rate of 5.2%. Anti-HBs seroprevalence was 44.6% (n=311), Anti-HCV seroprevalence was 0.6% (n=4) and Anti-HIV was 0.3% (n=3). Lower Anti-HBs was found as a significant risk factor for Hepatitis B infection (p=0.003), patients who had non-protective Anti-HBs levels were at tenfold risk of contracting Hepatitis B compared to their Anti-HBs positive counterparts.

Conclusion: The prevalence of hepatitis B in our study was at an intermediate epidemic level. Testing at every opportunity even in the emergency service is a suitable strategy for the prevention and control of hepatitis B. The findings are similar to other available data in our region. We suggest that low Anti-HBs level is the most significant risk factor for HBsAg seropositivity. More expanded and comprehensive studies should be carried in the whole population.

Introduction

Liver infection caused by Hepatitis B Virus (HBV) is a common disease in our country and in the world, which increases mortality and morbidity [1,2]. The World Health Organization (WHO) reported that 300 million people in the world had chronic Hepatitis B infection and 1.34 million people died from complications related to liver cancer, cirrhosis and chronic hepatitis in 2015 [3,4]. In terms of hepatitis B, seroprevalence is defined as high (more than 8%), moderate (2-8%), and low (less than 2%) [5]. Turkey is considered as a moderately endemic region with a 4% prevalence of HBsAg positivity, and 3.3 million people had chronic hepatitis between 2008-2011 [6]. According to the USPSTF, it is recommended to carry out hepatitis B screening in areas with prevalence more than 3%, in health delivery settings such as the primary care, outpatient clinics including emergency services [7]. Emergency services in our country happen to be the first place of application for acute ailments. In Turkey, there is no efficient referral system and patients can attend to all kind of healthcare facilities, but they have to wait according to the number of applied patients. As they can easily be accepted in a few minutes, patients prefer emergency departments even for their chronic conditions. Our emergency department serves to about a 1.5 million-population. In fact, it serves patients from all parts of the society, in this vein HBsAg seroprevalence in patients admitted to emergency department could be an important indicator in terms of reflecting the HBsAg prevalence of the population. The aim of this study is to evaluate the patients who applied to Emergency Department of Aydın Adnan Menderes University Hospital, by screening for viral hepatitis while revealing the relationship between HBsAg seroprevalence and affecting factors. Our second aim was to reflect the seroprevalence of our society in order to guide family physicians and emergency care specialists who play active roles in the care of patients from all parts of the society including the emergency ward.

Materials and Method

Our study was conducted by examining the records of all patients who had applied to the Emergency Department of Adnan Menderes University Hospital between 01.01.2019-01.01.2020 for various reasons and had their HBsAg checked. This hospital serves to approximately one and a half million population. The data consisting the demographic characteristics of the patients (age, gender, health insurance, residence), reason for coming to the emergency department, laboratory parameters of the patient (ALT, AST, HBsAg, Anti-HBs, Anti-HCV and Anti-HIV), current hepatitis status of the patient, chronic diseases, whether an operation was performed in the emergency department were determined. Due to the fact that Nationwide Hepatitis B vaccination program was started in Turkey in 1998, date of birth of the patients was taken into account during data analysis. Because of samples studied for HBsAg, Anti-HIV and Anti-HCV are reported as reactive if the value was >1.0, Anti-HBs level of 10 UI/ml and above was accepted as positive. Anti-HBs levels of the patients were categorized



as <10 and ≥10. Dependent variables of the study was HBsAg seropositivity status of patients attending to the emergency department while the independent variables of the study were gender, age, place of residence, having a chronic disease, HCV and HIV infection, emergency operation, Anti-HBs level, being a healthcare worker, and being born before 1998. This study was approved by the Ethical Council of the School (Date: 21.12.2020, Nr:66393). Frequency, standard deviation, mean and percentage distributions were used in descriptive statistical methods. Chi-square test was used to compare categorical variables. Binominal logistic analysis was used to identify potential influencing factors associated with hepatitis B infection. In all parameters, p<0.05 was considered as statistically significant.

Results

The total number of 693 patients, whose HBsAg markers were checked, were included in the study, 57.3% (n=397) of the patients were male and the mean age was 53.8±21.6 (4-99). 58.6% (n=405) of the patients lived in the urban area while 95.5% (n=662) had health insurance. 41.1% (n=288) of the admitted patients had at least one chronic disease mostly hypertension and diabetes mellitus, with a prevalence of 14% and 11.4%, respectively. The HBsAg seroprevalence of those included in the study was 3.3%. The highest prevalence of HBsAg seropositivity was recorded in the 41-60 age group with a rate of 5.2%. Anti-HBs seroprevalence was 44.6% (n=311), Anti-HCV seroprevalence was 0.6% (n=4) and Anti-HIV was 0.3% (n=3). When their immune status was evaluated, it was found that 51% (n=346) of the patients did not have any protection against HBV, and 45% (n=309) had protection against HBV (through vaccination or having the disease). Inactive carrier state, acute or chronic HBV infection was present in 4% (n=21) of the patients. Atypical serology was found in two male patients with simultaneous HBsAg and Anti-HBs positivity. No significant correlation was found between HBsAg positivity and independent variables such as age, gender and place of residence. In the binominal logistic regression analysis, lower Anti-HBs was a significant risk factor for Hepatitis B infection (p=0.003). The patients who had non-protective Anti-HBs levels were found to have 10 times increased risk for Hepatitis B than their immunopositive counterparts. The mortality rate was 7 times higher in HBsAg positive individuals compared to negative patients (p=0.000). In our study, no patients with HCV or HIV co-infection with HBV were found. Patients born before 1998 had higher levels of Anti-HBs (67%) and no case of Hepatitis B positivity compared to individuals born after 1998 with 44% Anti-HBs and HBsAg seroprevalence of 3.5%. The difference was statistically significant (p=0.000).

Table 1: Factors affecting HBsAg positivity

Table with 5 columns: Total number of patients=693, HBsAg positive (n), HBsAg negative (n), Odds Ratio (%95 CI), P-value. Rows include Age, Sex, Place of abode, Being a health worker, Low levels of Anti-HBs (<10 IU/mL), HIV or HCV infection, History of Emergency procedure/operation, History of chronic disease.

Table with 6 columns: Born before 1998, Yes, No, Death as an outcome within one year of admission, Yes, No. Values include counts and percentages.

Table 2: Comparison of HBsAg and Anti-HBs seroprevalence with some demographic characteristics.

Table with 7 columns: Demographic characteristics, HBsAg n=693 (Positive s (%), Negative s (%)), p-value, Anti-HBs n=678 (Positive s (%), Negative s (%)), p-value. Rows include Sex, Age, Health insurance, Place of abode, Presence of Liver disease, History of Chronic disease, Health Care Worker, History of operation in the emergency service, Born before 1998.

Discussion

The HBsAg seroprevalence of patients was 3.3% in our study. Interestingly, sociodemographic factors such as age sex, place of abode, being a health care worker, HIV/HCV coinfection, presence of chronic diseases and having an operation in the emergency room were not predictors of HBsAg seroprevalence. Patients with low Anti-HBs were at 10 times more risk for HBsAg positivity. When the HBsAg seroprevalence differs in various regions of Turkey [8,9]. According to a systematic review of 339 articles evaluated by Toy et al, the seroprevalence of HBsAg in Turkey is estimated in between 4-5% [10]. Geographically, the HBsAg seroprevalence in Turkey varies, while it is 8% higher in the east, it has been reported to be approximately 3-4% in the west. The results of different epidemiological studies show that HBsAg seropositivity has an increasing trend from West to East [8-11]. The seroprevalence of HBsAg in this study

was similar to those in the Western part of the country, but lower than the average reported in Turkey. Looking at the distribution of HBsAg seroprevalence across the age group it was striking to note that patients less than 20 years of age had the lowest prevalence rate. No positive case was seen. The reason behind this observation might be due to higher rate of vaccination in the pediatric populace as supported by data from the Turkish Ministry of Health corroborating a vaccination rate of more than 70% over the last decade in the country [6,12,13]. On the contrary, the highest rate of HBsAg positivity was found in middle and advanced age groups. The highest HBsAg positive individuals were between the ages of 41-80. In literature, being over 50-year-age is considered as a risk factor for HBsAg seropositivity [14]. It suggests that horizontal transmission is more important in Turkey and transmission mostly occurs in adulthood. For this reason, practices that will prevent HBV transmission by raising awareness about the disease in the population in this age group and evaluating individuals in this age group for vaccination may be beneficial for public health. In our study, only a low Anti-HBs level was found to be a significant risk factor. Considering the results of a study by Tesfa et al. in Ethiopia, the risk of hepatitis B infection in individuals with lower Anti-HBs levels was as twice as high, while it increased tenfold in ours [15]. This finding supports Anti-HBs protection against HBV infection supporting the importance of vaccination. A high level of Anti-HBs in the community is an indicator of protection against HBV [16]. Anti-HBs seroprevalence is between 10.1% and 46.1% in Turkey [17,18]. In our study, Anti-HBs was positive in approximately half of the evaluated patients. This rate is similar to the data in our country. When the Anti-HBs result was evaluated according to gender, the positivity rate seemed to be significantly lower in women. Contrary to our study, in a study by Andrea et al. in Italy, it is higher in women [19]. Likewise, the highest Anti-HBs rate was in the 21-40 age group with a rate of 2/3, the period in which the protection was highest. The lowest level of protection was found in over-80 year-old group with a rate of approximately 1/3. The decrease in the level of Anti-HBs with the increasing age of the patients can be explained by the gradual decrease in the effectiveness of the vaccine after 15 years [20]. At the same time, factors that increase with age, such as obesity, smoking, and chronic disease, may cause a lower immune response [21]. In addition, Anti-HBs was positive in 2/3 of those born after 1998, while this rate was 41.6% in born-before 1998 group, and this difference was statistically significant. The result of a study conducted by Kaya et al. was found similar [22]. As the hepatitis-B vaccine has been included in the routine vaccination calendar in Turkey after 1998 and the seroprevalence rate of the group is 0%, being born after 1998 is considered a protective factor against hepatitis B. Thus, it can be said that a successful policy is carried out regarding the effectiveness of the vaccine by detecting high Anti-HBs levels and low HBsAg seroprevalence in the pediatric and young adult age group [23]. Anti-HBs negativity is generally observed in individuals who have not been vaccinated or have not been exposed to HBV.

Anti-HBs negative cases were evaluated as patients without protection against HBV. Anti-HBs (-) were found in half of the patients in our study. Most of them were found as both negative for Anti-HBs and HBsAg. Since this group has a risk of infection with HBV, they should be offered and evaluated for vaccination. For this reason, it is seen that the benefit to be provided by vaccination in terms of protection from the disease is still at significant levels. In our study, we found two cases (0.3%) in which HBsAg and Anti-HBs were found to be positive simultaneously. In a recent study by Aydin et al., a higher, a higher prevalence of 3.6% was reported compared to our result [24]. While some authorities do not attach any clinical significance to this profile, many factors can explain the co-positivity of HBsAg and Anti-HBs. For instance, it is common in patients with HIV, DM, and COPD, in cases where the immune response is decreased [25]. In addition, this situation can be seen in patients with HBV Pre-S deletion mutation due to liver fibrosis. This profile can also be seen in individuals who have problems with the HBV virus elimination and clearance, in patients at the seroconversion stage, and in patients with chronic hepatitis B [26-28]. The patients included in the study were also evaluated in terms of HIV and HCV seroprevalence. A prevalence of 0.4% and 0.6% was found respectively. The results in this study were similar to the results of studies conducted in different regions of Turkey focusing on HIV and HCV. Anti-HCV seroprevalence in Turkey varies between 0.1% and 1.5% [29,30]. In a study conducted by Thomas et al. in 2019, Anti-HCV was found to be similar at a rate of 0.6% [31]. Patients with HT had comparatively higher rate of HBsAg positivity in our study. Despite of lack of adequate studies substantiating this, results obtained from the study by Zhou et al., in which patients with chronic hepatitis were evaluated, suggested the patients with hepatitis B were more prone to metabolic syndrome and were at higher risk, especially for cardiovascular events [32,33]. It is thought that it may be important to evaluate patients with CHB infection, especially those over 40 years of age, in terms of cardiovascular events, given the high risk of MS. In addition, the mortality rate was 7 times higher in the HBsAg-positive patient group than in HBsAg-negative patients. This result was similar to the literature. For example, in a cohort study conducted by Gui et al, the mortality of hepatitis B patients was 4.5 times higher than that of the gen-

eral population [34]. The strengths of this study are the inclusion of all patients checked for HBsAg who applied to our emergency department. This study can contribute and complement other research conducted in other settings. It does provide information about the population that may be affected, as the participants in the study represent adult age groups in comparable proportions of both sexes. It may be a limitation that our study is depending on only records, so the analyses included the information in the records. Although, we don't have the vaccination information, as it was initiated in 1998, we can assume the vaccination is very high in young patients. Prospective studies can be conducted in order to see the vaccination rates, etc. Despite these limitations, our study should be considered as a pioneering study, which can give an idea of the situation in society. Further prospective, population-based studies should be held in order to define the actual situation. In summary, with a HBsAg seroprevalence which correlates to intermediate endemicity, low Anti-HBs proves to be the sole significant risk factor for HBV transmission. More so, being born after 1998 was significantly associated with higher positive rate for Anti-HBs with higher immunity against HBV further strengthening the notion of a successful vaccination policy implementation in our region.

Conclusion

The prevalence of hepatitis B is at an intermediate epidemic level, in our study. Testing at every opportunity even in the emergency service is a suitable strategy for the prevention and control of hepatitis B. As the lowest positivity was observed in the 0-20 age group, the vaccination policy against hepatitis B can be considered successful in our region. Low levels of Anti-HBs increase the risk of HBV infection 10 times. As the highest HBsAg seroprevalence was detected in late adulthood, evaluation in terms of HBV positivity and hepatitis B vaccination of seronegative individuals will decrease transmission and mortality attributed to HBV considerably. More so, the mortality rate was found to be higher in HBsAg positive patients in our study. In this respect, HBsAg positive patients with other comorbidities should be followed closely and evaluated in terms of drug therapy and management. Finally, as the horizontal transmission is seemingly at the forefront for the high HBsAg seroprevalence observed in the middle age group, vaccination against HBsAg should be given more importance. This study in the emergency department is a pioneering study and we suggest that more expanded and comprehensive studies should be carried out in emergency service in order to understand the risk of Hepatitis B infection while further strengthening preventive measures against the disease.

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