Research Article

Doi: 10.4274/vhd.25238
Viral Hepatitis Journal 2015; 21(3): 72-75

Seroprevalence Rates of Hepatitis A Virus in Different Age Groups in the Province of Kırşehir and a Review of the Literature

Kırşehir Bölgesinde Farklı Yaş Gruplarında Hepatit A Virüs Seroprevalans Oranları ve Literatürün Değerlendirilmesi

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ABSTRACT

Objective: Hepatitis A is one of the most common infectious diseases in the world. The prevalence of hepatitis A virus (HAV) infection correlates with the economic development of a region due to the transmission by fecal-oral route. In this study, we aimed to determine the seroprevalence of hepatitis A among patients of different age groups admitted to a training and research hospital.

Materials and Methods: During the study period, January 2009-June 2013, serum samples of patients admitted to Ahi Evran University Research and Training Hospital were tested for anti-HAV IgM and IgG antibodies by the chemiluminescent microparticle immunoassay using Cobas 6000 (Roche, Germany) analyzer. The patients were divided into the age groups: 0-5, 6-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, and 71 years and over. The statistical analysis was performed using SPSS 15.0 software and a p value of less than 0.05 was considered statistically significant.

Results: Anti-HAV IgM and anti-HAV IgG positivity rates were 0.5% and 87.3%, respectively. The highest anti-HAV IgM positivity was detected in the 41-50 age group and the lowest in the 0-5 and 11-20 age groups. The highest anti-HAV IgG positivity rate was observed in patients 0-5 years of age (99.7%) and lowest in those 11-30 years of age (61%). Anti-HAV IgM positivity rate was highest in August, September and December.

Conclusion: In this study, the prevalence of HAV infection was found to be similar to that in previous studies performed in our country. It is clear that implementation of vaccination programs as well as improving sanitation practices are essential for decreasing the prevalence of the infection.

Keywords: Hepatitis A virus, IgM, IgG, seroprevalence

ÖZ

Amaç: Hepatit A dünyada en sık izlenen enfeksiyon hastalıklarındandır. Bulaş fekal-oral yol ile olması nedeniyle hepatit A virüs (HAV) enfeksiyonu prevalansı bölgenin ekonomik gelişimi ile paraleldir. Bu çalışmada, eğitim ve araştırma hastanemize başvuran farklı yaş gruplarından hastalarda hepatit A seroprevalansının saptanması amaçlanmıştır.

Gereç ve Yöntemler: Ocak 2009-Haziran 2013 yılları arasında Ahi Evran Üniversitesi Eğitim ve Araştırma Hastanesi'ne başvuran hastaların serum örneklerinde Cobas 6000 (Roche, Germany) cihazı kullanılarak kemiluminesans mikropartikül immünoassay metodu ile anti-HAV IgM ve IgG antikorları incelendi. Hastalar 0-5, 6-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, ve 71 yaş üzeri olarak sınıflandırıldı ve değerlendirildi. İstatistiksel analiz SPSS 15.0 software kullanılarak yapıldı ve p değeri <0,05 altında ise anlamlı olarak kabul edildi.

Bulgular: Anti-HAV IgM ve anti-HAV IgG pozitifliği sırasıyla %0,5 ve %87,3 idi. Anti-HAV IgM pozitifliği en yüksek 41-50 yaş grubunda, en düşük 0-5 ve 11-20 yaş grubunda belirlendi. Anti-HAV IgG pozitifliği ise en yüksek 0-5 yaş grubunda (%99,7), en düşük 11-30 yaş grubunda (%61) izlendi. Anti-HAV IgM pozitifliğine en sık Ağustos, Eylül ve Aralık ayında rastlandı.

Sonuç: Bu çalışmada HAV prevalansı ülkemizde yapılan diğer çalışmalarla benzer bulunmuştur. HAV enfeksiyon prevalansının azaltılmasında aşılama programlarının yanı sıra sanitasyon uygulamalarının iyileştirilmesi gereklidir.

Anahtar Kelimeler: Hepatit A virüs, IgM, IgG, seroprevalans

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Phone: +90 386 213 45 15 E-mail: drtulin@yahoo.com **Received:** *14.06.2015* **Accepted:** *18.08.2015*
Viral Hepatitis Journal, published by Galenos Publishing.

Introduction

Hepatitis A virus (HAV) is a nonenveloped single-stranded ribonucleic acid (RNA) virus causing a common infectious disease especially in developing countries. The risk of HAV infection is associated with unsafe water, poor sanitation and personal hygiene. Transmission occurs by the faecal-oral route, direct contact with an infected person, ingestion of contaminated food or water and, after exposure to contaminated blood or blood products. The incubation period is usually 14-28 days. Acute infection shows different clinical courses ranging from asymptomatic infection to fulminant disease with the common symptoms and signs including fever, malaise, diarrhea, nausea and jaundice, but does not cause chronic liver disease. Infected children under six years of age are generally asymptomatic and the severity of the disease and the mortality rate increases in older age groups. The diagnosis of hepatitis A is based on demonstration of specific antibodies against HAV using enzyme-linked immunosorbent assay (ELISA). An increase in the levels of transaminases is also detected during the infection (1,2,3,4).

An estimated 1.4 million new cases of HAV infection emerge worldwide each year (3). The prevalence varies according to the geographic location, age and socioeconomic status of the patients (5). Turkey is classified among the countries with moderate endemicity with the reported prevalence rate for anti-HAV IgG between 89% and 100%. In this study, we aimed to determine the incidence of acute hepatitis A infection and seroprevalance rate of IgG in Kırşehir within a period of five years and to create the first epidemiological data source for this city.

Materials and Methods

We retrospectively analyzed the records of patients whose serum samples were evaluated (age range: 3-97 years) for the presence of anti-HAV IgM and IgG antibodies in our laboratory at Ahi Evran University Research and Training Hospital, in Kırşehir, Turkey between January 2009 and July 2013. The blood samples were examined by the chemiluminescent microparticle immunoassay (CMIA) using Cobas 6000 (Roche Modular Analytics, Germany) analyzer for anti-HAV IgM and IgG antibody screening. A total of 29081 serum samples were investigated for anti-HAV IgM and 33012 for anti-HAV IgG. The patients were classified into seven age groups; 0-5, 6-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, and 71 years and over. The statistical analysis was performed using SPSS 15.0 software and a p value of <0.05 was considered statistically significant.

Results

During the study period, of the 29081 patient sera tested for anti-HAV IgM, 44 (0.15%) were positive. Anti-HAV IgG antibody was analyzed in 33012 patients of whom 28837 were positive displaying the seropositivity rate of 87.3%. Evaluation of anti-HAV IgG seropositivity according to the age groups revealed that anti-HAV IgG seropositivity among patient of age groups of 0-5, 6-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, and >71 years were 99.7%, 91.2%, 61.2%, 61.4%, 91.9%, 97%, 97.8%, 98.6% and 98.1%, respectively. IgM antibody positivity was highest in 41-50 age group and lowest among 0-5 and 11-20 age groups with the rates of 29.5% and 2.3%, respectively (Figure 1). Changes in the seropositivity rate of anti-HAV IgM and IgG during years are shown on Figure 2. Anti-HAV IgM was positive in 24 (1.2%) male and 20 (0.9%) female patients and no statistically significant relationship was detected between gender and IgM positivity (p>0.05). Evaluation of the seasonal distribution of the acute HAV cases showed that the infection was more common in August (11.3%), September (13.6%) and December (13.6%), and was least frequent in February (2.3%) (Figure 3).

Discussion

HAV infection is one of the most common infectious diseases in the world. Turkey is classified in the moderate endemicity group for HAV infection and the seroprevalence varies by geographic regions and socioeconomical conditions (1,3,4,6).

In this study, anti-HAV IgG and IgM seropositivity in patients admitted to a tertiary hospital during the last five years were evaluated. Anti-HAV IgG and IgM seropositivity was 87.8% and 0.15%, respectively. Minimal variations were detected both for

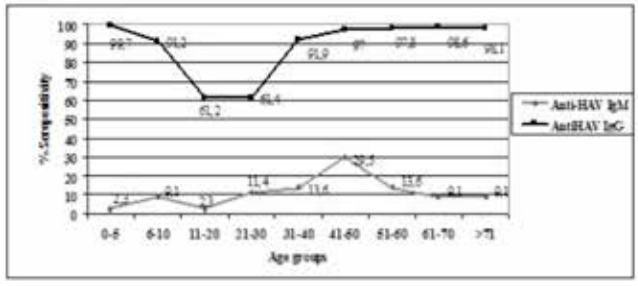

Figure 1. Distribution of the anti-HAV IgG and IgM positivity rate by age groups

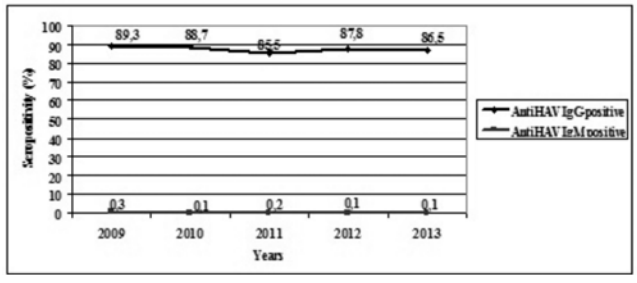

Figure 2. Alteration of seropositivity rate of anti-HAV IgM and IgG during the study years, 2009-2013

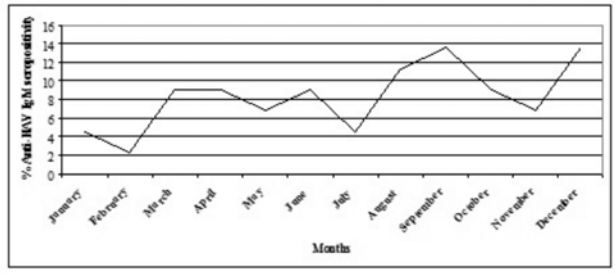

Figure 3. Distribution of anti-HAV IgM positivity rates by months

seropositivity of anti-HAV IgM and IgG during the five years. While HAV IgG positivity rate was 89.3% in 2009, a slight decline to 85.5% in 2011 and a minimal increase to 87.8% in 2012 were observed.

HAV IgM seroprevalence rates vary according to the geographic region, sanitation condition and socioeconomic status with the highest rates in South Asia. Similarly, variation in the prevalence was observed in Turkey, especially according to the geographic regions with the Eastern part at a greater risk for the infection development compared to the Western parts. In studies conducted in Turkey, anti-HAV IgM prevalence was found to be 0.5% in İzmir, (6) 2.6-15.1% in Van, (7) 18.1% in Iğdır, (8) and 2.8% in Konya (9). In this study, a lower anti-HAV IgM positivity rate was observed in our country compared to that in the previous studies and the rate was found to decreased from 0.3% in 2009 to 0.1% in 2013. It was observed that IgM antibody positivity rate was higher in the age group of 41-50 years inconsistent with the above mentioned literature information. Any statistically significant relationship was not detected between IgM positivity rate and age group or study year ($p>0.05$). This could be explained by the high rate of the mild clinical course of the infection that rarely requires medical treatment in our province.

Evaluation of the IgG seropositivity according to the age groups showed that the highest IgG seropositivity was observed in the age group of 0-5, followed by the group of 31-40 years. The most susceptible patient group was 11-30 with the positivity rate of 61%. According to the World Health Organization, (3) acute infection is more common in childhood in developing countries and in advanced age in developed countries. Patient acquires the infection in young adulthood rather than in early childhood as shown in our study, probably due to the improvement of socioeconomic status. However, several reports as well as with our results indicate that the infection in developing countries could be seen in a wide range of ages, both in childhood and advanced age (10). Commonly, it is believed that HAV IgG seropositivity rate associates with increasing age. It could be stated that the seropositivity is lower in the provinces located in the Western parts of our country (Table 1).

Seasonal variation in the infection prevalence was detected mostly in autumn and winter months (8). Similarly, most cases were detected in September and December. Seropositivity rate generally shows no difference between genders (6,11,12). It has been reported that gender was not associated with infection seroprevalence, but there have been some studies reporting that male patients had more risk for infection. In this study, the seropositivity rate was similar in both sex and no statistically significant relationship between seropositivity rate and gender was observed.

Table 1. Hepatitis A virus IgG seroprevalence studies conducted in Turkey

Study (Reference)		Study period	% Anti-HAV IgG positivity
Uzun et al. (6)	İzmir	2012	85.2
Parlak et al. (7)	Van	2012-2013	89.9
Arvas et al. (8)	Iğdır	2011	16.1
Kalem et al. (9)	Konya	2005-2009	77
Aşcı et al. (10)	Afyon	2012-2013	69.6
Alıcı et al. (11)	İstanbul	2011-2012	61
Balamtekin et al. (13)	Kayseri	2002-2004	41.5
Bolukbas et al. (14)	Bolu	2013	77.2
This study	Kırşehir	2009-2013	87.3

HAV: Hepatitis A virus

Transmission of HAV among individuals primarily occurs in enclosed spaces, such as daycare centers, schools. Family contact is considered as a risk factor for dissemination and, acute attack rate for HAV has been found to be 10-20% among household contacts (1). In this study, six of 44 acute HAV cases were detected in household members indicating the attack rate of 13.6%.

The Centers for Disease Control and Prevention recommended vaccination for the regions of medium endemicity and scientific evidence shows that two doses of inactive hepatitis A vaccination can provide lifetime protection (3). In Turkey, hepatitis A vaccine has been included in the immunization schedule since October 2012. Turkey has the risk of outbreak of hepatitis A due to the migration from the Eastern to Western parts of Turkey and migration of refugees to our country, consequently, the increase in susceptible young adult population. This is the first study investigating HAV seroprevalence in Kırşehir and it was found that IgG seropositivity rate was similar with that in the nearby cities in our region and IgG seroprevalence was high in all age groups. More comprehensive seroprevalence studies should be conducted to evaluate vaccine efficacy.

Authorship Contributions

Ethics Committee Approval: The study did not need to get Ethics Committee approval, Informed Consent: Consent form was filled out by the participant, Concept: Tülin Demir, Design: Tülin Demir, Data Collection or Processing: Tulin Demir, Meral Turan, Analysis or Interpretation: Tülin Demir, Meral Turan, Literature Search: Tülin Demir, Writing: Tülin Demir, Peer-reiew: External and Internal peer-reviewed, Conflict of Interest: No conflict of interest was declared by the author, Financial Disclosure: The author declared that this study has received no financial support.

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