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Original Article *Özgün Araştırma*

EVALUATION OF HEPATITIS A SEROLOGY IN A TERTIARY CARE HOSPITAL IN ANKARA

Ankara'da Üçüncü Basamak Bir Hastanede Hepatit A Serolojisinin Değerlendirilmesi

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ABSTRACT

Objective: Hepatitis A virus (HAV) is a common cause of acute hepatitis in developing countries. The aim of this study is to investigate the serology of HAV infection in a tertiary care hospital in Ankara, and to review the change of the epidemiology of HAV infection.

Material and Methods: Patients who were tested for anti HAV IgG for any reason other than acute hepatitis during the two years period, between October 1, 2018 and October 1, 2020, and older than 18 years were retrospectively analysed, according to age groups. People younger than 18 and who had immunisation history were excluded. The age and sex of the patients and anti HAV IgG levels were recorded.

Results: The mean age of 3338 participants was 41±17.3 years. One thousand eight hundred eighty-two (56.4%) of the participants were female. Anti HAV IgG was positive in 2551 (76.5%) of them. The lowest positivity was found in the 18-20 age group as 31%. The rate of HAV IgG seropositivity increased by age and it was statistically significant (p=0.0001).

Conclusion: Although hepatitis A vaccine is included in routine vaccination, there is a younger population sensitive to hepatitis A, especially below the age of 30, in our country. We think it would be beneficial to vaccinate adolescents and young adults.

***Keywords**: Hepatitis A, HAV IgG, serology*

ÖZ

Amaç: Hepatit A virüsü (HAV) gelişmekte olan ülkelerde yaygın görülen, akut hepatit etkeni bir virüstür. Bu çalışmanın amacı Ankara'da üçüncü basamak bir hastanede hepatit A serolojisini ve değişen epidemiyolojisini incelemektir.

Gereç ve Yöntemler: 1 Ekim 2018 - 1 Ekim 2020 tarihleri arasında, akut hepatit dışında herhangi bir nedenle anti-HAV IgG testi bakılan hastalardan, 18 yaş ve üstündekiler, yaş gruplarına gore retrospektif olarak incelendi. Hepatit A aşısı olanlar çalışmaya dahil edilmedi. Katılımcıların yaş ve cinsiyetleri ve Anti HAV IgG değerleri kaydedildi.

Bulgular: Çalışmaya alınan 3338 kişinin yaş ortalaması 41±17.3 idi. Katılımcıların 1882'si (%56.4) kadın idi. Katılımcıların 2551'inin (%76.5) Anti HAV IgG testi pozitif idi. En düşük pozitiflik %31 olarak, 18-20 yaş grubunda bulundu. Yaş ilerledikçe HAV IgG pozitiflik oranının arttığı görüldü. Bu istatistiksel olarak da anlamlıydı (P=0,0001).

Sonuç: Hepatit A aşısı rutin aşılamaya girmesine rağmen, ülkemizde, özellikle 30 yaş altında, hepatit A'ya duyarlı bir kesim bulunmaktadır. Adolesan ve genç yetişkinlerin aşılanmasının faydalı olacağını düşünmekteyiz.

***Anahtar Kelimeler**: Hepatit A, HAV IgG, seroloji*

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INTRODUCTION

Hepatitis A virus (HAV) is a common cause of acute hepatitis, especially in developing countries. The illness is transmitted by fecal oral route (1). Every year, 1.4 million hepatitis A infections are seen in the world. Although the disease is self-limiting, in a small group of cases (0.14-0.35%) it can cause fulminant hepatitis and death, especially when seen at an advanced age (2). Symptomatic hepatitis A with or without jaundice has been reported as 50-75% in adults. This rate is 10% in children younger than 5 years old (3). In addition, prolonged hepatitis causes a long stay in the hospital and loss of workforce. The world is divided into high, medium and low endemicity regions in terms of the incidence of hepatitis A infection. While India, Far East, South Africa, South America and Asia are high endemicity regions, our country is among the middle endemicity countries (4, 5).

However, with the improvement of living conditions and socioeconomic status and better water and food sanitation, the number of hepatitis A infection has decreased while the proportion of people vulnerable to HAV has increased. For this reason, in our country hepatitis A vaccine was included in the child vaccination program in 2012. However, there is still a group in the community that can be affected by Hepatitis A in case of an outbreak. Therefore, the prevalence of hepatitis A should be evaluated according to age groups to determine this group. In this study, it was aimed to examine the seroprevalence of HAV according to age groups in the patients who admitted to our hospital.

MATERIALS AND METHODS

A retrospective cohort study was conducted in Infectious Diseases clinic of a teaching hospital with 500 beds in Ankara. Ethics committee approval was obtained (Dr. Abdurrahman Yurtaslan Oncology Hospital Ethics Committe of Clinical Research; date: 13.01.2021, issue number: 2021-01/935). The study was conducted in a period of two years between October 1, 2018 - October 1, 2020. Patients aged ≥18 years who were tested for anti HAV IgG were included. The people younger than 18 years, who had vaccination history or who had acute hepatitis or elevation of liver function tests were excluded.

Statistical Analysis

The data of the patients, like age, sex and anti HAV IgG results were taken from our hospital's computerized medical record system. If the patient was tested more than once, the first test was included. Anti HAV antibodies in serum samples were analyzed with chemiluminescence microparticle immunoassay by Architect 2000 (Abbott Laboratories, Illinois, USA). Samples with anti HAV IgG titer ≥1 S/CO were evaluated as positive and titers <1 S/CO as negative.

RESULTS

The study population included 3338 participants. The median age was 41±17.3 (range:18-97). Anti HAV IgG was positive in 2551 (76.5%) and negative in 787 (23.5%) of participants. The lowest seropositivity was found in the 18-20 age group (31%) and the highest was in people older than 55. It was observed that the rate of HAV IgG positivity increased in parallel with the age group and it was statistically significant. (p=0,0001, Spearman correlation analysis r=-0,558). Anti HAV IgG results according to age groups are given in Table-1. One thousand eight hundred eighty-two (56.4%) of the participants were female and 1456 (43.6%) of them were male. One thousand for hundred and seven (74.8%) of the female participants and 1144 (78.6%) of the males were HAV IgG positive. There was no statistically significant difference between male and female participants in terms of HAV seropositivity. (p>0.05). HAV IgG seropositivity according to age and sex is given in Table 2.

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Table 1. Anti HAV IgG results according to age groups

Age group	HAV Ig G Positive, n (%)	HAV Ig G Negative	Total, n	*p*
18-20	93(31)	207(69)	300	0.0001
21-25	171(40.6)	250(59.4)	421	
26-30	186(54.5)	155(45.4)	341	
31-35	218(739)	77(26.1)	295	
36-40	337(86.2)	54(13.8)	391	
41-45	333(94)	21(6)	354	
46-50	316(96)	13(4)	329	
51-55	274(97.8)	6(2.2)	280	
>55	623 (99.4)	4(0.06)	627	
Total	2551(76.5)	787(23.5)	3338	

Table 2: Anti HAV IgG results according to age and sex

	Female			**Male**		
Age group	**HAV Ig G Positive** n (%)	**HAV Ig G Negative** n (%)	**Total** n	**HAV Ig G Positive** n (%)	**HAV Ig G Negative** n (%)	**Total** n
18-20	62(33)	126(67)	188	31(27.7)	81(72.3)	112
21-25	117(42)	161(58)	278	54(37.8)	89(62.2)	143
26-30	105(53.8)	90(46.2)	195	81(55.5)	65(44.5)	146
31-35	110(72.8)	41(27.2)	151	108(75)	36(25)	144
36-40	197(86.4)	31(13.6)	228	140(86)	23(14)	163
41-45	187(93.5)	13(6.5)	200	146(94.8)	8(5.2)	154
46-50	177(96.2)	7(3.8)	184	139(95.9)	6(4.1)	145
51-55	134(98.5)	2(1.5)	136	140(97.2)	4(2.8)	144
>55	318(98.8)	4(1.2)	322	305(100)	0(0)	305
Total	1407(74.8)	475(25.2)	1882	1144(78.6)	312(21.4)	1456

DISCUSSION

HAV is a member of the genus Hepatovirus in the *Picornaviridae* family. It is a non-enveloped, single stranded RNA virus with icosahedral symmetry and is 27 nm in size (6). It was defined by Feinstone et al in 1973 (7). HAV is transmitted from person to person via the fecal oral route. Contaminated water or food that are not washed well and eaten raw play an important role in contamination. It can be transmitted one week before and 2 weeks after the acute hepatitis infection, and the virus can also be transmitted from asymptomatic cases.

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HAV can be transmitted by using intravenous drugs, shared needles, with blood transfusion and sexual intercourse as well (3).

HAV is the most common cause of acute viral hepatitis. Acute HAV infection may appear asymptomatic, subclinical or symptomatic, with or without jaundice. While the disease is usually asymptomatic or subclinical under the age of 15, the frequency of symptomatic infection increases with age. In the case of cholestatic hepatitis or the hepatitis form that goes with exacerbations, the disease may last for months and this may cause loss of workforce. The disease rarely can also be fulminant and mortal (8).

HAV infection is more common and has high seroprevalence especially in areas with low socioeconomic level, in developing countries, in regions with poor infrastructure and hygiene conditions. Our country is in the middle endemicity region in terms of HAV infection (9). World Health Organization (WHO) does not recommend routine vaccination in regions where HAV infection is highly endemic, as the disease is seen in early childhood. Since outbreaks may occur from time to time, vaccination is recommended in moderately endemic regions like our country (10). Due to the routine vaccination program that was implemented in our country in 2012, children born in 2012 and after are immune to hepatitis A (11). However, there is HAV susceptible population in adolescents and young adults.

Studies have shown that seroprevalence of HAV can vary in different regions of our country. In the study of Ceyhan et al in 2005-2006, while the western and central Anatolian regions of Turkey were in the middle endemic region, the east and southeast were found with high endemicity (12). Different results have been obtained in studies from different regions of our country. Anti HAV IgG positivity was found as 93.9% in the seroprevalence study conducted by Koseet al, that included 2156 people, aged ≥15 years in Izmir in 2010. Anti Hav IgG seropositivity was correlated with lower income level, older age, low education level and collective life (military, nursing home, nursery), in this study. The reason for the high seroprevalence was attributed to low education level and income level of most of the participants (13). We could not investigate education level and income level of the participants, as the study is designed retrospectively.

In the study conducted by Ertürk et al. in Rize in 2012, the ages of participants were between 17-70, years and the incidence of HAV infection was reported as 75% (14). Our study was conducted in people ≥ 18 years old and HAV seroprevalence was 76.5%, similar to their study.

In 2010, a seroprevalence study that covered all regions of the country, was conducted by Turkish Liver Research Association. Five thousand four hundred and seventy-one adults were tested for HAV IgG and HAV seroprevalence was higher than our study (93.2%) We think that this high rate may reflect the status in eastern regions of Turkey (15).

If we look at the seroprevalence rates in the studies including children; anti HAV IgG positivity was 74% in the study of Tosun et al. The study was conducted in İzmir and Manisa and included 3715 subjects. In another study, 2003 people were tested in Sakarya and 74.7% of them were positive for Anti HAV IgG.

In the study of Parlak et al. 5363 people in Van were evaluated between 2012 and 2013, and Anti HAV IgG positivity was reported as 89.9%. In another study conducted in Batman, 93.9% of 2606 people with an average age of 34.6 were reported as HAV IgG positive (16-19). When the results of these studies are analysed, it is seen that HAV seroprevalence is higher in the east part of our country compared to the western and central regions. Our study is conducted in a research hospital in Ankara, reflecting the seroprevalence in central region.

We can compare the previous studies with ours' to see the change of epidemiology of HAV infection in Ankara. Tekeli et al. reported, HAV IgG seropositivity

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as 99% in a study that was between the ages of 20-52 years, in 1991 (20). In another study in 2001, Cesur et al. reported the rate as 87.4% between the ages of 15-75 years (21). The study by Turker et al. that was carried out in 2008-2010 and, that involved children and adults, the rate was 80.8% (22). In our study it was found to be 76.5% and it is lower than past studies carried out in Ankara in similar age groups. In the light of the results of these publications, we see that the rate of the population that is susceptible to HAV has increased in our city and country.

When we examine HAV seroprevalence according to age groups; anti HAV IgG was positive in 99.4% participants older than 55years, 97.8% in participants who were in 51-55 age group, 96% in 46-50 age group and 94% in 41-45 age group, in our study. In other studies conducted in İzmir and Afyon, seroprevalence of HAV infection in people older than 40 years was 99,1%, and 97.79% respectively (13,23). Cesur et al. reported the seropositivity of 15-30 age group as 72.7 in 2001. Tosun et al. reported this rate as 77% in adolescents in the age of 15-17 in 2001, and 62% in 2009 (16, 21, 24). While anti HAV IgG positivity was 54.5% in the 26-30 age group and 40.6% in the 21-25 age group, this rate drops to 31% in the 18-20 age group, in this study. A remarkable increase in the number of people susceptible to HAV infection has been observed in adolescents and young adults over the years. This age group is vulnerable to hepatitis A in the case of an outbreak.

Improvement of living conditions, infrastructure, hygiene and sanitation conditions and decrease in the number of people living in the same house caused a decrease in the frequency of HAV infection in young children in Turkey, as in the rest of the world. The age of acute hepatitis A infection has switched to adolescence and young adulthood instead of childhood (9). With the inclusion of Hepatitis A vaccine among the routine paediatric vaccines in our country since 2012, the immune population for hepatitis A in the child age group has increased. But adolescents and young adults are at the risk of acute hepatitis A infection (11). We think that a catch-up vaccination with hepatitis A vaccine will be beneficial for the seronegative population.

Our study has some limitations. Since the study was designed retrospectively, the relationship between patients' demographic data and HAV seropositivity rates could not be evaluated. The study includes the data of one hospital in Ankara. Since our hospital does not have a paediatric diseases department, people under the age of 18 could not be included in the study.

In conclusion, the incidence of hepatitis A at younger ages decreased with the increase in the socioeconomic level, the development of personal hygiene and sanitation, and the decrease in the number of individuals living in the same house in Turkey. The hepatitis A vaccine, which has been on the child vaccination schedule since 2012, protects children younger than 8 years. However, most adolescents and young adults are at risk of HAV infection and it will be beneficial to vaccinate this group.

Conflict of Interest: None to declare

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Researchers' Contribution Rate Statement: SC conceived and designed research. SC and CS analyzed data and wrote the manuscript.

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