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Hepatitis A Virus and Hepatitis E Virus Infection in Adult Patients From A Tertiary Care Hospital of North India

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Abstract
Introduction: *Acute Viral Hepatitis A infection among adults in developing country is low due to pre exposure of Hepatitis A virus (HAV) during childhood and adolescence. Anti-HAV prevalence in population worldwide has grouped countries into high, intermediate low and very low endemicity. The anti-HAV prevalence in Indian population is of high endemicity. But, there is heterogenous exposure of hepatitis A virus in different region of the country. In India the age of acquiring hepatitis A virus infection is shifting from early childhood to adolescence and adulthood. An increase in acute viral hepatitis A infection among admitted adult patients is being observed in this centre.*
Objective : *To determine the prevalence of Hepatitis A Virus (HAV) and Hepatitis E virus (HEV) infection among adult patients of suspected acute viral hepatitis admitted in Gastroenterology Department, Nehru Hospital, PGIMER, Chandigarh*
Methods: *Two hundred eighty five adult patients(206 Males,79 Females) of acute hepatitis, alcoholic liver disease with acute exacerbations and chronic liver disease with decompensation were included in the study for suspected viral aetiology (Study Period: October 2012 to September 2015). Patient's detail record included clinical features, routine diagnostic investigations and abdominal ultra-sonography. Three ml. of blood was collected from each patient and serum stored at – 20^0 C. All samples were tested uniformally for Anti HAV IgM, Anti HEV IgM, HBsAg and Anti HCV by ELISA.*
Results: *Overall 89 adult patients(31.22%, 67Males,22 Females, Mean age: 41.31 yrs. $\pm$ 14.74) out of 285 patients of suspected viral hepatitis were reactive for Anti HAV IgM.4 patients (1.4%,all male) were reactive only for anti HEV IgM. Dual viral infections were found in 7 patients (2.45%, 6 male,1 female) which were reactive for Anti HAV IgM + HBsAg , 8 patients (2.8%, 6 male,2 female) were reactive for Anti HAV IgM + Anti HCV and 01 male patient was reactive for Anti HAV IgM + Anti HEV IgM.*
Conclusion: *31.22 % adult patients of suspected viral hepatitis had Acute Viral Hepatitis A infection needing hospitalization.. 2.8% of adult patients had dual HAV and HCV infection while 2.45% adults had dual HAV and HBV infection. Prophylactic vaccination against HAV infection is needed for adult patients including healthy persons from this region after appropriate screening for HAV immunity.*
Keywords: *Acute Viral Hepatitis, Adult, HAV, HEV*

I. Introduction

Acute Viral Hepatitis A infection among adult in developing country is low due to pre exposure of Hepatitis A virus (HAV) during childhood and adolescence. Although Hepatitis A virus (HAV) infects more than 80% of the population in many developing countries by late adolescence [1]. Anti-HAV prevalence in population worldwide has grouped countries into high, intermediate low and very low endemicity. USA accounts for low endemicity while Sub-Sahara Africa and Mongolia accounts for the high endemicity of hepatitis A virus (HAV) infection. Anti-HAV prevalence estimate suggest that middle-income region countries of Asia, Latin America, Middle East and Eastern Europe have intermediate or low endemicity as their sero-prevalence rates are declining with economic program and improved hygiene standards [2]. Socio-economic improvement has impacted HAV infection to shift from high to intermediate endemicity in many part of China [3]. Adults of high endemicity are usually immune and epidemics are uncommon. The anti-HAV prevalence in Indian population is of high endemicity. But, there is heterogenous exposure of hepatitis A virus in different region of the country. In India the age of acquiring hepatitis A virus infection is shifting from early childhood to adolescence and adulthood. The sero-prevalence of anti-HAV among Delhi school children (4-18 years of age) was 93.2% [4]. While sero-prevalence was 62.6% among medical student (mean age ± 19.9 years) of Delhi [5]. This difference of sero-prevalence may be due to less exposure of HAV contaminated food or water and increase in hygiene standards among medical students. Due to improvement in sanitary conditions many young adults are susceptible to HAV infection. An increase in acute viral hepatitis A infection among admitted adult patients is being observed in this centre.

II. Objectives

To determine the prevalence of Hepatitis A Virus (HAV) and Hepatitis E virus (HEV) infection among adult patients of suspected acute viral hepatitis admitted in Gastroenterology Department, Nehru Hospital, PGIMER, Chandigarh.

III. Methodology

The present study was conducted on patients attending Department of Gastroenterology, Nehru Hospital, PGIMER, Chandigarh between October 2012 to September 2015.Two hundred eighty five consecutive adult patients (206 Males and 79 Females) of acute hepatitis with or without alcoholic liver disease and chronic liver disease were included in this study. These were of suspected viral aetiology causing acute viral hepatitis (AVH) for Hepatitis A and Hepatitis E virus or associated viral infection . Patient's detailed clinical records including presenting complaints, any past history, history of vaccination against Hepatitis B virus and other necessary informations were recorded. Routine blood tests and liver function tests including serum alanine and aspartate aminotransferases (ALT and AST), alkaline phosphatase (ALP), direct and total serum bilirubin, total protein and albumin were done. Abdominal ultrasound were done in all patients to know the current status of liver and other organs. Three ml. of patient's blood were collected , serum separated and stored at – 20^{o}C. All samples were uniformally tested by ELISA for anti HAV IgM (DSI Italy), Anti HEV IgM (DSI , Italy), HBsAg (Erba- Mannheim) and anti HCV (Erba-Mannheim). Results of ELISA tests were interpreted as per manufacturer's instruction.

IV. Results

A total of 285 patients (72.28 % Male and 27.71 % Female) of suspected acute viral hepatitis were admitted in Gastroenterology Department at Nehru Hospital, PGIMER, Chandigarh. The mean age of all patients was 41.31 yrs. ± 14.74. They had history of outdoor food intake and also of having water filtration system installed at their homes. The mean serum bilirubin level was 10.8 mg/dl ± 2.6. The mean serum AST and ALT levels were 106.7 IU/L ± 31.3 and 82.5 IU/L ± 26.8 respectively. The mean serum total protein was 6.3 g/dl ± 1.2 and mean albumin 3.6 g/dl ± 0.6. Overall 31.22% of suspected acute viral hepatitis had Hepatitis A Virus (HAV) infection while 1.4% patients had Hepatitis E virus (HEV) infection (Table I). Dual viral infection of HAV and HEV occurring through common feco-oral route was found in only one patient (Table II).Dual viral infection with Hepatitis B virus (HBV) and Hepatitis A virus was found in 2.45% of patients with features of acute viral hepatitis admitted in Nehru hospital. Also 2.8% of admitted patients had dual infection of Hepatitis C virus (HCV) and HAV. None of the admitted patients had dual infections along with HEV infection.

V. Tables

Table I. Viral Markers Among Patients of Suspected AVH

Patients	Anti HAV IgM Reactive	Anti HEV IgM Reactive
Male (n=206)	23.5 % (67/285)	1.4%(4/285)
Female (n= 79)	7.71%(22/285)	Nil
Total (n =285)	31.22 % (89/285)	1.4%(4/285)

Table II. Dual Viral Infections (n= 285)

Patients	Anti HAV IgM + Anti HEV IgM Reactive	Anti HAV IgM + HBsAg Reactive	Anti HAV IgM + Anti HCV Reactive	Anti HEV IgM + Anti HCV Reactive	Anti HEV IgM + HBsAg Reactive
Male	01	06	06	Nil	Nil
Female	Nil	01	02	Nil	Nil
Total	01	07 (2.45%, 7/285)	08 (2.8%, 8/285)	Nil	Nil

VI. Discussion

The present study shows that there is high incidence of Hepatitis A infection among adult patients from this region despite India being high endemic zone for HAV. The anti HAV IgG sero- prevalence among medical students of Delhi was 62.2% [5].Although there is heterogenous exposure of Hepatitis A virus in different parts of country due to variable hygiene levels. In another study on anti HAV sero-prevalence in Delhi in year 2000 showed overall prevalence of 71.2%. The prevalence in subjects more than 35 years was higher 92.1% (186/200 persons) than in subjects with 57% (170/298 persons) of less than 35 years [6]. This is due to improved hygiene in persons of less than 35 years during their childhood and adolescent periods in recent past compared to subjects of more than 35 years. A study from Taiwan showed 15% anti HAV IgG prevalence in 948 subjects (age 0.3 to 63 years).Also there was minimum sero-conversion at ages ranging from 1 to 30 years. This demonstrated that there is decline in prevalence of HAV infection among children, adolescents and young adults. This is due to improvement in socio-economic status and environmental sanitation. Hence the risk of

sudden outbreak exist due to travel and migration in that area[7].Similar situation of improved hygiene in people from this region could be the cause of lack of protective antibodies to HAV in this population with increase in HAV infections in adults which is normally not anticipated in this country with high endemicity. The sero-prevalence of anti-HAV in Saudi Arabia was 18.6% in 2008 among 1357 students (16-18 yrs) of Madi Neh, Al-Qaseem and Aseer region. Among them the anti-HAV IgG prevalence in lower economic class student was 36.6%, lower middle economic class 16.6%, upper middle economic class 9.6% and upper economic class 5.1%. The study indicates that these countries may have increasing burden of disease from HAV infection in future [8]. The transition of anti-HAV prevalence to intermediate endemicity in urban population has lead to increase in frequency of acute viral hepatitis A infection in adults in five years period (1999-2003) from 3.4% to 12.3% in North India[9] while in present study 31.225 adult patients had HAV infection needing hospitalisation.]. However, HAV vaccination and changing life styles associated with booming economy has contributed to rapid decline in risks to acquire hepatitis A virus infection in China during a study period between 1990 and 2006 [10].Also, HAV infection in adults lead to acute liver failure(ALF) as found in 0.85% of patients (27/1371) in a hospital based study [11].

A study from Kenya showed 1.3% patients (5/382) having dual infection with Hepatitis A virus and Hepatitis B virus [12].2.45% patients(7/285) had HBV and HAV infections admitted in present study. Hepatic flares occur in HCV infected patients with acute viral hepatitis A infection[13]. In present study 2.8% patients had HAV with HCV infection which needed hospitalisation. However , there was none case of HEV and HBV dual infection case in present study. But a study from China demonstrates 40.1% patients (118/294) of HBV and HEV had dual infection among total of 294 HEV infected patients [14]. This highlights the need for vaccination against Hepatitis A Virus in adults due to their improved hygiene practises from this region after proper evaluation. Hence, this will reduce the increasing burden of disease from Hepatitis A Virus infection in adults.

VII. Conclusion

In present study the mean age of adult patients admitted for suspected viral hepatitis was 41.31 yrs. ± 14.74. Among them 31.22% of adult patients were suffering from Acute Viral Hepatitis A infection needing hospitalization. Also, 1.4% of admitted adults were suffering from Hepatitis E Virus infection. 2.8 % of adult patients had dual Hepatitis A Virus and Hepatitis C Virus infection. 2.45% of adult patients needing medical treatment had dual Hepatitis A Virus and Hepatitis B Virus infection.

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