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Original Article

Prevalence and risk factors of Hepatitis A in children in Tabriz, Iran

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Abstract

Introduction: Hepatitis A is the most common viral hepatitis during childhood especially in developing countries. It is, usually, self-limiting, but may be associated with severe complications in some patients particularly those with comorbidities. This study was aimed to determine the seroprevalence of hepatitis A in 2-16 years old children in Tabriz, Iran.

Methods: The study was a cross-sectional survey on all children who were referred to the clinic of Tabriz children hospital. For every subject, demographic data, including age, sex, method of sewage and waste disposal/type of water supply, history of blood transfusion and parent's addiction were recorded. Immunoglobulin G (IgG) antibodies against hepatitis A virus (anti-HAV) were measured in sera by enzyme-linked immunosorbent assay. The association between seropositivity and demographic characteristics was studied.

Results: This cross-sectional study was performed on 252 children aged 2-16 years in Tabriz city during 2012. Totally, 32.9% of children were seropositive for IgG antibody (anti-HAV) There was a significant difference in the history of blood product transfusion between two groups (P = 0.001). A total of 3% of case-patients had poor type of water supply. The discrepancy between two groups was statistically significant (P = 0.040). There was no significant statistic correlation in seroprevalence of hepatitis A relative to parent's addiction (P = 0.480), age (P = 0.650) and sex (P = 0.890).

Conclusion: According to this study, hepatitis A is prevalent in the pediatric population, and it must be considered in the approach to all susceptible cases of acute hepatitis. Considering the difficulties for the control of environmental sources, we need to have a protocol for routine vaccination of children in our country.

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Introduction

Hepatitis A virus (HAV) is the most common cause of viral hepatitis. HAV is a small, non-enveloped, single-stranded RNA virus from the Picornaviridae family. The risk of infection is universally distributed. The incidence of infection has a strong relation with sanitary and environmental conditions and the level of socioeconomic development. Hepatitis A has a high rate of endemicity in underdeveloped countries with poor sanitation. The virus has a fecal-oral transmission cycle and is transmitted through environmental contamination, mainly through drinking water and food. This form of transmission often requires direct contact between individuals.[1-5]

Hepatitis A is an acute, usually, self-limiting liver disease, but the course of the disease is not invariably benign. A dramatic complication of hepatitis A is acute liver failure. The patients at risk for this complication are elder patients with underlying liver disease or immunosuppressed patients. Hepatitis A in children usually has an asymptomatic course

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while in adults the clinical presentations are more common, thus in developed nations, the proportion of symptomatic cases is higher because infection is more likely in elder patients due to routine childhood vaccination coverage.[6,7] Up to 70% of infected adults develop symptoms, including icterus. In contrast, only about 30% of children younger than 6 years become symptomatic, which are, usually, nonspecific and flu-like, without an apparent jaundice. The rising prevalence of HAV infection has led to an increase in the number of requests for HAV serologic tests.[8,9]

This study was aimed to investigate the epidemiologic data on anti-HAV seroprevalence in Tabriz, Iran, in relation to demographic characteristics in 2-16 years old children.

Methods

This cross-sectional survey was performed on children who were referred to the clinic of Tabriz children hospital from April 2012 to April 2013. For every subject, the questionnaires, which included age, sex, method of sewage and waste disposal/type of water supply, blood product transfusion and parent's addiction were filled by a fellow research by interviewing the parents. The association between seropositivity and demographic characteristics was studied. Written informed consents were obtained from all parents. A volume of 2 mL of the blood sample was taken from each case. Serum samples were stored at −20 °C.

Hepatitis A immunoglobulin G (IgG) antibody was measured by an enzyme-linked immunosorbent assay test. The kit was produced by Italy DIA, PRO Company. Antibody levels more than the determined cut-off point were considered as positive. Data were analyzed with the SPSS software (version 17, SPSS Inc., Chicago, IL, USA). The prevalence of anti-hepatitis A antibodies was evaluated. Findings were described by mean ± standard deviation (SD) and the proportion, and the distribution was presented by SD. T-test, chi-squared test and Fisher's exact test were used. $P < 0.05$ was considered as statistically significant.

Results

This cross-sectional study was carried out on 2-16 years old children in Tabriz. The children were attended in the gastroenterology clinic of Tabriz children hospital. In total 252 children were studied. From 252 children, 135 children were boys (53.6%) and 377 (46.4%) were girls. The mean age was 8.1 ± 1.3 and 8.5 ± 0.5 years in HAV positive and negative groups respectively. The overall mean age was 8.4 ± 1.6 years. There was no significant relationship between seropositivity and age ($P = 0.650$).

The overall rate of positive test results was 32.9% for anti-HAV (total). 83 cases were seropositive, and 169 cases (67.1%) were seronegative and from the 83 seropositives, 45 (54.2%) were boys, and 38 (45.7%) were girls. The rate of the anti-HAV positivity did not differ significantly between males and females ($P = 0.890$).

A total of 3% of HAV positive patients compared with 1.6% of the control group had poor type of water supply/waste disposal. This discrepancy was statistically significant ($P = 0.040$). There was a significant difference in the history of blood product transfusion between two groups with $P = 0.001$. The relationship between parent's addiction and seropositivity was not significant ($P = 0.480$).

Discussion

Hepatitis A is an acute, typically self-limiting liver disease and is one of the most common infectious diseases in the world. Hepatitis A causes reasonably little deaths, but it may be associated with a dramatic course resulting in acute liver failure and death. Presentation of disease is determined by the age of exposure, with a tendency to be asymptomatic or subclinical during childhood and symptomatic among adults. It has been reported that 70% of children < 6 years of age are asymptomatically infected or develop a mild self-limiting illness.[1-5,10]

A systematic review in the United States reported following risk factors for the

transmission of HAV infection: sexual or household contact with a patient with hepatitis (25%), contact in a day-care center (15%), international travel to endemic areas (5%) and contaminated food or water-borne outbreak (5%). However, in about half of cases, no evident risk factor could be found.[11]

Owing to a lack of comprehensive study in our country, determining the epidemiology of HAV is complicated, and there is limited data in this field. In our study, HAV seropositivity was investigated in 2-16 years old children, which was 32.9% in Tabriz city.

A number of factors that influence the serology of HAV were evaluated in this survey. They included age, gender, method of waste disposal/type of water supply, blood product transfusion and parent's addiction. Among these parameters, method of waste disposal/type of water supply and blood product transfusion had a significant relationship with the seropositivity of HAV ($P = 0.040$), $P \leq 0.001$ respectively). The most frequently reported risk factor was poor condition of sewage and waste disposal and type of water supply.

In the present study, case patients (HAV positive) and control subjects (HAV negative) did not differ with respect to demographic characteristics including age, sex, and parent's addiction. In European developed countries, there is a decrease in prevalence of hepatitis A infection, especially among the younger age group, due to marked improvements in socioeconomic and hygiene situation and widespread coverage of vaccination. In a study by Pham et al. from Canada,[12] the seroprevalence of HAV was 1% in children aged 8-13, 1-6% in ages 20-24, 10% in 25-29 and 17% in 30-39.[13]

In a Korean study, the overall seropositivity rate of HAV was 51.06%. The male/female ratio for total anti-HAV seropositivity was not statistically significant (52.86% vs. 49.44%, $P = 0.560$). In another study from this country, the total rate of the anti-HAV positivity was 62.8%.[9,14]

Some studies from our country have evaluated the epidemiology of HAV. In previous reports, the rate of HAV seropositivity was 8.09% and 44.3% in Isfahan[15] and Zanjan in Iran[16] pediatric patients respectively. There was no association between sex and positive antibody in the former study and between sex, age and seropositivity in the latter survey.[15,16]

In a study by Taghavi et al. in Kashan, Iran, twenty-six out of 680 cases (3.9%) were seropositive for HAV antibody. The relation between seropositivity and sex was not statistically significant ($P = 0.772$).[17] A significant discrepancy in the mean age among two seropositive and seronegative population was not reported ($P = 0.215$). The findings of our study are in accordance with those three studies.

In another study from Shiraz in Iran, IgG antibody of hepatitis A was positive in 88.2% of individuals. In this study, the seroprevalence was significantly associated with poor water supply and older age ($P = 0.001$ and $P = 0.010$ respectively). 79.3% of cases under 20 years and 91.3% of subjects 20-30 years of age were seropositive. This rate was 99% for the cases more than 30 years of age.[18] The seroprevalence is more higher in this study than present survey, but the association with studied factors is similar to our survey.

We did not find any studies in the literature that reported results in terms of the effect of blood product transfusion and parent's addiction on the seroprevalence of HAV in children. The association between the history of transfusion and HAV seropositivity seems to be due to the small sample size of study; however it may be attributed to high rate of acquired HAV antibody transmitted in chronically transfused patients. The present study had a number of limitations; however it had public health implications and will add on our insight to the epidemiology of hepatitis A in Iran.

Conclusion

Considering the controversial results in investigations evaluating the effect of risk factors on seroprevalence of HAV, it seems difficult to have a guideline for the handling of HAV infection. In order to evaluate the influence of each factor, cases should be

matched with controls in several characteristics. Well-structured studies with larger sample size are needed to determine the association of any parameter with seropositivity rate of HAV and guide health care workers to determine the HAV epidemiology and disease burden. With regards to the difficulties for the control of environmental sources, promoting hygiene and appropriate sanitation, we need a universal coverage for hepatitis A vaccination of children in our country.

Conflict of Interests

Authors have no conflict of interest.

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