

Seroprevalence of Hepatitis C Infection in Healthy Children from the Western Region of Saudi Arabia

SOAD M. JABER, MB BS, CABP.DCH.; OMAR I. SAADAH, MB BS, CABP, MRCP (UK); AHMAD J. FARSI* and HANI Z. MARZOUGI*

The Department of Pediatrics, Faculty of Medicine & *KAUH and King Abdulaziz University, Jeddah, Saudi Arabia.

Abstract

Objective: Community-acquired HCV infection was regarded as the main pattern of HCV infection especially after the implementation of the blood screening program in the Kingdom. Our aim was to determine the seroprevalence of community-acquired HCV infection in a group of healthy children from the western region of Saudi Arabia.

Study Design: Blood samples were collected from children attending the surgical clinics for minor surgery at King Abdulaziz University Hospital in Jeddah in the period between November 2001 to October 2003. Sera were tested for HCV antibody using a third-generation enzyme-linked immunosorbent assay.

Results: 1059 children screened, mean age \pm SD (7.4 \pm 3.7 years), range (1-18 years), 630 were males (60%). Four children tested positive with a mean age \pm SD (7 \pm 3.1 years), range (4-11 years). Giving a seroprevalence of 0.38%. There was no difference in seropositivity according to age groups, *p* values was 0.9.

Conclusion: The seroprevalence of HCV infection in healthy children residing the western region of Saudi Arabia is low, which may reflect the general improvement in the standard of living.

Key Words: Hepatitis C - Children - Prevalence - Enzyme-Linked Immunosorbent Assay - Saudi Arabia.

Introduction

HEPATITIS C virus (HCV), a positive strand RNA virus which is related to falvi and pestiviruses family, was first identified in the USA in 1989 as a major causative agent of post transfusion non-A, non-B hepatitis [1].

Approximately 3% of the world population are chronically infected with hepatitis C virus (HCV) [2]. There was a wide variation in the reported prevalence of hepatitis C in healthy children between developed and developing countries. In Japan, the seroprevalence of HCV among 1442

healthy children was zero [3]. In the United States the seroprevalence was 0.25 in the 6-11 year age group, and 0.4% in the 12-19 year age group [4]. In Saudi Arabia, it was estimated in a population-based survey to be 0.9% of 4,496 Saudi Arabian Children (aged 1 to 10 years) [5], while in Egypt and Cameroon it was 10% and 14.5% respectively [6,7].

These findings raised the question of vertical and intrafamilial transmission because it is not likely for these children to have acquired infection from blood transfusion or parenteral drug use.

This study was undertaken to determine the seroprevalence of antibody to hepatitis C virus in otherwise healthy children attending the surgical clinics at King Abdulaziz University Hospital.

Methods

Study Population:

The subjects were children who were seen for routine care at the surgical clinics at King Abdulaziz University Hospital, Jeddah in the period between November 2001 to October 2003 with no hepatitis-related symptoms. Children with history of transfusion of blood or its products were excluded from enrollments. Patients' data were completed using a questionnaire. Written permission was taken from parents to participate in the study.

Serological Testing:

Sera were tested for anti-HCV by the commercially available third generation Enzyme-Linked Immunosorbent Assay technique, the BioElisa HCV (BIOKIT, S.A. Barcelona, Spain). These kits are based on recombinant antigens representing epitopes of HCV: Core, NS3, NS4 and NS5. Ac-

cording to the manufacturers this test has a sensitivity of 100% and a specificity of 99.87%. The standard testing protocol, as specified by the manufacturer, was adhered to at all time. Positive results were confirmed by another ELISA.

Statistical Analysis:

Statistical analysis was performed using Stata Statistical Software (Release 6.0, College station, TX). Prevalence of HCV was calculated by each participant's age group. Statistical significance was accepted if $p < 0.05$.

Results

1059 child screened, mean age \pm SD (7.4 \pm 3.7 years), range (1-18 years). The distribution of ages was skewed towards the youngest age group. 630 were males (60%). Four children tested positive with a mean age \pm SD (7 \pm 3.1 years), range (4-11 years) giving a seroprevalence of 0.38%. There was no difference in seropositivity according to age groups ($p=0.9$). All were males. All were asymptomatic with normal growth and normal liver functions. Two had history of previous hepatitis A infection at 3.5 and 4 years of age respectively.

Discussion

The ecology of hepatitis C virus is not well understood, and the routes of transmission are not completely delineated. The most efficient route of transmission of HCV is percutaneous, through exchange of blood products, donated organs, or shaving with contaminated needles. However this is not the only route, since many individuals with hepatitis C report no blood or needle exposure, suggesting that perinatal, intrafamilial, sexual and occupational transmission may occur.

The introduction of anti-HCV testing of all blood donations in 1990 has contributed dramatically to the fall in the risk of post-transfusion hepatitis to close to 1 per 100,000 units [8,9]. However, HCV infection in children still occurs in the absence of history of blood transfusion, as reported in the multicenter Study by Bortolotti et al. [10] of 77 European children with chronic hepatitis C in which 12 had no history of exposure to any risk factors for viral hepatitis. This indicates the intrafamilial and vertical routes as important channels of acquisition of HCV.

The prevalence of hepatitis C in otherwise healthy children has been reported to be low [11]. The reported prevalence of HCV has been different in different countries. This may be related to the

endemicity of HCV infection at different countries as well as the sensitivity of the screening test being used.

In this study we have estimated a seroprevalence of 0.38% among 1059 otherwise healthy Saudi children attending day care surgery for minor procedures at King Abdulaziz University Hospital, which is considered the main hospital in the City of Jeddah with a total capacity of 800 beds. This hospital serves most of the population residing the Western Province of Saudi Arabia.

This study was preceded by an earlier community based study by Al Faleh et al. [5] who reported a seroprevalence of 0.9% in 4,496 Saudi children randomly selected from different regions of the kingdom of Saudi Arabia. All regions were presented by a sample of patients randomly selected. The prevalence of anti HCV varied markedly (0% to 5.7%) from one region to another. The highest prevalence was reported from Gizan region. This difference may be explained in part by the diversity in socioeconomic standards despite the homogeneity of the population in cultural practices and habits.

Our study, though is not a community based study, showed clearly a decline in the prevalence of HCV in healthy children with no risk factors for HCV infection over a period of approximately 10 years. This may reflect the general improvement in the socioeconomic standards in the recent years.

References

- 1- CHOO Q.L., KUO G., WEINER A.J., OVERBY L.R., BRADLEY D.W. and HOUGHTON M.: Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome. *Science*, 244: 359-362, 1989.
- 2- ALTER M.J.: Epidemiology of hepatitis C in the West. *Semin Liver Dis.*, 15: 5-14, 1995.
- 3- TANAKA E., KIYOSAWA K., SODEYAMA T., et al.: Prevalence of antibody to hepatitis C virus in Japanese school children: comparison with adult blood donors. *Am. J. Trop. Med. Hyg.*, 46: 460-4, 1992.
- 4- ALTER M.J., KRUSZON-MORAN D., NAINAN O.V., et al.: The prevalence of hepatitis C infection in the United States, 1988 through 1994. *N. Eng. J. Med.*, 341: 556-62, 1999.
- 5- AL-FALEH F.Z., AYOOLA E.A., AL-JEFFRY M., et al.: Prevalence of antibody to hepatitis C Virus among Saudi Arabian children: A community-based study. *Hepatology*, 14: 215-8, 1991.
- 6- NGATCHU T., STROFFOLINI T., RAPICETTA M., CHIONNE P., LANTUM D. and CHIARAMONTE M.: Seroprevalence of anti-HCV in an urban child population: a pilot survey in a developing area, Cameroon. *J. Trop. Med. Hyg.*, 95: 57-61, 1992.

- 7- EL-NANAWY A.A., EL-AZZOUNI O.F., SOLIMAN A.T., AMER A.E., DEMIAN R.S. and EL-SAYED H.M.: Prevalence of hepatitis C antibody seropositivity in healthy Egyptian children and four high risk groups. *J. Trop. Pediatr.*, 41: 341-3, 1995.
- 8- DONAHUE J.G., MUOZ A., NESS P., et al.: The declining risk of post-transfusion hepatitis C infection. *N. Engl. J. Med.*, 327: 369-73, 1992.
- 9- BLAJCHMAN M.A., BULL S.B. and FEINMAN S.V.: Post transfusion hepatitis: Impact of non-A, non-B hepatitis surrogate tests. *Canadian Post-Transfusion Hepatitis Prevention Study Group. Lancet*, 345: 21-5, 1995.
- 10- BORTOLOTTI F., JARA P., DIAZ C., et al.: Posttransfusion and community-acquired hepatitis C virus infection in childhood. *J. Pediatr. Gastroenterol. Nutr.*, 18: 279-83, 1994.
- 11- JONAS M.M., ROBERTSON L.M. and MIDLEMAN A.B.: Low prevalence of antibody to hepatitis C virus in an urban adolescent population. *J. Pediatr.*, 131: 314-6, 1997.