Seroprevalence of Hepatitis A Virus Antibody Among Children and Young Adults in Bangkok†

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Abstract

Objective : To determine the prevalence of hepatitis A virus (HAV) antibodies in various age groups of healthy children and young adults who have not received the hepatitis A vaccine.

Method : Blood samples were collected from 825 volunteers aged 1-30 years from a well baby clinic and five academic institutions in the Don Mueang area from 1998 to 1999. Serum samples were assayed for specific HAV IgG antibodies using a commercial enzyme-linked immunosorbent assay (ELISA) kit.

Results : The seropositivity rate (12.4 % overall) in each age group was as follows: 1-3 years, 7.7 per cent; 4-7 years, 6.6 per cent; 8-11 years, 12.4 per cent; 12-15 years, 10.7 per cent and 16-30 years, 25.9 per cent.

Conclusions : In the Don Mueang area of Bangkok, the majority of children (< 16 years) do not have natural immunity against HAV. The use of hepatitis A vaccine for this population should be considered. Pre-vaccination serologic screening for HAV IgG in children may not be worthwhile.

Key word : Seroprevalence, Hepatitis A Virus, Children, Adults

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Hepatitis A virus (HAV) infection is characteristically an acute self-limited illness with fever, malaise, jaundice, anorexia, nausea and vomiting(1). The infection is usually subclinical or mild in small children. Even though the burden of the disease is not as serious as hepatitis B or hepatitis C infection, it may eventually cause patients to be absent from school or work, and some of them need hospitalization. At present, hepatitis A vaccine is available as an optional vaccine in Thailand(2). However, the majority of people in developing countries cannot afford it. The purpose of this study was to demonstrate the current seroprevalence of antibodies to HAV among Thai children and young adults in Bangkok. This data may be beneficial for considering the proper use of hepatitis A vaccine in the Thai population.

MATERIAL AND METHOD

A cross-sectional survey was carried out in a well baby clinic, a kindergarten school, an elementary school, a high school, and two graduate schools from 1998 to 1999. Most volunteers originated from a middle socioeconomic background. Healthy volunteers aged 1 to 30 years were recruited on a voluntary basis without any randomization, to take part in the survey after they or their parents had provided written informed consent. By interviewing the volunteers or their parents, those who had chronic illnesses, had previously received hepatitis A vaccine, and those who had received blood or blood component in the past three months were excluded. Immunization records were reviewed in approximately 80 per cent and 60 per cent in children aged 1-7 and 8-16 years respectively to confirm that they had not received the vaccine.

A total of 895 subjects who were residing in the Don Mueang area, a northern suburb of Bangkok at the time of the survey, were enrolled to ensure at least 150 subjects in each of the following five age groups: 1 to 3 years (n=168), 4 to 7 years (n=182), 8 to 11 years (n=178), 12 to 15 years (n=178) and 16 to 30 years (n=189).

Two milliliters of blood were obtained and the separated serum was stored at -20°C until testing at the Central Laboratory of Queen Saovabha Memorial Institute, Thai Red Cross Society. Specific HAV IgG antibodies were determined using "Enzymun", an enzyme-linked immunosorbent assay (ELISA) test system. According to the test instructions, antibody levels of < 12, 12-27 and > 27 mIU/ml were taken as negative, borderline and positive respectively. The specimens with borderline results were repeated and the results relied on the second test. If the antibody levels of both tests were borderline, the specimens were documented as positive according to the instructions.

Demographic data were presented by using mean, ratio, range and percentage. Categorized variables were analyzed by Chi-square test and noncategorized variables were analyzed by Student *t*-test. The level of significance was set at alpha = 0.05.

Table 1. Seropositivity of hepatitis A virus antibodies in the study subjects classified by age-group.

Age group (years)	Number tested	Number positive anti-HAV IgG	%
1-3	168	13	7.7
4-7	182	12	6.6
8-11	178	22	12.4
12-15	178	19	10.7
16-30	189	49	25.9
Total	895	115	12.8

RESULTS

The mean age of the subjects was 10.7 years with a male to female ratio of 1.1:1. Specific HAV IgG antibodies were determined in all enrolled 895 subjects, with the overall seroprevalence rate of 12.8 per cent.

The percentage of seropositive subjects tended to increase after the age of sixteen, from 7.7 per cent in the 1 to 3 year age group, 6.6 per cent in the 4 to 7 year age group, 12.4 per cent in the 8 to 11 year age group, 10.7 per cent in the 12 to 15 year age group and 25.9 per cent in the 16 to 30 year age group (Table 1).

After categorizing subjects into seropositive and seronegative groups, it was found that the male to female ratio was not significantly different, whereas, seropositive subjects were significantly older (Table 2).

DISCUSSION

Our study showed that seroprevalence rate of HAV antibodies in children aged 1-15 years was approximately 10 per cent, whereas, one-fourth of young adults aged 16-30 had positive anti-HAV IgG

Table 2. Age and sex of the study subjects, who with or without no anti-HAV IgG.

Characteristics	Anti-HAV IgG positive (n=115)	Anti-HAV IgG negative (n=780)	p-value
1. Age (years)			
Mean ± standard deviation	14.08 ± 7.07	10.21 ± 6.30	< 0.001
2. Male : female sex ratio	1.5:1	1:1	0.064

antibodies. This figure is similar to previous studies (1996-1998) which demonstrated that seroprevalence of HAV antibodies among children and adolescents in Bangkok and other parts of Thailand was between 9.2-12.7 per cent[3-6], compared to the seroprevalence rate of 31.1 per cent in 1988[3]. The dramatic decrease of this infection is different from cytomegalovirus (CMV) and Epstein-Barr virus (EBV) infections, which are still very high[7,8]. This can be explained by improvements in hygiene and sanitation which may influence the transmission of HAV infection (oral-fecal), whereas, CMV and EBV infections are transmitted through droplets. The low seroprevalence rate of HAV infection from our data suggests us that this population is at risk of HAV infection in the future and may be serious if the infections occur during adulthood.

At present, hepatitis A vaccine is available in Thailand and has been proved to be safe and highly immunogenic. However, it is rather expensive and the majority of Thai people cannot afford it. Pediatric Infectious Disease Society of Thailand recommends hepatitis A vaccine as an optional vaccine and suggests the first shot at the age of six[2]. It may be beneficial for Thai children and young adults. The present data suggest that pre-vaccination screening may not be worthwhile in children but may be considered in young adults.

In summary, in the Don Mueang area of Bangkok, the majority of children do not have natural immunity against HAV. The use of hepatitis A vaccine for this population should be considered. Pre-vaccination serologic screening for HAV IgG in children may not be cost-effective.

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ความชุกของแอนติบอดีย์ต่อไวรัสตับอักเสบ เอ ในเด็กและผู้ใหญ่ในกรุงเทพมหานคร†

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วัตถุประสงค์ : เพื่อประเมินความชุกของแอนติบอดีย์ต่อไวรัสตับอักเสบ เอ ในเด็กกลุ่มอายุต่าง ๆ และในผู้ใหญ่ที่มีสุขภาพแข็งแรง และไม่เคยได้รับวัคซีนป้องกันไวรัสตับอักเสบ เอ มาก่อน

วิธีการ : เก็บตัวอย่างเลือดจากอาสาสมัครอายุ 1-30 ปีจากคลินิกเด็กดี 1 แห่งและสถาบันการศึกษา 5 แห่งในเขตดอนเมือง ระหว่างปี พ.ศ. 2541-2542 จำนวน 825 คน และตรวจหาแอนติบอดีย์ชนิดจีต่อไวรัสตับอักเสบ เอ โดยใช้ชุดทดสอบสำเร็จรูป

ผลการศึกษา : อัตราการตรวจพบแอนติบอดีย์ต่อไวรัสตับอักเสบ เอ เฉลี่ยร้อยละ 12.4 จำแนกเป็นร้อยละ 7.7, 6.6, 12.4, 10.7 และ 25.9 ในช่วงอายุ 1-3, 4-7, 8-11, 12-15 และ 16-30 ปีตามลำดับ

สรุป : ในเขตดอนเมือง กรุงเทพมหานคร เด็กอายุน้อยกว่า 16 ปี ส่วนใหญ่ไม่มีภูมิคุ้มกันโดยธรรมชาติจากไวรัสตับอักเสบ เอ อาจพิจารณาใช้วัคซีนป้องกันไวรัสตับอักเสบ เอ สำหรับประชากรกลุ่มนี้ การตรวจเลือดก่อนฉีดวัคซีนในเด็กไม่น่าเป็นสิ่งคุ้มค่า

คำสำคัญ : ความชุก, ไวรัสตับอักเสบ เอ, เด็ก, ผู้ใหญ่

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