PREVALENCE OF HEPATITIS A VIRUS INFECTION IN NORMAL INDIVIDUALS AND HOSPITAL PATIENTS IN KUALA LUMPUR

TON S. H.
THIRUSELVAM A.
LOPEZ C. G.
NORIAH R.

SUMMARY

110 normal, healthy adults were tested for antibody to hepatitis A (anti-HA) type IgG and 86 (78.2%) were found to be positive. An age-specific prevalence was found to be lowest in the lower age-group and highest in the higher age-group. Out of 24 IgG positive individuals, only one was found to have type IgM. No significant difference in the incidence of anti-HA type IgG was found between 42 patients in the Urology Unit, General Hospital, Kuala Lumpur and normal individuals ($p > 0.1$). 15 patients diagnosed as viral hepatitis were investigated for HAV IgG and IgM antibodies. 13 (86.7%) were positive for type IgG. Of this, only five (33%) were positive for the type IgM, suggesting that HAV is the cause of acute viral hepatitis in 33% of cases admitted to hospital as viral hepatitis.

INTRODUCTION

Viral hepatitis caused by Hepatitis A Virus (HAV) occurs most frequently in children and young adults. The disease is transmitted from person to person via faecal-oral route or from a common oral source such as food or water. [1] HAV consists of a single-stranded RNA [2] and its antibody level peaks at some six weeks after the onset of the illness. The antibody has long-lasting titres and long-lasting immunity to HA is implied with the appearance of the antibody. [3] As antibody to HA antigen (IgG type) appears to persist for many years, [3] its detection should reflect past exposure to the virus. Detection of IgM antibodies on the other hand indicates recent infection.

Since there is no report of the incidence of clinical hepatitis A in this country, this paper reports the incidence of the antibody to the HAV (anti-HA) in normal, healthy individuals in Kuala Lumpur, as well as in some hospital patients.

MATERIALS AND METHODS

Blood from various groups were collected aseptically from 110 male voluntary blood donors, from 42 haemodialysis patients and 15 patients admitted to hospital with acute viral hepatitis. The antibodies to HAV (IgG Anti HAV and IgM Anti HAV) were determined by radioimmunoassay (Abbot-HAVAB and HAVAB-M). Counting was done on the Packard Autogamma Scintillation Spectrometer (Model 5110.) Cut off values were as recommended by the manufacturer.

RESULTS

Of the 110 individuals tested for anti-HAV type IgG, 86 (78.2%) were positive. The age-specific prevalence of anti-HAV in an adult population of Kuala Lumpur is shown in Table I. In general the prevalence increases with age, being lowest in the

Ton S.H., MSc Phd Aberd
Dept. of Biochemistry
Faculty of Medicine
U.K.M., Kuala Lumpur

Noriah R, Med Lab Tech
Dept. of Biochemistry
Faculty of Medicine
UKM, Kuala Lumpur

Thiruselvam R. BSc Hon
Lopez CG, MBBS, DCP, FRCPA
National Blood Services Centre
General Hospital
Kuala Lumpur

TABLE I
AGE-SPECIFIC PREVALENCE OF ANTI-HAV (IgG) IN AN ADULT POPULATION OF KUALA LUMPUR

Age (yrs)	No. tested	No. positive (%)
18 - 20	6	4 (66.7)
21 - 30	62	46 (74.2)
31 - 40	29	24 (82.8)
41 +	13	12 (92.3)
Total	110	86 (78.2)

younger age group and highest as the age increases. 24 of the anti-HA type IgG positive individuals were also investigated for the presence of anti-HA type IgM. Of the 24 tested, only one (4.1%) was positive for the IgM and this individual belonged to the younger age group.

42 patients in the Urology Unit were also investigated for HAV antibodies of the IgG class and 36 (85.7%) were positive. However there was no significant difference between this group and the above healthy individuals ($p > 0.1$).

Table II shows the results of both IgG and IgM antibodies in 15 patients diagnosed as suffering from viral hepatitis. 13 (86.7%) were positive for the type IgG. Of these, five also had the anti-HA type IgM and out of the five, four belonged to the younger age group.

TABLE II
PREVALENCE OF ANTIBODIES TO HAV (IgM + IgG CLASS) 15 IN PATIENTS DIAGNOSED AS VIRAL HEPATITIS

Patient	Age (yrs)	IgG	IgM
1	67	+	−
2	59	+	−
3	50	+	−
4	49	+	−
5	42	+	−
6	39	+	−
7	34	+	−
8	33	−	−
9	23	+	−
10	19	−	−
11	37	+	+
12	24	+	+
13	17	+	+
14	14	+	+
15	14	+	+
15		13 (86.7%)	5 (33.3%)

DISCUSSION

Antibody to hepatitis A antigen appears to persist for many years and long-lasting immunity is implied with the appearance of the antibody. [3] Its detection reflects past exposure to the virus. It appears that normal individuals near the fourth decade and above are less likely to have an acute hepatitis A infection as there is usually evidence of immunity, and therefore the possibility of other causes of hepatitis should be actively pursued. This age specific prevalence of anti-HA in the general adult population is similar to that reported by Szmuness *et al.*, [4] and Gust *et al.* [5]Gust *et al.*, [5] reported that in the general population in Melbourne, Australia, approximately 20% of children have acquired this antibody by the age of ten years and the proportion rose to 95% by the age of 60 years. Szmuness *et al.*, [4] found that the prevalence of anti-HA gradually increased throughout adulthood and reached its peak level in people 50 years and older.

The incidence of anti-HA is similar in both the normal individuals and in patients in the Urology Unit indicating that the risks of exposure to HAV is similar in both groups and not increased in the Urology group by repeated hospital admissions. Among the 15 patients diagnosed as viral hepatitis the finding of five patients with IgM HAV antibodies indicated recent exposure to the virus in these patients. [6,7] As three of the five patients were younger than 20 years of age it suggested that acute viral hepatitis due to the HAV is more prevalent in the younger age group.

The evaluation of hepatitis A has been described by McCollum's five-phase theoretical model. [8] The **first** phase of hepatitis A appears to be operative in underdeveloped, tropical and subtropical countries in which hygienic and sanitary levels may be primitive. In such areas, hepatitis A is not considered a public health problem since the disease may be prominent only among susceptible visitors who may have high rates of clinical infection. In the **second** phase which is associated with improvement in hygienic and sanitary standards, exposure to hepatitis A in early childhood is less apparent and hepatitis is recognised chiefly in children aged five to fourteen. In the **third** phase, attack rates are highest in adults. Sustained high hepatitis attack rates in adults are seen in the **fourth** phase. The fifth phase is characterised by a fall in hepatitis attack rate. Our data on the incidence of the anti-HA type IgG

in our population indicates that Kuala Lumpur falls under the second and the third category.

ACKNOWLEDGEMENT

This work was partially supported by a grant from the Universiti Kebangsaan Malaysia.

REFERENCES

[1] Koff S. R. *Prevention of viral hepatitis in Viral hepatitis.* New York, Chichester,Britain, Toronto: Wiley Medical Publication. John Wiley and Sons, 1978; 192.

[2] Coulepis A G, Tannock G A, Locarnini S A, Gust I D. Evidence that the genome of hepatitis A virus consists of single-stranded RNA. *J Virol* 1981; **37:** 473-477.

[3] Purcell R H, Dienstag J L, Feinstone S M *et al.* Relationship of hepatitis A antigen to viral hepatitis. *Am J Med Sci* 1975; **270:** 61-71.

[4] Szmuness W, Dienstag J L, Purcell R H *et al.* Distribution of antibody to hepatitis A antigen in urban adult population. *N Engl J Med* 1976; **295:** 755-758.

[5] Gust I D, Lehman N I, Locas C R, Ferris A A, Locarnini S A. *Studies on the epidemiology of hepatitis A in Melbourne in Viral Hepatitis.* Vyas, Cohen and Schmid (eds.) Philadelphia: Franklin Institute Press, 1978; 105-112.

[6] Locarnini S A, Ferris A A, Lehman N I *et al.* The antibody response following hepatitis A infection. *Intervirology,* 1977; **8:** 309-318.

[7] Deinhardt F W, Frosner G G, Schmidt R *et al. Significance of anti-HA of the IgM class for the diagnosis of hepatitis A in Viral hepatitis.* Vyas, Cohen and Schmid (eds.) Philadelphia: Franklin Institute Press, 1978;736.

[8] Koff S R. *Epidemiology of hepatitis A in Viral Hepatitis.* New York, Chichester, Britain, Toronto: Wiley Medical Publications. John Wiley and Sons, 1978; 67-71.