CYTOMEGALOVIRUS INFECTION IN PENANG: A SEROLOGICAL SURVEY

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INTRODUCTION

Cytomegaloviruses are ubiquitous agents that commonly infect people throughout the world. This virus causes neonatal disease acquired as a congenital infection (Hanshaw, 1971). Although clinical disease is uncommon a high prevalence of this infection is reported in several countries (Stern and Elek, 1965; Krech and Jung, 1971; Madhavan *et al.*, 1974). In view of the paucity of reports in Malaysia, this investigation was undertaken and based on the geometric mean and end point antibody titres conclusions are drawn.

MATERIALS AND METHODS

Antigen: Antigen derived from Ad 169 strain of cytomegalovirus was obtained from commercial sources (Instituto Behring).

Sera: Eight hundred and thirty eight sera obtained from persons of different age groups during 1985-86 were tested. The sera were mainly from blood donors and those received for routine VDRL tests and other investigations.

Complement fixation test: The test was carried out as described by Grist *et al.*, (1979). Complement and haemolysin titres were determined by "Chess board" titration. Four units of complement (4 HD_{50}) and 2 percent sheep cells sensitised by optimal sensitising dose of haemolysin were used.

All sera were tested against four units of antigen at doubling dilutions from 1:8 to 1:256. The controls used were (a) 1:8 dilution of test sera for their anti-complementary activity (b) antigen control for its anticomplementary activity (c) antigen and antiserum control for specificity of the antigen (d) complement control with 4, 2 and 1 units HD_{50} (e) un-infected cell control antigen for its non-specific reaction with 1:8 dilution of test sera and (f) haemolytic system control. Highest dilution which shows more than 50% fixation of complement is taken as its titre of antibody against cytomegalovirus antigen.

RESULTS

The results of the investigations are shown in Table 1. Three hundred and fifty two (41%) sera out of 838 sera tested showed significant antibody titre i.e. 1:8 or more. The incidence of this virus infection was lowest at 26% in the age group of 11-20 years and highest at 59% of those above 50 years of age. The infection is well below 30% in the age groups upto 20 years and increases gradually upto 59% in persons above 50 years of age.

The geometric mean titre (GMT) was highest (22) in age group of 11-20 years and those above 50 years. GMT was also significantly higher in females in all age groups except in that of 21-30 years and those above 50 years.

DISCUSSION

Seroepidemiology, using complement fixation test through some what imperfect, provides the best means for assessment of incidence of cytomegalovirus infection in a

Table 1

C.F. antibody titres and geometric mean titres against cytomegalovirus in different age groups in Penang.

Age Groups (Years)	Sex	No. of sera tested	No. of negative sera (< 1:8)	C.F. antibody titre						No. of positive sera (%)	Total positive sex (%)	GMT for sex	GMT for age group
				1:18	1:16	1:32	1:64	1:128	1:256				
< 10	M	43	29	6	6	2	0	0	0	14 (33)	32	13	15
	F	41	23	8	3	5	1	1	0	18 (44)	(38)	18	
11 - 20	M	34	26	0	7	1	0	0	0	8 (24)	19	17	22
	F	39	28	3	3	0	4	1	0	11 (28)	(26)	26	
21 - 30	M	151	100	16	15	12	5	1	2	51 (34)	111	16	15
	F	177	117	30	17	9	4	0	0	60 (34)	(34)	14	
31 - 40	M	89	48	15	11	10	5	0	0	41 (46)	89	17	17
	F	85	37	20	12	8	6	2	0	48 (56)	(51)	17	
41 - 50	M	53	26	12	7	4	3	1	0	27 (51)	38	16	19
	F	19	8	2	4	2	2	0	1	11 (59)	(53)	27	
< 50	M	68	28	12	10	7	8	2	1	40 (59)	63	23	22
	F	39	16	6	6	7	4	0	0	23 (60)	(59)	21	
Total		838	486	130	101	67	42	8	4	352 (41)		18	

given geographical region. Seroepidemiologic data obtained by similar survey in different populations in other countries show a widely varying incidence of infection. In Tanzania (Krech and Jung, 1971) virtually all children are infected before the age of 15 years. In Northern India, the incidence was 83% in children under 5 years and increasing to almost 100% by 10-15 years (Pal *et al.*, 1972) and in South India the incidence was 66.7% below 5 years of age increasing to maximum of 96.7% by 35 years of age (Madhavan *et al.*, 1974).

In contrast, in developed countries as in Washington (Rowe *et al.*, 1965), Stockholm (Carlstrom, 1965), and London, England (Stren and Elek, 1965) the incidence of this virus infection is less than 30% and the maximum incidence of only 50% is reached in age group above 50 years.

Compared with these reports in Penang, Malaysia even upto the age of 30 years the infection rate is below 40% and maximum of 59% is found in age group above 50 years, thereby indicating that the incidence of this virus infection is comparable to that of developed countries.

The other interesting feature is the geometric mean titre (GMT) was highest at 22 in age groups of 11-20 years and those over 50 years indicating active viral infection in these age groups compared to the others. GMT was also significantly higher in females except in the child bearing age groups of 21-40 years and in these above 50 years of age. Active viral infection is probably commoner in females of younger age groups.

This present study is in contrast to the findings of Tan *et al.*, (1976) who found that 83% of women of child bearing age group (14 - 44 yrs) showed antibodies against CMV in Kuala Lumpur, the incidence being higher than in Penang. The GMT should also be calculated apart from estimating the incidence of this infection in different parts of the country to understand its epidemiology and active infection in the population.

SUMMARY

During 1984-1985, a total of 838 sera obtained from individuals of different age groups, mostly blood donors and those whose sera were received for VDRL tests and other serological investigations. The sera were titrated for complement fixing antibodies against cytomegalovirus (Ad169 strain). Three hundred and fifty two (41%) out of 838 sera showed significant antibody titre. The incidence of this virus intection varied form 26% in the age group of 11-20 years to 59% of those above 50 years of age.

Geometric mean titre (GMT) was highest (22) in age groups of 11-20 years and those over 50 years indicating active viral infection in these two age groups. GMT was also significantly higher in females in all age groups except in the age group of 21-30 years and those above 50 years, indicating that active viral infection is more common in females.

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