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Low prevalence of antibody to human parvovirus B19 in Singapore

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SUMMARY

A seroepidemiological survey was conducted in Singapore to assess the prevalence of antibody to human parvovirus B19. Sera were collected from 600 healthy individuals between 6 months and over 50 years of age and tested for IgG antibody against B19 virus by antigen capture indirect immunosorbent assay. The overall seropositivity rate was 16·2%. All the children under 5 years of age were seronegative. Antibody prevalence increased gradually from 3·5% in school children (5–14 years of age) to 7·7% in age group 15–19 years and then to 10·3% in young adults (20–24 years of age). In the age group 25–34 years the prevalence was 28% and in the age group over 35 years 65% had parvovirus B19 antibody. The results of the survey indicate that there has been very low incidence of B19 virus infection in Singapore during the last two decades.

Human parvovirus B19 (B19 virus) is the aetiologic agent of erythema infectiosum, a common, mild, acute infection of childhood [1]. It sometimes causes more severe manifestations such as arthralgia, transient aplastic crisis in patients with hereditary haemolytic anaemia, prolonged bone marrow suppression in immunocompromised patients and abortion or foetal death if infection occurs during pregnancy [1]. In countries in the temperate zone, parvovirus B19-infections are common in childhood with a peak incidence in the age group 5–15 years [2–4].

While rashes in children due to measles and rubella viruses used to be common in Singapore before mass vaccination against these viruses was introduced, erythema infectiosum had seldom been encountered. During the last 10 years a few sporadic cases of erythema infectiosum have been suspected clinically but no outbreak is known to have occurred. To determine the extent of B19 virus infection in Singapore, sera obtained from the 1993 seroepidemiological surveys on vaccine-preventable diseases were tested for antibody against this virus.

Serum specimens were collected from 600 healthy subjects from 6 months to over 50 years of age during February–July 1993. They were volunteers who

responded to a public announcement asking people to donate blood and to contribute in epidemiological studies. The age distribution of the volunteers is indicated in Fig. 1. Each age group included an about equal number of males and females. The ethnic distribution of the volunteers was 78% Chinese, 15% Malays, 4% Indians and 3% others. After sampling, the sera were frozen, and when the collection had been completed, the samples were sent to the National Institute of Health, Japan.

Anti B19 immunoglobulin G (IgG) antibody was detected by antigen capture indirect enzyme-linked immunosorbent assay (ELISA) using anti B19 monoclonal antibody and native B19 virus particle antigen [5].

Overall, only 97 of 600 (16·2%) of the sera were positive for B19 virus antibody. All the preschool children less than 5 years were seronegative. The prevalence was low in children and young adults between 5 and 24 years of age. The prevalence then more than doubled to a mean of 28% in the age group of 25–34 years, and increased further to a mean of 65% in people over 35 years of age (Fig. 1). No gender nor ethnic differences were observed.

It should be stressed that the subjects selected for the survey were not random samples. Therefore, the results obtained may not be representative of the Singapore population. Nevertheless, the survey showed that there has been very little transmission of B19 virus infection during the last two decades, as only 1·5% in the age group below 20 years of age were seropositive. The higher antibody prevalence in adults reflects a greater rate of acquisition of B19 virus infection in their childhood and the antibody was maintained even without recent exposure to the B19 virus.

Recently, there has been a marked decline in the incidence of some other viral infections in Singapore; e.g. hepatitis A [6], herpes simplex virus infection [7], cytomegalovirus infection [8], and varicella–zoster virus [9], probably partly due to improvement of environmental hygiene and sanitation and better housing conditions. The overall seroprevalence of antibody to B19 virus was, however, even lower than that to these other viruses. At the same time, the transmission of some other viral diseases continued to be high, with 84% of the children below 15 years of age infected with mumps virus [10], and epidemics of another childhood exanthem of viral aetiology, hand, foot and mouth disease, continued to occur [11].

The prevalence of anti B19 IgG antibody in children in Singapore is lower than that in Japan [5, 12], Germany [3], USA [4], and England and Wales [2]. It is also lower than that in Brazil [13, 14] and Africa [15]. On the other hand, antibody prevalence in adults over 35 years of age in Singapore was higher than that in Germany and a little lower than that in England and Wales and Japan (Fig. 2). In Japan, a 10-year shift of antibody prevalence to B19 virus was noted during the period 1973–84, but there was no corresponding decline in the prevalence of varicella–zoster virus infection [5].

As Singapore is highly susceptible to outbreaks of erythema infectiosum caused by B19 virus, a high degree of vigilance is being maintained. Outbreaks of rash-illness in children suspected of being due to B19 virus will be serologically investigated. Children and young adults are at risk of contracting the infection when travelling to areas where epidemics of B19 virus are occurring. There is also

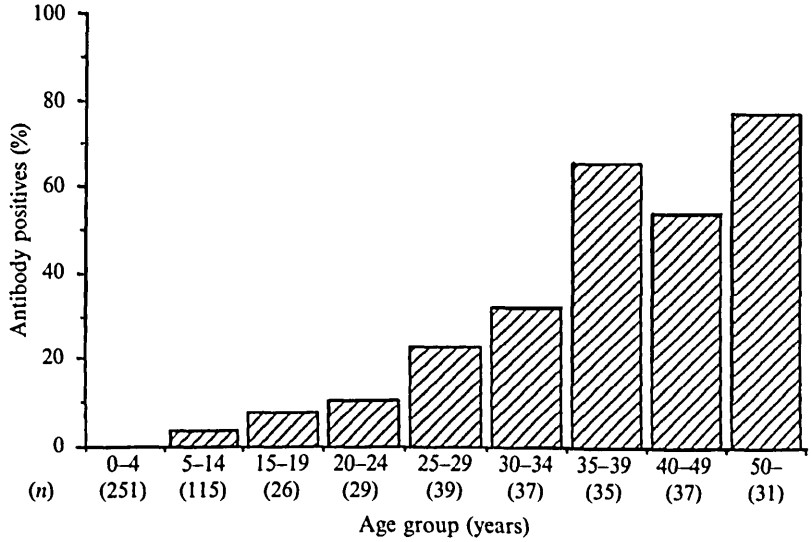

Fig. 1. Age-specific prevalence of IgG antibody to human parvovirus B19 in Singapore, 1993. (*n*): Number of sera tested.

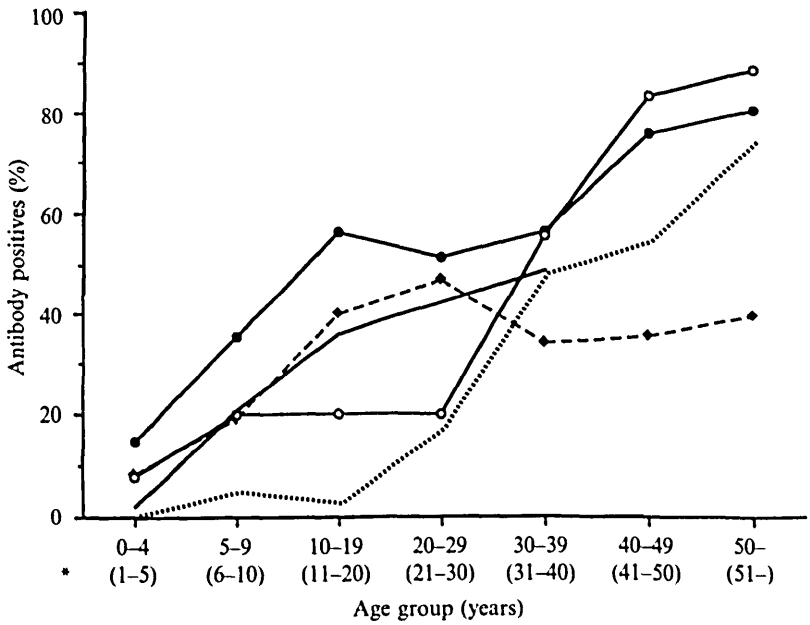

Fig. 2. Comparison of the prevalences of IgG antibody to parvovirus B19 in different countries based on this report and references [2–5]. -----, Singapore, 1993; ◆---◆, Germany, 1986*, ●–●, UK, 1985–6*; ○–○, Japan, 1984; —, USA.

the possibility of introducing B19 virus infection into the country as a consequence of the large number of visitors, and an epidemic could follow. Of concern is the low level of antibody prevalence (23%) in women 20–35 years of age, as infection during the second trimester of pregnancy may result in substantial risk of foetal loss [16].

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