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Seroepidemiological Study of Human Parechovirus 1

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Human parechovirus 1 (HPEV1), previously known as echovirus 22, was recently reclassified as Parechovirus, a new genus distinct from the Picornavirus genus on the basis of its exceptional molecular and biological properties (1). HPEV1 was originally isolated in 1956 during an epidemic of summer diarrhea (2). Previous studies reported that the predominant clinical manifestations caused by HPEV1 were infantile diarrhea and respiratory illness (3-7), but more serious symptoms such as myocarditis and encephalitis have also been reported (3). Reports on infections and the epidemiology of this virus, however, have been few, probably because infection with this virus is rare compared with other enteroviruses such as echovirus 30 (8). In this study, we investigated the antibody prevalence of HPEV1 in order to elucidate the extent of its infection in Hiroshima Prefecture.

A total of 195 sera, collected in October 2000 from residents living in Hiroshima Prefecture aged between 5 months and 79 years old, were measured for neutralizing antibody titer against HPEV1. A recent isolate of HPEV1 (HA00-243 strain: isolated in Hiroshima Prefecture in July 2000) (9) was used as an antigen, and the method used was the standard micro-neutralizing technique for enteroviruses with some modifications. Neutralizing antibody titers were expressed as a reciprocal of the highest serum dilution which inhibited the cytopathic effect by 50%. Titers exceeding 1:4 were considered to be positive.

Neutralizing antibody titers and the antibody-positive rate of age groups against HPEV1 are shown in Fig. 1. Significant levels of antibody against HPEV1 were found in almost all the sera tested (178/195; 91%), with the titers ranging from 1:4 to 1:512 or more. The number of antibody-positive sera began to increase from 6 months of age, and then rapidly increased further. Almost all the children aged between 1 and 15 years old had antibody against HPEV1 (1-5 years old: 78%, 6-10: 100%, 11-15: 89%, respectively). Additionally, the geometric mean of neutralizing titers in these age groups was higher than in other age groups (Fig. 1). Similar seroepidemiological findings on HPEV1 have been reported by others. In a study in Finland, 72 of 79 individuals aged over 1 year (91%) had neutralizing antibodies against HPEV1 (1-5 years old: 78%, 6-10: 100%, 11-15: 89%, respectively). Additionally, the geometric mean of neutralizing titers in these age groups was higher than in other age groups (Fig. 1). Similar seroepidemiological findings on HPEV1 have been reported by others. In a study in Finland, 72 of 79 individuals aged over 1 year (91%) had neutralizing antibodies against HPEV1 (5), and studies carried out in the 1960s in Japan showed that almost all the children aged over 1 year had antibody against HPEV1 (6,10). These results indicate that the seroconversion for HPEV1 antibodies occur in almost all children shortly after 1 year of age. Furthermore, HPEV1 was most commonly found in children aged under 1 year: according to the WHO data from 1967 to 1974, 61% of HPEV1 infections reported

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were seen in children under 1 year old, and 97% (566 out of 581 cases) were observed in children aged under 15 years (11). In a retrospective study in Sweden, a total of 109 cases of HPEV1 infection have been reported during a 25-year period from 1966 to 1990, and of all the patients from whom HPEV1 was isolated, 72% were aged under 1 year (4). We also previously reported that all of the patients from whom HPEV1 was isolated were under 2 years of age (9). Thus, we consider that HPEV1 is a common human pathogen whose infection occurs in the early years of life.

We compared the neutralizing antibody titers of the sera against the recent isolate (HA00-243 strain) and the prototype HPEV1 (Harris strain, which was isolated in 1959) (2). Antibody titers against the Harris strain were essentially the same for those of the HA00-243 strain (data not shown), which suggests that the antigenic epitope that induces the production of neutralizing antibody may be relatively well conserved among HPEV1 as described by Joki-Korpela et al. (12). We are currently planning a phylogenetic analysis among HPEV1 to make clear the molecular epidemiology of HPEV1 infection.

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REFERENCES
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Air Quality Monitoring in a Neonatal Intensive Care Unit

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Air sampling in health care facilities, especially in special-care areas such as neonatal intensiv? care units (NICUs), should be done on a periodic basis ln Order to determine indoor air quality, efficacy of dust control measures, or air-handling system performance. (The draft guideline is avail-

(1) ). A practical method to assess alr quality lS tO monitor airbome particles with in a certain size range using particle counters (2). Airbome particles and wind speed were continuously monitored in an NICU with five beds from 0:00 to 18:00 0n weekdays. The NICU was 199.6 m3 in size (76.75 m2floor space by 2¥6 m high), and equipped with an anteroom of21.1 m3 (8¥1 m2floor space by 2.6 m high) and a fixed dusted room-air recirculation system with 85.4 % retum. As shown in a sketch of the NICU (Fig¥ 1), four air-supply ventP were located in the ceiling and fitted with high-eeciency partlCulate air (HEPA) filters for air cleaning¥ Two air-exhaust vents were located near the floor ln two COmerS and three were located in the ceiling. The volume of air supply was 4,800 m3/h, and the air changed 24 times per hour. In the room were seven incubators,including two spares,and five monitonng equlPment units, resplratOrS, a radiant warmer, several shelves for

solutions, medical supplies, records, and other materials. Air

bone particles of >1.0 LLm diameter and wind speed were continuously monitored using a laser particle counter (KC-

03Al, ‹yion Co., Tbkyo) and a wind meter (6521, Kanomax Co., Tokyo) placed at different places in the room (point A, B, orC indicated in Fig. 1) 1 m above the floor. PointAwas

under an air-supply vent in the center of the room, point B

was near an aiƒgeXhaust vent in a corner, and polnt C was

near an air-exhaust vent in the ceiling and su'óOunded by an

incubator, a monitorlng equlpment unit, and a sink unit.

Thefluctuation in airbome particles in the NICU is shown in Fig. 2. At pointA, the particle number was 10 I 80/ft3 (4 - 30 ~ 102/m3) which was the lowest level among the three moni-

102, 61-68.