The Pedriatric Infectious Disease Journal • Volume 29, Number 2, February 2010  Measles Outbreak in an HIV Orphanage

TABLE 1. The Comparisons of Rotavirus Positive Cases (Mean) in Each Month During 3 Periods

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</thead>
<tbody>
<tr>
<td>July vs. August</td>
<td>Z = –1.900</td>
<td>P = 0.057</td>
<td>Z = –2.500</td>
</tr>
<tr>
<td>August vs. September</td>
<td>Z = –1.000</td>
<td>P = 0.317</td>
<td>Z = –2.500</td>
</tr>
<tr>
<td>September vs. October</td>
<td>Z = –0.000</td>
<td>P = 1.000</td>
<td>Z = –2.500</td>
</tr>
<tr>
<td>October vs. November</td>
<td>Z = –1.904</td>
<td>P = 0.056</td>
<td>Z = –2.500</td>
</tr>
<tr>
<td>November vs. December</td>
<td>Z = –2.652</td>
<td>P = 0.007</td>
<td>Z = –1.502</td>
</tr>
<tr>
<td>December vs. January</td>
<td>Z = –0.730</td>
<td>P = 0.465</td>
<td>Z = –1.502</td>
</tr>
<tr>
<td>January vs. February</td>
<td>Z = –0.419</td>
<td>P = 0.675</td>
<td>Z = –1.502</td>
</tr>
<tr>
<td>February vs. March</td>
<td>Z = –1.567</td>
<td>P = 0.012</td>
<td>Z = 2.727</td>
</tr>
<tr>
<td>March vs. April</td>
<td>Z = –2.417</td>
<td>P = 0.016</td>
<td>Z = 1.902</td>
</tr>
<tr>
<td>April vs. May</td>
<td>Z = –1.063</td>
<td>P = 0.288</td>
<td>Z = 2.877</td>
</tr>
<tr>
<td>May vs. June</td>
<td>Z = –0.149</td>
<td>P = 0.898</td>
<td>Z = 2.877</td>
</tr>
<tr>
<td>June vs. July</td>
<td>Z = –0.149</td>
<td>P = 0.898</td>
<td>Z = 2.877</td>
</tr>
</tbody>
</table>

Mann-Whitney U Test; P value < 0.05 means significant.

rotavirus positive cases (mean) in each month during 3 periods showed that there is no significant difference among 3 periods from July to November. During the first period (1982–1986), the beginning of peak cases started from November. In the second period (1996–2002), the beginning of peak cases started from December to January while in the third period (2003–2008), the beginning of peak cases started from January to February (Fig., Supplemental Digital Content 1, http://links.lww.com/INF/A213).

DISCUSSION

Many research groups in Japan have confirmed most of gastroenteritis cases to be caused by rotaviruses and noted that infection often appears related to the ambient temperature. Our analysis based on laboratory studies during the past 28 years shows that a temporal shift in peak rotavirus activity in Japan, from winter to early spring (from January to April), has occurred with weather factors.

The coolest months (January and February) in winter have the most of the year, followed by P[4], P[5], P[6] and some other unusual P types. Regarding G and P combinations, G1P[8] combination was the most predominant genotype followed by G2P[4], G3P[8], G9P[8] were found in 92% of cases. Some unusual G and P combinations such as G1P[4], G2P[8], G3P[4], G3P[9], G1G3P[8], and G2G3P[8] were found during this periods. It was noteworthy to point out the shift of the dominant strain from G1 to G2 during 2001–2002. The overall pattern of genotypes was similar to those described in other countries of Asia. It’s clear that rotaviruses show great genomic diversity.

We found that rotavirus has been mostly associated with gastroenteritis in infants and children less than 2 years of age in Japan. Over a 28-year period, the present study collected information on cases of rotavirus infection diagnosed and their epidemiological features in a specific geographic area and well-defined population, children under 15 years of age. The cases studied do not represent every case of rotavirus gastroenteritis occurring in the study area.

REFERENCES


MEASLES OUTBREAK IN AN ORPHANAGE

HIV-INFECTED CHILDREN ON ANTIRETROVIRAL THERAPY ARE STILL AT RISK

Linda Aurripibul, MD,‡ Thanayuee Puthanakit, MD, * Suparat Kanjanavanit, MD,† Thira Sirisanthana, MD, * and Viral Sirisanthana, MD†

Abstract: An outbreak of measles occurred in an orphanage in Chiang Mai, Thailand where 44 HIV-infected and 19 HIV-uninfected children were accommodated. History of measles vaccination was significantly correlated with the risk of acquiring measles, where HIV infection status was not.
The current Centers for Disease Control and Prevention recommendation is to give the first dose of measles vaccination at 12 to 15 months of age and the second dose at school entry. The same dosage schedule is recommended for all HIV-infected children who are not severely immunocompromised.1 Although asymptomatic HIV-infected children responded well to vaccination, protective antibodies do not persist as long as those in HIV uninfected children.2 A cross-sectional survey in 93 school-aged HIV-infected Thai children with immune recovery after highly active antiretroviral therapy (ART) demonstrated that the prevalence of measles protective antibody was 42%.3 Thus, despite routine immunization during infancy and childhood, more than half of HIV-infected Thai children with immune recovery after ART are susceptible to measles.

In July 2008, a measles outbreak occurred in an orphanage in Chiang Mai, Thailand. Its residents included both HIV-infected children as well as uninfected children from nearby, impoverished communities. This outbreak provided a spontaneous opportunity to evaluate the susceptibility to measles in HIV-infected children with immune recovery after ART in relation to their measles vaccination status.

PATIENTS AND METHODS

The study was conducted in July and August 2008. All 63 children who were residents of the orphanage at the time of the measles outbreak were included in the analysis. To identify cases of measles, we reviewed the orphanage’s health records and daily records of caregivers as well as the children’s hospital records. The diagnosis of measles was made clinically by a local physician. Vaccination history was extracted from the child’s vaccination record which is a part of his/her health record at the orphanage.

The children in the orphanage live together and share bedrooms, canteen, and study rooms. Sixteen children (25%) attended a nearby primary school while 15 older children (24%) stayed at a boarding school on weekdays. There was no history of measles in any child before this outbreak. Forty-four of the 63 children (70%) were infected with HIV. One 9-year-old boy whose CD4 cell count was 558 cells/µL was not receiving ART; the other 43 HIV-infected children were receiving ART. All of them had already achieved immune recovery, defined as recent CD4 cell count, 3 months before this outbreak, was 39% (1171 cells/µL) and her plasma HIV RNA level was <50 copies/mL. No other serious complications occurred, nor was there any death.

On July 23, a medical team from the hospital visited and vaccinated all the children in the orphanage. After discharge from the hospital, measles cases were isolated in 1 area of the orphanage until active rashes subsided. Surveillance was conducted in the schools where children from the orphanage attended. Although none of the school children who were not residents of the orphanage developed measles, all of them were given measles vaccine during this outbreak. Following implementation of these control measures, no additional cases of measles occurred in this orphanage and the 2 schools.

Of the 63 children, the median age was 9.6 years (range, 3.1–16.6). Twenty-two (35%) were male. Thirty-six (57%) had a documented history of measles vaccination. Thirteen children (20.6%) developed measles. Table 1 shows measles attack rates stratified by HIV infection status and history of measles vaccination. The overall attack rate was 21% (13/63). The attack rate among HIV-infected children was similar to that among uninfected children (10/44 vs. 3/19, P = 0.74). The attack rate among children without history of measles vaccination was 10 of 27; than among those with history of measles vaccination was significantly lower (3/36, P = 0.01). The 36 children with history of measles vaccination included 14 HIV-infected children who participated in the CMUH measles program, none of whom had measles.

A multivariate analysis for factors associated with acquiring measles named age, time since last measles vaccina-
Measles is still a common disease in developing countries. For physicians who were trained and practiced there, the clinical diagnosis is very reliable especially in the situation of disease outbreak. Children presented with fever, cough, coryza and conjunctivitis for a few days, followed by an erythematous maculopapular rash, and a pathognomonic enanthem (Koplik spots). Severe complications and death may occur, especially in immunocompromised patients.6

With increasing access to ART for HIV-infected children in developing countries, many children can now live longer and healthier lives.7,8 Measles immunization is recommended for children, including HIV-infected children who are asymptomatic but are not severely immunocompromised as well as children who are asymptomatic.4 However, in HIV-infected children standard measles vaccination schedules may be insufficient because of primary and/or secondary vaccine failure. Our previous cross-sectional survey involving HIV-infected Thai children with immune recovery after ART revealed a prevalence of protective antimeseles antibody of only 42%.5 Following 1 additional dose of measles vaccine in children who did not have protective levels of measles antibody, we could induce protective antibody titers in 90% of the children 4 weeks later.5 A recent study in Kenyan HIV-infected children showed similar results; a prevalence of measles protective antibody after 6 months of ART initiation was 42% and with revaccination 78% had positive responses.9 Currently, no specific guidelines for immunization in HIV-infected children after immune recovery has yet been formulated by relevant authorities, including WHO, the United States Centers for Disease Control, or the American Academy of Pediatrics.

Because of high intensity of exposure to measles virus in the orphanage, a result of crowded living conditions, the attack rate in our population was high (21%). The outbreak demonstrated that in an orphanage, previous measles vaccination could significantly protect children from the disease. The CMUH measles program is a way of ascertaining that participants in the program are current on measles vaccination. The outbreak was controlled with isolation and a catch-up vaccination of all orphanage residents and children at the 2 schools.

Based on these findings we emphasize the importance of mandatory primary measles immunization. We also recommend that after immune recovery all HIV-infected children be current on measles vaccination. This can be done by checking for protective measles antibody and vaccinating nonimmune children as in our measles program. Alternatively, all children in immune recovery after ART initiation can be given measles vaccination.

**ACKNOWLEDGMENTS**

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**REFERENCES**


**ORAL FLUID TESTS FOR SCREENING OF HUMAN IMMUNODEFICIENCY VIRUS-EXPOSED INFANTS**

Gayle G. Sherman, MD, PhD,**‡§ Rivka R. Lilian, BBioMedSci(Hons),‡ and Ashraf H. Coovadia, FCP(SA)‡§

**Abstract:** In high human immunodeficiency virus (HIV) prevalence settings, routine screening of infants attending immunization visits could improve identification of HIV-exposed infants to receive an early diagnosis and appropriate interventions. This first assessment of 2 rapid oral fluid HIV tests in early infancy demonstrates a sensitivity of <90% for detection of HIV-exposure resulting in failure to detect at least 1 in 10 HIV-infected infants.

**Key Words:** human immunodeficiency virus, oral fluid, rapid test, infants, prevention of mother to child transmission

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From the *Department of Molecular Medicine and Haematology, Medical School, University of the Witwatersrand, Parktown, Johannesburg,