Measles in Pregnancy Is Not Child’s Play

Philip Alfred Brunell
Formerly of the Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland

(See the Major Article by Ogbuanu et al on pages 1086–92.)

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The estimated number of measles deaths globally has declined from >548 000 in the year 2000 to about 160 000 in 2011 (http://www.who.int/mediacentre/fact_sheets/fs286/en/). Although the emphasis has been on decreasing child mortality, there has been a disquieting increase in the number of cases in adults.

In the study by Ogbuanu et al, in this issue of Clinical Infectious Diseases, 38% of measles cases were in adults [1]. In the United States in the past decade, at least 1 adult was affected in 13 of the 16 epidemics of measles involving >10 cases [2].

Failure to be immunized in a community in which others are protected would diminish the chances of exposure and might lead to growing to adulthood unprotected against measles. Can this happen in the United States? It already has. Almost 3 decades after the introduction of measles immunization in the United States, there was a national epidemic with about 55 000 cases and about 120 deaths: 22% of cases were in persons aged >18 years, many of whom were unimmunized [3]. During this epidemic in Los Angeles alone, 58 cases were reported in pregnant women [4].

It is easy to be complacent at this time, as measles has been virtually eliminated in the United States. Those who forgo immunization in the belief that their immunized friends and neighbors will protect them are foolhardy. During the epidemic in the United States in the 1980s, we were able to test >1000 students shortly after the first case occurred in their school. Although only about 4% were found to be seronegative, a sustained epidemic with several generations of cases occurred in these schools, all in individuals previously identified as seronegative [5].

Although measles is included in the exanthematous diseases of childhood, it is better described as a generalized disease manifested by a rash. This is attested to by the results of the current study, in which about half of those affected had encephalitis or pneumonia [1]. As is true of many viral infections (eg, mumps and chickenpox), adults usually suffer greater morbidity than children when they contract measles. This is particularly true when measles occurs in pregnancy. The authors found that almost 10% of these women died from measles; 40% had pneumonia. The morbidity from measles, moreover, was significantly greater in pregnant than in nonpregnant women with measles. Respiration compromised by pneumonia further compounds the increased demands of pregnancy. This, in addition to a severe febrile illness, resulted in an increased risk of low-birth-weight newborns, intrauterine fetal death, and spontaneous abortion compared to pregnant women who did not have measles. Most of the adverse events in the unborn were in pregnancies complicated by maternal death. However, these events also were significantly more common in infants of those women who survived measles in pregnancy than in the babies of pregnant women who did not have measles.

Data were not available to assess the effect of human immunodeficiency virus (HIV) or previous measles immunization on the outcomes in the current study. Thus, the question of the duration of protection afforded by measles vaccine in HIV-positive women could not be addressed. The immune response in untreated HIV-infected infants to measles vaccine was found to be clearly abnormal. The magnitude of the response, antibody avidity, and immunologic memory were markedly impaired. Antibody declined rapidly postimmunization and could not be boosted. In the same study, adults who had been immunized in childhood prior to their HIV infection appeared to have retained their antibody levels and had normal antibody avidity [6]. Children who have been treated with highly active antiretroviral therapy have much better initial and booster responses, particularly those whose immune function is relatively intact [7].
Although there was no evidence of embryopathy in the infants of affected mothers, a teratogenic effect cannot be ruled out in a study of this size. Only 7 of the pregnancies were complicated by measles in the first trimester when, by analogy with rubella, embryopathy would have been most likely. In contrast to rubella, however, congenital malformations due to measles have not been definitively reported. Some malformations were reported in infants born to mothers who had measles during pregnancy, but these did not appear to constitute a syndrome and could easily have occurred coincidentally. The largest study previously reporting 327 pregnancies complicated by measles had similar findings. However, some of these infants may have had hearing impairments that were not attributable to measles. Otitis media, which is common in this population, was not excluded [8]. In the current study, sporadic malformations also were found in infants born to mothers who did not have measles.

Although 9 infants were born within 7 days after the onset of maternal measles, only 1 case of neonatal measles was reported, and this infant died. With onset close to parturition, one might anticipate some neonatal cases, because of intrauterine transmission of measles or as a result of direct transmission postnatally. Although the relationship of the interval between maternal onset and delivery and the placental transfer of antibody have been described for varicella [9], there are no such studies for measles. Because the onset of varicella is much more clearly delineated than that of measles, determining the transfer of maternal antibody in measles would be more difficult because of the long prodrome prior to rash. Passive immunization with immune globulin usually is recommended when measles occurs close to term.

The risk of neonatal measles extends beyond the newborn period, as subacute sclerosing panencephalitis has occurred subsequently in an infant so affected [10]. Thus, healthcare providers must continue to be on the lookout for such cases for some time after cases of neonatal measles occur. This is known to affect children who have had measles early in life.

The global measles eradication program has been remarkably successful in decreasing mortality in children from this disease. We should not however, neglect the plight of adults, in particular, pregnant women, as they appear to constitute an increasing proportion of the cases in places with incomplete protection of the population.

Note

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