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Parvovirus B19 and Pregnancy

Recently, a private physician notified the Section of Epidemiology concerning a 26-year-old mother, pregnant with her third baby. At 30 weeks gestation, the woman noted decreased fetal activity. An ultrasound examination showed abdominal ascites and fetal oligohydramnios. The following day there was complete lack of fetal movement, fetal heart sounds could not be found, and an ultrasound demonstrated fetal demise. The patient underwent induction of labor and delivered a female fetus. At autopsy the fetus was noted to have nearly total liver necrosis.

The woman had reported possible exposure to fifth disease (erythema infectiosum) to her physician when she was at 22 weeks gestation. One week earlier her 3-year-old son had developed spots on his skin below the waist. Other cases of fifth disease had been reported in the community. The physician counseled the mother concerning fifth disease, and suggested antibody testing for parvovirus B19. Initial antibody testing of the mother showed an elevated IgM titer indicating recent infection with parvovirus B19. Repeat testing 3 weeks later again showed elevated parvovirus B19 IgM antibodies.

Discussion:

Parvovirus B19 is the only parvovirus known to infect humans. However, there are a number of other parvoviruses which infect other species of animals. These include canine parvovirus and feline panleukopenia virus, for which many dogs and cats, respectively, are now routinely immunized. Humans are not susceptible to these animal parvoviruses.¹

Parvovirus B19, discovered in 1975, causes a usually benign, self-limited illness, erythema infectiosum, commonly known as fifth disease. Patients with erythema infectiosum are typically healthy except for a red rash on the face, which has been termed the "slapped-cheek" appearance, and a reticulated or lace-like rash on the trunk and extremities. The rash usually appears near the end of viremia, but can recur for weeks or months. Many adults who develop this infection experience a moderately severe, self-limited arthropathy. Approximately 20% of infected persons are asymptomatic. The virus has been demonstrated to infect and lyse red blood cell precursors, interrupting production of red cells. Patients with chronic hemolytic anemia, such as sickle cell disease, who are acutely infected with parvovirus B19, may develop aplastic crises due to an acute reticulocytopenic anemia. Chronic infection may occur in persons with immunodeficiency.

Humans are the only known hosts of parvovirus B19 infection. Outbreaks commonly occur among school-age children, especially in the winter and spring. Secondary spread is common, occurring in about 50% of susceptible household contacts. Transmission is felt to be through respiratory secretions; rarely transmission via blood transfusion has been demonstrated.^{1,7}

Patients with erythema infectiosum are most infectious before onset of illness and rash. However, patients with aplastic crisis are highly contagious during their illness. Transmission of infection to 35 to 40% of susceptible hospital personnel has occurred following unprotected contact with a patient with parvovirus B19 aplastic crisis.⁸ In most studies, over 50% of adults have serologic evidence of past infection.

Infection in a pregnant woman can, but usually does not, lead to fetal infection. Prospective studies have estimated that fetal transmission occurs in approximately 33% of pregnant women infected with parvovirus B19. Fetal infection sometimes causes severe anemia due to hemolysis, leading to congestive heart failure, generalized edema (fetal hydrops), and death. The risk of fetal death attributable to acute parvovirus B19 infection during pregnancy is estimated to be less than 10%, ranging from 3 to 38% in different studies.^{1,2,3,4,5,6}

Malformations have not been reported in live infants born after in-utero infection. Hepatic necrosis noted in this case has not previously been reported. Abnormalities have been noted in fetal animals with in-utero parvovirus infection.⁶ **Diagnosis:** The optimal method for detecting infection is by assay for serum parvovirus B19-specific IgM antibody, the presence of which confirms infection within the past several months. Serum IgG antibody indicates prior infection and immunity. Private laboratories in Alaska provide this testing. The U.S. Centers for Disease Control and Prevention (CDC) and the Alaska Division of Public Health do not provide testing for parvovirus B19 infection.

Recommendations:

1. Pregnant women in contact with a person with erythema infectiosum should be informed of the relatively low potential risk to the fetus and should be offered serologic testing for infection. Fetal ultrasound and alpha fetoprotein determinations are useful for monitoring the fetus of a woman with confirmed acute parvovirus B19 infection.^{1,7}
2. When parvovirus B19 is circulating in a community, pregnant women working in schools, day cares, and health care and other facilities with a high likelihood of exposure should be informed of the potential effects of this infection on the pregnancy; serologic testing of exposed pregnant women should be considered to determine immune status.^{1,7}
3. Routine exclusion of pregnant women from the workplace where erythema infectiosum is occurring is not recommended.^{1,7}
4. Children with erythema infectiosum may attend day care or school, as they are no longer infectious after onset of rash.^{1,7}

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