Erythema infectiosum and parvovirus B19 infection in pregnancy

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Contents

The recent observation that parvovirus infection during pregnancy can cause spontaneous abortion[1] has raised concern among many pregnant women, particularly when there is an epidemic of erythema infectiosum in the community. This article reviews the pertinent scientific information and suggests management guidelines for physicians who are confronted with this problem.

Erythema infectiosum, or fifth disease, is the commonest manifestation of parvovirus B19 infection.[2,3] It usually presents as a mild febrile illness with a maculopapular rash of variable intensity. The early rosy to bright red "slapped cheek" appearance may be overlooked. Eventually a lacy, net-like erythema develops that may affect the face, arms and trunk. In adults the rash is less common, but infection may involve the joints.[4]

The discovery of parvovirus B19 was reported in 1975.[5] In addition to being the agent of erythema infectiosum it is the primary cause of aplastic crisis in people with chronic hemolytic anemia[6] and can lead to spontaneous abortion or still-birth.[7,8] The occurrence of mild, nonexanthematous or asymptomatic infections is especially common among children.[3,9] Serologic surveys have shown that parvovirus B19 infection is common, 30% to 60% of adults having antibody to the strain.[9]

Role in hydrops fetalis and stillbirth

Hydrops fetalis and stillbirth were first reported in association with parvovirus B19 infection in 1984. Since then approximately 170 cases of B19 infection in pregnancy have been described.[10-19] The infection was diagnosed through seroconversion, the detection of IgM-specific antibody in the mother's serum or the detection of B19 DNA in fetal tissue.

The risk of fetal death from intrauterine infection was estimated to be less than 3%;[19] the risk did not correlate with gestational age at the time of infection or with the presence or absence of symptoms in the mother. Cases of maternal infection and subsequent fetal death were reported in each of the three trimesters. Stillbirth occurred 1 to 12 weeks after maternal infection.[8,10,14,15]

The fetal histopathologic features were similar in all the reports of fetal death, showing evidence of severe erythroblastic reaction consistent with an intrauterine viral infection.[13] Intrauterine hemolysis was indicated by iron deposits in the liver.[13]

The incidence of congenital malformations after maternal infection is no higher than the expected rate in the general population.[19] Thus, parvovirus B19 appears to be more embryocidal than teratogenic; this concept is further supported by case-control studies in which the incidence of parvovirus antibody was no greater among more than 300 infants with congenital anomalies than among healthy infants.[10]

The mechanism by which parvovirus causes hydrops fetalis and stillbirth is unknown. However, the virus has a predilection for rapidly dividing cells such as erythrocyte progenitor cells.[20] The increased number of these cells in patients with chronic hemolytic anemia may facilitate parvovirus B19's replication and cause aplastic crisis.[6] The relatively high proportion of erythrocyte progenitor cells in the fetus may also explain the hemolysis and anemia as well as the fetal edema and hydrops fetalis. A recent report has suggested that an elevated maternal serum a-fetoprotein level may be a useful marker for fetal aplastic crisis in cases of intrauterine parvovirus B19 infection.[18]

Recommendations

There are no known measures to treat or control parvovirus B19 infection, and there are only limited data on the effect of this infection in pregnancy. Physicians who counsel pregnant women concerned about such infections should be advised as follows.

- ?? Because of the high prevalence of parvovirus B19 IgG among adults, most pregnant women are not at risk for parvovirus infection, even during an epidemic of erythema infectiosum.
- ?? Serologic tests for parvovirus antibody are not commercially available and remain research tools. Therefore, individual risk cannot be assessed.
- ?? If a pregnant woman has symptoms of erythema infectiosum, with or without arthropathy, parvovirus B19 infection should be suspected. Information concerning the fetal outcomes in the small number of reported cases of infection in pregnancy should be provided. However, the risk of adverse effects on the fetus cannot be completely assessed because of the small number of cases.
- ?? Therapeutic abortion is not indicated, because the intrauterine infection is more embryocidal than teratogenic.
- ?? Management guidelines for pregnant women with symptomatic infection have not been formally evaluated. Monitoring of maternal serum for elevated levels of a-fetoprotein may indicate fetal aplastic crisis.[18] A preliminary study has suggested that fetal loss is unlikely if the level stays within normal limits.[18] If the levels are increased, then serial ultrasonography may be useful to detect hydrops fetalis. In cases of hydrops fetalis fetal blood samples may reveal the severity of the aplastic crisis; if severe, in-utero transfusions or early delivery and transfusions may be beneficial, although this has not been tested.
- ?? Exclusion from school or isolation of children with symptomatic erythema infectiosum is not recommended, because the virus is rarely detected in symptomatic patients.[2,3] Patients are infectious during the viremia, which occurs a week before the symptoms appear. In contrast, respiratory isolation precautions are suggested for patients in hospital with aplastic crisis and chronic hemolytic anemia, because the virus is commonly detected during the acute phase of the aplastic crisis.[6]

Conclusion

Most pregnant women are not at risk for parvovirus infection because of immunity. If maternal infection does occur the outcome will likely be a healthy term infant, although hydrops fetalis and stillbirth may occur. There is no known specific treatment available to prevent fetal infection, and vaccines have not yet been developed.

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