
In the name of
God

Parvovirus in pregnancy

Antibodies to B19 are found in 30 to 60 percent of adults .

The secondary attack may be as high as 50 percent.

Susceptible individual exposed in a classroom has a 20 to 30 percent risk of infection.

35 to 53 percent of pregnant women have preexisting IgG to the virus, indicating immunity from a prior infection .

The incidence of acute B19 infection in pregnancy is 3.3 to 3.8 percent groups.

B19 can be detected in blood and secretions as early as 5 to 10 days after exposure .

Patients with normal immune systems probably are not infectious after the onset of B19-associated rash, arthralgias, or arthritis.

Maternal-fetal effects

B19 infection during pregnancy may be associated with fetal loss or hydrops fetalis.

There do not appear to be long-term developmental sequelae of infection in children who do not develop hydrops fetalis.

Fetal loss：The initial reports linking B19 and poor fetal outcome suggested that the risk of stillbirth or fetal loss was **greater than 30 percent .**

Fetal death occurred in **6.3 percent** of pregnancies

The fetal death rate in women diagnosed with first trimester infection was 13 percent,

Decreasing to 9 percent for infections diagnosed at 13 to 20 weeks of gestation, and 0 after 20 weeks.

Transient effusions

- Maternal parvovirus infection has been associated with transient isolated fetal pleural or pericardial effusions that resolve spontaneously before term.

- Result from direct pleural or myocardial inflammation

Fetal hydrops

B19 is cytotoxic to fetal red blood cell precursors and may cause anemia and hydrops fetalis.

The specific ultrasound findings of nonimmune hydrops.

- The risk of anemia and fetal hydrops appears to be greater when women are infected during the first half of pregnancy.

- Hydrops occurred in 3.9 and was more common when infection was diagnosed at ≤32 weeks of gestation (4.4 versus 0.8 percent after 32 weeks).

- The median interval between diagnosis of maternal infection and hydrops was three weeks;
- 50 percent of cases occurred two to five weeks after maternal infection
- 93 percent occurred within eight weeks of maternal diagnosis.

severity of the anemia probably results from three factors:

- ✓ Reduced survival of fetal red blood cells.
- ✓ The need to meet the red cell demands of an expanding intravascular volume.
- ✓ Inability of the immature immune system of some fetuses to control the infection.

Heart failure

- Hemoglobin levels of 2 g/dL or lower have been reported and presumably lead to high-output congestive heart failure.

- B19 also can infect myocardial cells(myocardial injury) may contribute to the hydrops and fetal death in some cases .

Thrombocytopenia

Severe thrombocytopenia can lead to exsanguination at the time of intrauterine red cell transfusion.

The platelet count should be determined and platelets should be available for transfusion at the time of any fetal procedures.

DIAGNOSIS

- ✓ IgG and IgM antibody testing,
- ✓ Polymerase chain reaction assays may also be helpful in certain situations.
- ✓ Parvovirus B19 is difficult to culture

- IgM antibody (ELISA) are sensitive tests, detecting (80 and 90 percent)can be detected 10 days after exposure; they may persist for three months or longer .

- B19 IgG antibodies are detected several days after IgM and usually persist for years; they are a marker of past infection.

- Reliance on a negative IgM serologic result alone can be misleading in a patient with a significant exposure history, because in some instances maternal IgM levels may be below the detection limit.

- In such cases, polymerase chain reaction can be useful.

Fetal parvovirus infection

(PCR) is a sensitive method to detect small amounts of B19 DNA.

Use of this technique on amniotic fluid is the method of choice to make the diagnosis of fetal parvovirus infection .

Fetal blood for B19 IgM;Percutaneous fetal blood sampling, method used to obtain fetal blood, carries a 1 percent fetal loss rate.

Other methods:

- ✓ Electron microscopy,
- ✓ Detection of viral DNA,
- ✓ Probe hybridization assays for nucleic acids

APPROACH TO THE PATIENT EXPOSED TO B19

Pregnant women who are exposed to or have symptoms of parvovirus infection should have serologic testing for IgG and IgM antibodies.

- **Past infection:**

A positive IgG antibody and a negative IgM indicate maternal immunity; thus, the fetus is protected from infection.

- **Acute infection:**

A positive IgM antibody is consistent with acute parvovirus infection. The significance of this depend on the stage of pregnancy

- **Women who are diagnosed with acute infection in the first half of pregnancy should be counseled that there is no proven risk of parvovirus-induced congenital anomalies, but there is a risk for fetal loss.**

Women who are diagnosed with acute infection beyond 20 weeks gestation should receive periodic ultrasounds (weekly beginning as early as 22 weeks) to look for:

- Fetal hydrops,
- Scalp edema,
- Ascites,
- Polyhydramnios,
- Cardiomegaly.

Serial ultrasounds commonly are performed but the risk of hydrops is low.

There is also controversy about how long to continue ultrasound monitoring.

Suggesting that ultrasound be performed for at least eight weeks after an acute infection.

Susceptible host

A pregnant woman who is negative for both IgG and IgM parvovirus antibody is susceptible to infection, especially if she has contact with small children and there are parvovirus cases in the community.

Management of this patient will depend on history of potential parvovirus exposure:

History of exposure

There is no proven benefit to removal of seronegative women from high-risk employment (eg, school teacher or day care center employee) for the duration of pregnancy.

Careful hand washing and avoiding sharing food or drinks is likely to at least partially prevent the spread of B19.

Recent history of exposure

- If a pregnant patient has a history of recent parvovirus exposure and initial serologies are negative additional screening for maternal B19 DNA study.

MANAGEMENT OF ANEMIA AND HYDROPS

Mild to moderate anemia is well tolerated by the fetus and resolves without sequelae.

Severe anemia, can lead to hydrops fetalis and death.

parvovirus-induced anemia is a transient process, determination of fetal Hb is not necessary unless severe anemia is suggested by sonographic signs.

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- **Doppler assessment of (MCA) peak systolic velocity (PSV) and DV velocity are accurate and a noninvasive tool for detection of anemia alternative to cord blood sampling .**

Amniocentesis to determine change in optical density of amniotic fluid at 450 nm on the spectral absorption curve (delta OD450) probably is not useful for evaluating the degree of anemia since red blood cell destruction with production of bilirubin is not the primary cause of the anemia.

When severe anemia is suspected because of an elevated Doppler MCA PSV or signs of hydrops, the fetus requires close monitoring and assessment of fetal hematocrit by percutaneous umbilical vein sampling. Intrauterine fetal blood transfusion usually is performed if severe anemia is confirmed.

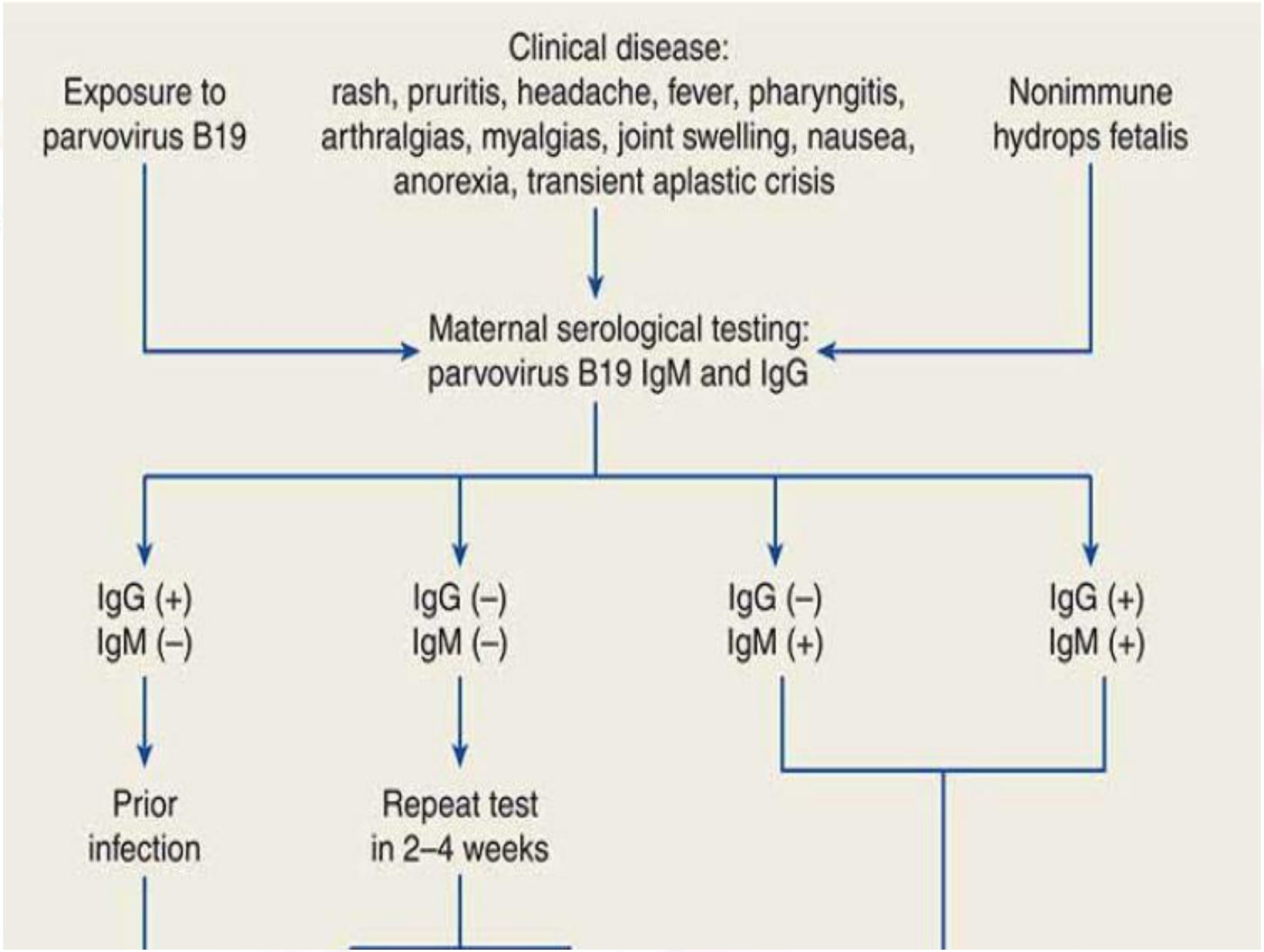
- The efficacy of intrauterine transfusion in parvovirus infection is suggested by a review.

- Fetal transfusion for hydrops improved the survival rate (82 versus 55 percent without transfusion).

postnatal management of the hydropic infant

The management of a woman with a hydropic infant should be undertaken in a tertiary care facility staffed by individuals experienced in the care of sick neonates.

With all high-risk births, delivery of a hydropic infant mandates coordinated efforts by the obstetrician, perinatologist, and neonatal team to optimize pregnancy outcome.



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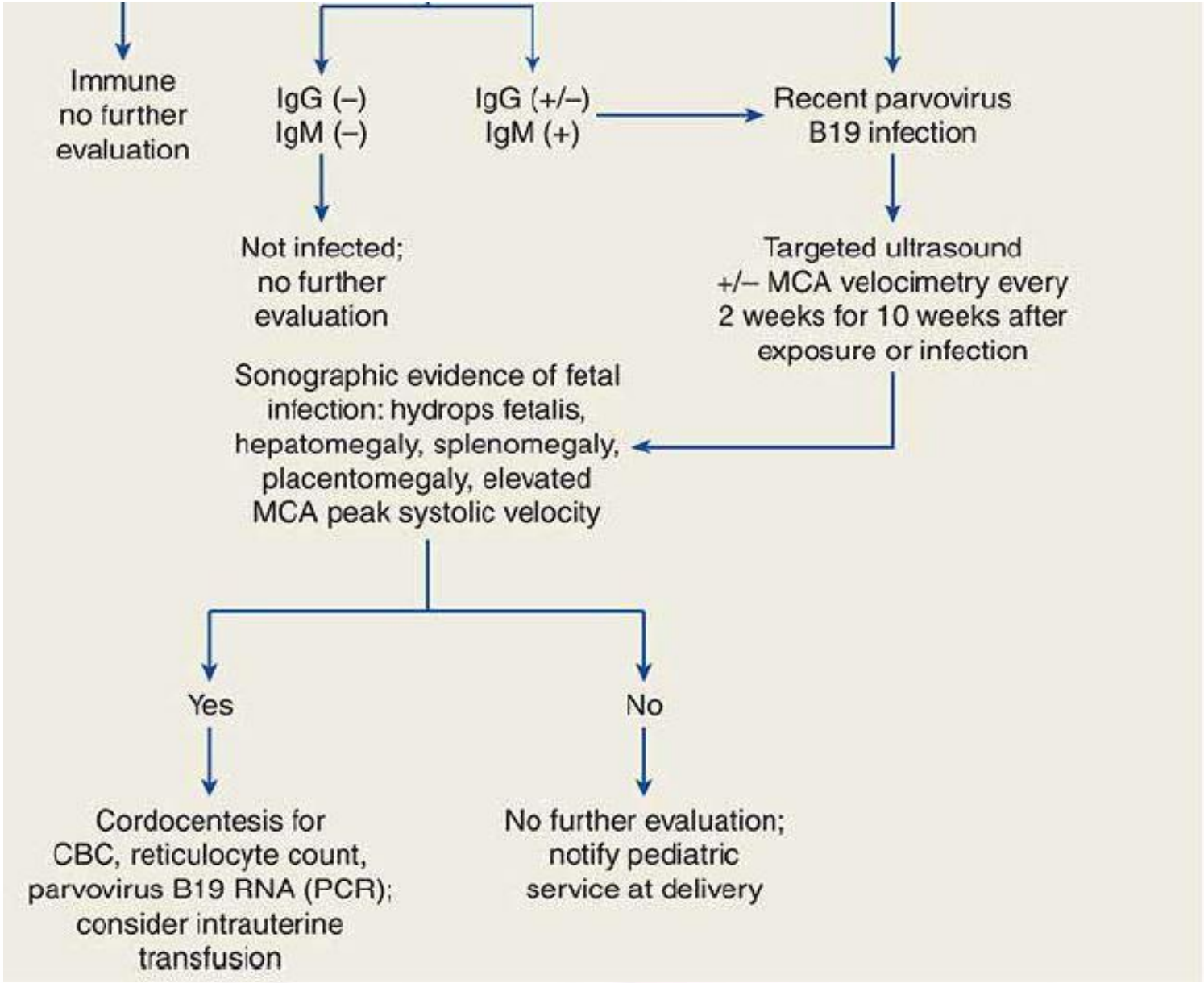

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Rubella in pregnancy

- Acquired rubella is generally a mild, self-limited disease approximately 14 to 21 days after inoculation with the virus.

- Prodromal symptoms consisting of low-grade fever, conjunctivitis, coryza, sore throat, cough, and occasionally headache and malaise.

- These symptoms usually last one to five days before the onset of the rash.

Congenital rubella syndrome

Rubella infection can have catastrophic effects on the developing fetus, resulting in spontaneous abortion, fetal infection, stillbirth, or intrauterine growth restriction.

Maternal-fetal transmission occurs via hematogenous spread and varies with gestational age.

There is considerable pathologic evidence that suggests that the rubella virus spreads through the vascular system of the developing fetus after infecting the placenta.

cytopathic damage to blood vessels and ischemia in affected organs .

In the first trimester, fetal infection rates as high as 81 percent have been observed, dropping to 25 percent in the late second trimester and increasing again in the third trimester from 35 percent at 27 to 30 weeks to nearly 100 percent for fetuses exposed beyond 36 weeks.

The risk of congenital defects after maternal infection is essentially limited to maternal infection in the first 16 weeks of pregnancy .

Risk of CRS is associated with infection after 20 weeks' gestation, and intrauterine growth retardation may be the only sequelae of third trimester infection' gestation

no evidence that rubella infection immediately prior to pregnancy increases the risk of congenital infection In general, maternal immunity, either vaccine or naturally derived, is protective against intrauterine rubella infection. However, there have been CRS cases resulting from maternal reinfection .None of these cases occurred in women infected after 12 weeks

DIAGNOSIS

Serology is widely available and may be used to screen for rubella infection Enzyme linked immunoassays (ELISA) are sensitive, easy to perform, and measure rubella-specific IgG and IgM. Immunofluorescent antibody assays are also sensitive and rapid; commercial IgG and IgM assays are available.

Other serologic tests :

- ✓ Passive hemagglutination antibody (PHA),
- ✓ latex agglutination, complement fixation,
- ✓ Hemagglutination inhibition (HI)
- ✓

Acute rubella syndrome is best diagnosed by:

- A fourfold rise in IgG titer
- The presence of rubella specific IgM
- A positive rubella culture

Serum should be obtained within 7 to 10 days after the onset of the rash and repeated two to three weeks later.

Rubella virus may be isolated from nasal, blood, throat, urine, or cerebrospinal fluid (CSF) specimens.

The virus is generally isolated from the pharynx one week before to two weeks after the rash.

Rubella IgM is detected in a pregnant woman in the absence of a history of rubella-like illness further investigation is required.

In persons with no or low risk of exposure to rubella, the reactive IgM is likely falsely positive due to rheumatoid factor or other antibodies which cross react with the assay.

The Centers for Disease Control and Prevention in the United States discourages the use of rubella IgM for rubella screening in pregnancy

Prenatal diagnosis

Polymerase chain reaction (PCR) is another option for providing presumptive diagnosis of rubella infection.. for prenatal diagnosis .

- A case report of maternal primary rubella in the second trimester also showed that amniotic fluid was negative by PCR at both 19 and 23 weeks, while fetal blood was positive at 23 weeks.

- Rubella specific PCR on CVS samples may be superior to standard serologic testing on fetal blood.

Ultrasound diagnosis of an affected fetus would be extremely difficult given the nature of the malformations

The workup of any fetus with intrauterine growth restriction should include evaluation for congenital viral infections including rubella.

TREATMENT

Treatment for acute rubella infection may include acetaminophen for symptomatic relief.

Glucocorticoids, platelet transfusion, and other supportive measures are reserved for patients with complications such as thrombocytopenia or encephalopathy.

The use of immune globulin for pregnant women with acute infection is controversial.

There are no data to suggest that IgG has a beneficial effect on the fetal response to disease and limiting the use of IG to women with exposure who decline pregnancy termination.

PREVENTION

A single dose of this vaccine given at one year of age or older results in measurable antibody in almost 95 percent of susceptible persons.

Vaccination is recommended for all children at 12 to 15 months and 4 to 6 years in conjunction with measles and mumps (MMR).

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Contraindications to rubella vaccination :

Febrile illness,

Immunodeficiency disorder,

History of anaphylaxis to neomycin,

Pregnancy.

Postpartum vaccination should be performed and Breastfeeding is not contraindicated.

Side effects: arthritis, arthralgia, rash, adenopathy, or fever.

Postpartum vaccination programs have been shown to significantly reduce rubella susceptibility in pregnant seronegative women

(ACOG) is that rubella susceptible women should receive MMR vaccine postpartum for protection against all of these viral pathogens.

Fetal infection is diagnosed by testing chorionic villous samples (CVS) and amniotic fluid samples with (PCR) assay.

Ultrasound findings are not specific for the prenatal diagnosis of CRS, but finding intrauterine growth retardation should prompt evaluation for congenital infections.

Women should be counseled about pregnancy termination, especially when infection is diagnosed prior to 16 weeks' gestation, due to the high risk for CRS.

- Rubella vaccination can effectively protect against subsequent infection and is the best strategy to eliminate cases of CRS.
- The vaccine is live and may cross the placenta and theoretically infect and it is contraindicated during pregnancy.
- women are advised to avoid pregnancy for one month following vaccination.
- Thus pregnancy termination is not recommended for women who are vaccinated during pregnancy.


Thank You!