



Rh Disease

The Rh factor is an inherited protein found on the surface of red blood cells. Most people have this protein and are called Rh-positive. However, some people don't have protein; they are called Rh-negative. **Rh-negative pregnant women are at risk of having a baby with a potentially dangerous form of anemia called Rh disease.** Fortunately, treatment usually can prevent Rh disease.

How does Rh disease affect a fetus or newborn?

Rh disease destroys fetal red blood cells. It once was a leading cause of fetal and newborn death. Without treatment, severely affected fetuses often are stillborn. In the newborn, Rh disease can result in jaundice (yellowing of the skin and eyes), anemia, brain damage, heart failure and death. It does not affect the mother's health.

How many people are Rh-negative?

In the United States, about 15 percent of the white population, 5 to 8 percent of the African-American and Hispanic populations, and 1 to 2 percent of the Asian and Native American populations are Rh-negative (American College of Obstetricians and Gynecologists [ACOG], 2006; Moise, 2009). Being Rh-negative does not affect a person's health in any way.

What causes Rh disease?

An Rh-negative mother and an Rh-positive father may conceive an Rh-positive baby. When this occurs, some of the fetus's Rh-positive red blood cells may get into the mother's bloodstream during pregnancy, labor and birth. Because red blood cells containing the Rh factor are foreign to the mother's system, her body tries to fight them off by producing antibodies against them. This is called sensitization.

Once a woman becomes sensitized, her Rh antibodies can cross the placenta and destroy some of the red blood cells of an Rh-positive fetus. In a first pregnancy with an Rh-positive baby, there usually are no serious problems because the baby often is born before the mother is sensitized, or at least before the mother produces many Rh antibodies. However, a sensitized woman continues to produce Rh antibodies throughout her life. This means that in a second or later pregnancy, an Rh-positive baby is at risk for more severe Rh disease.

How can a woman find out if she is Rh-negative?

A simple blood test can tell if a woman is Rh-negative. Every woman should be tested at her first prenatal visit, or before pregnancy, to find out if she is Rh-negative. Another blood test can show if an Rh-negative woman has become sensitized.

How can Rh disease be prevented?

An unsensitized Rh-negative pregnant woman can be treated with injections (shots) of a purified blood product called Rh immune globulin (RhIg) to prevent sensitization. She most likely receives RhIg at 28 weeks of pregnancy and again within 72 hours of giving birth if a blood test shows that her baby is Rh-positive (ACOG, 1999). She does not need an injection after delivery if her baby is Rh-negative. Some health care providers recommend an additional RhIg injection if a woman's pregnancy goes past her due date (ACOG, 1999; Moise, 2008).

An Rh-negative woman should be treated with RhIg after any situation in which the fetal red blood cells can mix with her blood, including (ACOG, 1999; Moise, 2008):

- Miscarriage
- Ectopic pregnancy
- Induced abortion
- Amniocentesis
- Chorionic villus sampling (CVS)
- Abdominal trauma
- External cephalic version (when the health care provider attempts to turn a breech-position baby into head-down position before labor)

Do all unsensitized Rh-negative women need treatment with Rhlg?

An Rh-negative woman does not need treatment with Rhlg if blood tests show that the baby's father is Rh-negative (ACOG, 1999). If the father is Rh-negative, the baby is Rh-negative. An Rh-negative baby is not at risk of Rh disease.

How does Rhlg work?

It is not known exactly how Rhlg works. It contains antibodies to the Rh factor that may prompt certain immune cells to clear Rh-positive cells from the mother's circulation. As a result, she may not produce her own antibodies against fetal Rh-positive cells (Moise, 2008).

Protection by Rhlg lasts only about 12 weeks (ACOG, 1999). An Rh-negative woman must be treated during each pregnancy.

Does Rhlg treatment always work?

Proper treatment with Rhlg can prevent sensitization in almost all unsensitized Rh-negative women (ACOG, 1999). However, Rhlg does not work for an Rh-negative woman who already is sensitized. The main reason Rh-negative women become sensitized is that they do not receive treatment when they need it, such as after an unrecognized miscarriage.

Is there any way to get rid of a sensitized mother's antibodies?

No. Even if a woman has no symptoms and stays healthy, she can continue to produce antibodies as part of her blood. If she has any more Rh-positive babies, they could develop Rh disease.

What special treatment does a sensitized Rh-negative woman need during pregnancy?

The baby's father can have a blood test to see whether he is Rh-positive or Rh-negative. If the father is Rh-negative, the baby is not at risk of Rh disease, and the pregnant woman does not need any special tests or treatment.

If the father is Rh-positive (or if his Rh status is not known), the health care provider usually offers a sensitized pregnant woman a test called amniocentesis to determine whether the baby is Rh-positive or Rh-negative. Even if the father is Rh-positive, he may carry an Rh-negative gene. The baby has a 50-percent chance of inheriting the Rh-negative gene, so he has a 50-percent chance of being Rh-negative. During amniocentesis, the doctor inserts a needle into a woman's abdomen to withdraw a small amount of amniotic fluid for testing. Amniocentesis poses a very small risk of miscarriage.

A new maternal blood test appears to be highly accurate in determining whether the fetus is Rh-positive or negative (5). This blood test was recently introduced in the United States and may soon reduce the need for amniocentesis (Van der Schoot, Hahn & Chitty, 2008).

If the fetus is Rh-positive (or if the fetal Rh status is unknown), the health care provider measures the levels of antibodies in the mother's blood as pregnancy progresses. If she develops high levels of antibodies, the provider recommends tests that can help determine if the baby is developing Rh disease.

Which tests are used to monitor the baby's health?

Most major medical centers offer an examination with a special form of ultrasound, called Doppler ultrasound, to determine if the fetus is developing anemia and how severe it may be. This test, which is repeated every 1 to 2 weeks, measures the speed of blood flowing through an artery in the fetus. It poses no risk to the fetus. Doppler ultrasound has reduced the need for amniocentesis to monitor fetuses at risk of Rh disease. A 2006 study reported that a Doppler ultrasound is more accurate than amniocentesis in detecting anemia (Oepkes, 2006). However, this test is not yet available everywhere. Women who do not live near a medical center that offers Doppler ultrasound can still be monitored with amniocentesis, which must be repeated every 10 days to 2 weeks.

If Doppler ultrasound or amniocentesis shows that the fetus may be developing severe anemia, the health care provider may recommend another test called cordocentesis. In this test, the doctor inserts a thin needle through the mother's abdomen, guided by ultrasound, into a tiny blood vessel in the umbilical cord to take a blood sample from the fetus. This test poses a small risk of miscarriage.

How are fetuses and newborns with Rh disease treated?

If the fetus is near term and tests show that the baby is developing anemia, the health care provider may recommend inducing labor early, before the mother's antibodies destroy too many fetal blood cells. After birth, if the baby has jaundice, he may be placed

under special blue lights (phototherapy). In some cases, the baby may need a blood transfusion. Some cases of Rh disease are so mild that the baby does not need any treatment.

About 10 percent of fetuses with Rh disease develop severe anemia, which in the past was usually fatal (Mari et al., 2000). Today these fetuses can be treated in the uterus as early as 18 weeks gestation with blood transfusions, which are given using cordocentesis. About 90 percent of treated babies now survive (Moise, 2008).

Can the RhIg treatment transmit HIV or hepatitis?

Although RhIg is a blood product, there is minimal to no risk of contracting HIV or hepatitis from it (ACOG, 1999). The donated blood is screened for HIV and hepatitis and treated with a substance that kills viruses and bacteria.

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