



Mansoura University

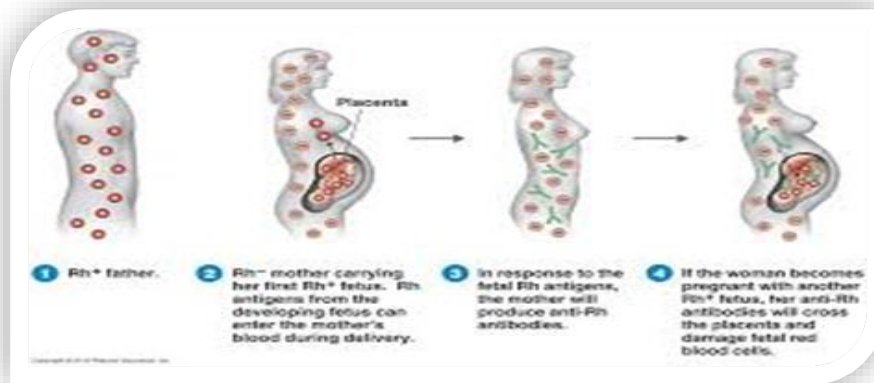
Faculty of Nursing

Woman's Health & Midwifery Nursing Department

Third level (credit hours)

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RH Incompatibility



Prepared by:

Group. D2

Under supervision:

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Out lines:

- Definition of the Rh incompatibility
- Pathophysiology of Rh incompatibility
- Signs and symptoms of Rh incompatibility
- High risk woman for Rh incompatibility
- Degrees of severity
- Diagnosis of the Rh incompatibility
- Treatment for Rh incompatibility
- Prevention of Rh incompatibility
- Complication of Rh incompatibility
- References

Objectives

General objective

At the end of this seminar, each student will be able to acquire knowledge, practice and attitude about Rh incompatibility

Specific objectives:

At the end of this seminar, each student will be able to:

- define the Rh incompatibility
- know the Pathophysiology of Rh incompatibility
- list signs and symptoms of Rh incompatibility
- describe high risk woman for Rh incompatibility
- define the degrees of Rh severity
- diagnose the Rh incompatibility
- classify tests and exams of Rh incompatibility
- know the treatment for Rh incompatibility
- identify the prevention of Rh incompatibility
- describe the complication of Rh incompatibility

Definition:

Rh incompatibility is a condition that occurs during pregnancy if a woman has Rh-negative blood and her baby has Rh-positive blood.

This means that if blood cells from your baby cross your bloodstream, which can happen during pregnancy, labor, and delivery, your immune system will make antibodies against your baby's red blood cells.

Antibodies are parts of your body's immune system. They destroy foreign substances.

Pathophysiology

The Rh factor is a specific protein found on the surface of your red blood cells. When you're pregnant, blood from your baby can cross into your bloodstream, especially during delivery.

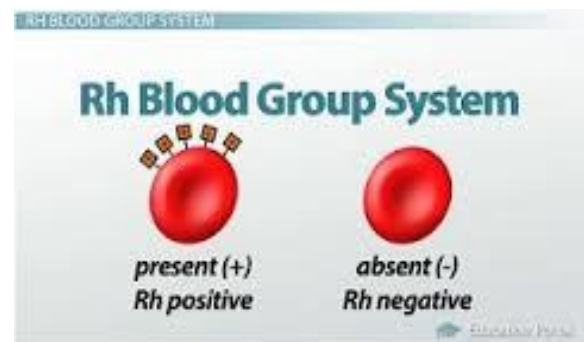
If you're Rh-negative and your baby is Rh-positive, your body will react to the baby's blood as a foreign substance.

Your body will create antibodies (proteins) against the baby's Rh-positive blood. These antibodies usually don't cause problems during a first pregnancy. This is because the baby often is born before many of the antibodies develop.

However, the antibodies stay in your body once they have formed. Thus, Rh incompatibility is more likely to cause problems in second or later pregnancies (if the baby is Rh-positive).

The Rh antibodies can cross the placenta and attack the baby's red blood cells. This can lead to **hemolytic anemia** in the baby.

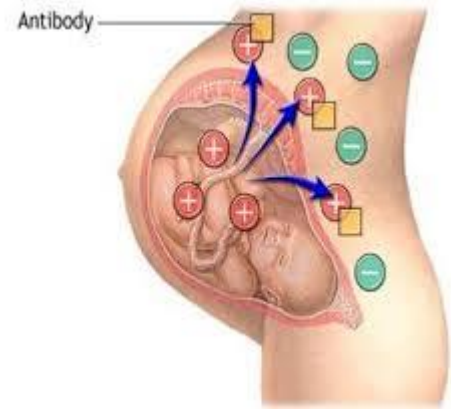
Without enough red blood cells, your baby won't get enough oxygen. This can lead to serious problems. Severe hemolytic anemia may even be **fatal** to the child.



Causes

Factors that influence an Rh-negative pregnant female's chances of developing Rh incompatibility include the following

- Ectopic pregnancy
- Placenta Previa
- Placental abruption
- Abdominal/pelvic trauma
- In utero fetal death
- Any invasive obstetric procedure (eg, amniocentesis)
- Lack of prenatal care
- Spontaneous abortion
- Failure to administer Rh IgG when indicated
- Error in typing the mother's or infant's blood
- Unrecognized fetomaternal hemorrhage
- Inadequate Rh IgG dosage for the volume of fetomaternal hemorrhage



Other conditions to consider in patients with suspected Rh incompatibility include the following:

- ABO incompatibility
- Autoimmune hemolytic anemia
- Microangiopathic hemolytic anemia
- Spherocytosis
- Hereditary enzyme deficiencies
- Alpha thalassemia
- Erythroblastosis fetalis
- Hydrops fetalis

Signs and Symptoms of Rh Incompatibility:

After birth, the infant may have:-

- Pale skin and mucous membranes (lining of the cheeks and gums)
- Limp and sleepy
- Jaundice (yellowing of the skin and eyes)
- Difficulty breathing.
- Swelling in his face, arms, and legs
- lethargy
- low muscle tone

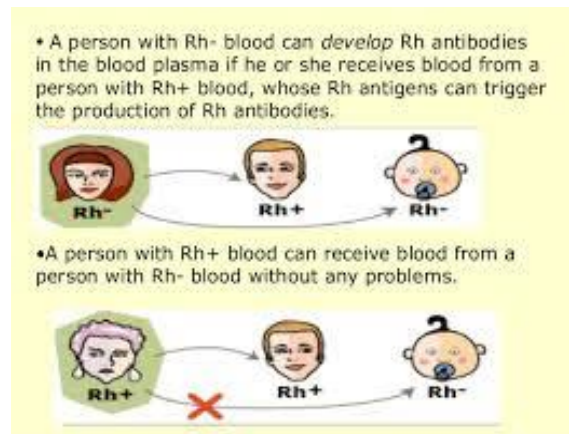
Your unborn baby's symptoms can range from mild to life-threatening. When your antibodies attack your baby's red blood cells, hemolytic disease can occur. This means your baby's red blood cells are destroyed.

When your baby's healthy red blood cells are destroyed, bilirubin will build up in their bloodstream. Too much bilirubin is a sign that the liver, which is responsible for processing old blood cells, is having trouble.

Your baby may have one or more of the following symptoms if their bilirubin levels are high after birth

High Risk women for Rh Incompatibility:

- a) Any woman who is Rh-negative and is having a child with a father who is Rh-positive or with an unknown Rh status is at risk for Rh incompatibility.
- b) It takes time for the body to develop antibodies, so firstborn children are usually not affected. However, if a mother became sensitized because of a miscarriage or abortion, her first birth may be affected by Rh incompatibility.
- c) A mother can be exposed Rh-positive blood during certain prenatal tests like amniocentesis.
- d) A mismatched blood transfusion or blood and marrow stem cell transplant.
- e) An injection or puncture with a needle or other object containing Rh-positive blood.



Degrees of severity

1-**Mildly affected** infants may have little or no anemia and may exhibit only hyperbilirubinemia secondary to the continuing hemolytic effect of Rh antibodies that have crossed the placenta

2-**Moderately affected** infants may have a combination of anemia and hyperbilirubinemia/jaundice

3-In **severe cases** of fetal hyperbilirubinemia, kernicterus develops. {Kernicterus is a neurologic syndrome caused by deposition of bilirubin into central nervous system tissues. Kernicterus usually occurs several days after delivery and is characterized by loss of the Moro (ie, startle) reflex, posturing,

poor feeding, inactivity, a bulging fontanel, a high-pitched shrill cry, and seizures. Infants who survive kernicterus may go on to develop hypotonia, .hearing loss, and mental retardation}

4-Another serious life-threatening condition observed in infants affected by Rh incompatibility is erythroblastosis fetalis, which is characterized by severe hemolytic anemia and jaundice. The most severe form of erythroblastosis fetalis is hydrops fetalis, which is characterized by high output cardiac failure, edema, ascites, pericardial effusion, and extra medullary hematopoiesis. Newborns with hydrops fetalis are extremely pale with hematocrits usually less than 5. Hydrops fetalis often results in death of the infant shortly before or after delivery and requires an emergent exchange transfusion if there is to be any chance of infant survival

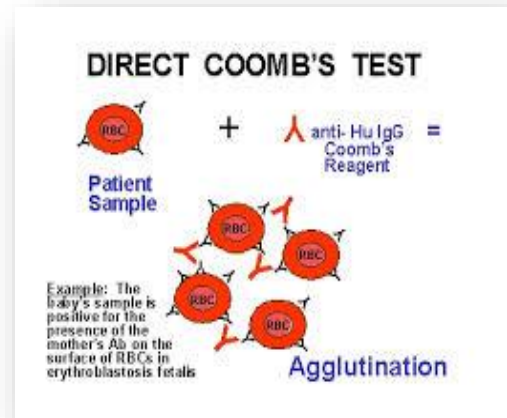
Diagnosis:

A blood test to determine your Rh status will likely be done at your first prenatal visit with your doctor. If you're Rh-negative, your partner may also be tested. If your partner is also Rh-negative you don't have anything to worry about. If your partner is Rh-positive and you're Rh-negative, your doctor will look for these signs of Rh incompatibility:

- **Blood tests:** Immediately after the birth of any infant with an Rh-negative mother in the ED or prehospital setting, examine blood from the umbilical cord of the infant for ABO blood group and Rh type, measure hematocrit and hemoglobin levels, perform a serum bilirubin analysis, obtain a blood smear,



and perform a direct ***Coombs test***
(A positive direct Coombs test is a sign of Rh incompatibility. This test uses a blood sample to look for the presence of cell-destroying antibodies on the surface of your red blood cells).



(Elevated serum bilirubin measurements, low hematocrit, and elevated reticulocyte count from the neonate can help determine if an early exchange transfusion is necessary)

Fetal blood sampling: This test may be done to check your baby's blood type and risk of anemia. Caregivers take a sample of your baby's blood from the umbilical cord. With an ultrasound to guide them, a needle is put through your skin, into your uterus, and into the umbilical cord.

Ultrasound: This test uses sound waves to show pictures of your baby inside your uterus. Caregivers can learn the age of your baby and see how fast he is growing. The movement, heart rate, and other organs of your baby can be seen. Your placenta and amniotic fluid may be checked.

Doppler ultrasonography: may be done periodically to evaluate blood flow in the fetus's brain. If it is abnormal, the fetus may have anemia. Then doctors anesthetize an area of skin over the woman's abdomen and insert a needle through the abdomen into the umbilical cord to obtain a sample of blood from the fetus (a procedure called percutaneous umbilical blood sampling). The sample is then analyzed to check for anemia.

Treatment of Rh Incompatibility:

** If you're pregnant and your doctor determines that you've already developed antibodies against your baby, your pregnancy will be closely monitored.

** Treatment focuses on preventing the effects of the incompatibility. In mild cases, the baby can be treated after birth with:

- Series of blood transfusions (may be given through the umbilical cord and after birth to treat severe anemia).
- Hydrating fluids
- Immunoglobulin: This is an injection of antibodies to help reduce the destruction of red blood cells.
- Electrolytes, which are elements that regulate metabolism
- Phototherapy:
- Phototherapy involves keeping your baby near fluorescent lights to help reduce the bilirubin in their blood. These procedures may be repeated until the Rh-negative antibodies and excess bilirubin have been removed from your baby's blood. Whether it must be repeated depends on the severity of your baby's condition

Prevention of Rh Incompatibility:

Rh incompatibility is almost completely preventable. Rh-negative mothers should be followed closely by their providers during pregnancy.

You can prevent the effects of Rh incompatibility by getting an injection of Rh immune globulins (RhIg) during your first trimester, during a miscarriage, or while having any bleeding during your pregnancy. This blood product contains antibodies to the Rh factor. If your baby has Rh-positive blood, you should get a second injection a few days after you give birth.



Special immune globulins, called **RHoGAM**, are now used to prevent RH incompatibility in mothers who are Rh-negative.

If the father of the infant is Rh-positive or if his blood type is not known, the mother is given an injection of **RhoGAM** during the second trimester. If the baby is Rh-positive, the mother will get a second injection within a few days after delivery.

These injections prevent the development of antibodies against Rh-positive blood. However, women with Rh-negative blood type must get injections:

- During every pregnancy
- After a miscarriage or abortion
- After prenatal tests such as amniocentesis and chorionic villus biopsy
- After injury to the abdomen during pregnancy

RhoGAM® description

- Contains IgG anti-D (anti-Rh₊)
- Prevents Rh alloimmunization
- Manufactured from human plasma that contains anti-D
- A single 300mcg dose will suppress the immune response to 15 ml of Rh-positive RBCs (approx 30 mL whole blood)



Doses of RhoGAM:

*Anti D (RhoD or RhoGAM) injection **1500 IU / 300 µg**
IM for the mother at(28 weeks of gestation, threatening abortion at any time, for the mother within 72 hours of an abortion of 13 weeks or more , delivery of Rh positive baby or after procedures like amniocentesis or chorionic villus sampling, obstetric complication, threatened abortion).



*If abortion within 13 weeks give **250 IU/ 50 µg**

*if abortion, amniocentesis, any other manipulation after 34 weeks give **600 IU/ 120 µg** within 72 hours



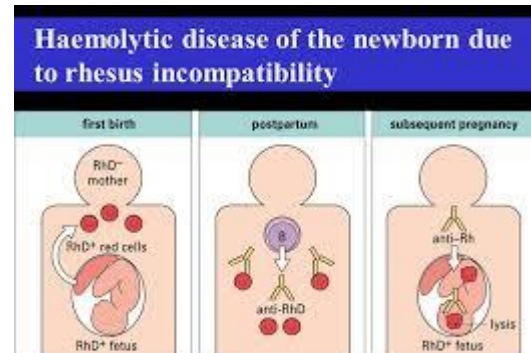
Women are often given **corticosteroids** to help the fetus's lungs mature. Then the baby can be safely delivered earlier. When the fetal lungs are mature, labor is induced (usually at 32 to 35 weeks of pregnancy). The baby may need additional transfusions after birth. Sometimes no transfusions are needed until after birth.

Complications:

The outlook is good in mild cases of Rh incompatibility.

Severe cases, in which the effects of Rh incompatibility aren't prevented, can result in severe complications.

- 1) Brain damage of the baby
- 2) Fluid buildup or swelling in the baby
- 3) Trouble with mental function, movement, hearing, and speech
- 4) Seizures
- 5) Anemia
- 6) Heart failure
- 7) Death of the baby can also occur. Rh incompatibility is rarely a problem in countries with good medical care.



Nursing management for Rh incompatibility

Nursing diagnoses for Rh incompatibility

Risk for injury from breaking down products of RBCs in greater numbers than normal and functional immaturity of the liver

Goals

- Will receive appropriate therapy to accelerate bilirubin excretion.
- Will experience no complications from phototherapy.

- Will experience no complications from exchange transfusion.
- Interrupted family process R/T infant with potentially adverse physiologic response.
- Family will receive emotional support.
- Family will be prepared for home care of the neonate.

NURSING CARE for Rh incompatibility DURING PHOTOTHERAPY

- 1) Remove clothing to proper skin exposure.
- 2) Turn infant frequently to expose all skin area.
- 3) Record and report jaundice and blood levels of bilirubin.
- 4) Record and report if any change in body temperature
- 5) Cover and check eyes with eye patches to prevent eye injury.
 - a. Be sure the eyes close before applying eye patch to prevent corneal irritation
 - b. Should be loose enough to avoid pressure.
 - c. Eye patches should be changed every 8 hourly and eye care
- 6) Nurse should expect the infant's stools to be green and the Urine dark because of photo degradation products.
- 7) Serum bilirubin and hematocrit should be monitored during therapy and for 24 hours following therapy.
- 8) In case of breast milk jaundice stop breast feeding temporarily.
- 9) Maintain feeding intervals to prevent dehydration.

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