MATERNAL ALLOIMMUNIZATION & HDFN

A brief overview for patients and their families

Hemolytic Disease of the Fetus & Newborn

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WHAT IS RED BLOOD CELL ALLOIMMUNIZATION AND HOW DOES IT CAUSE HDFN?

Maternal alloimmunization occurs when a woman makes red blood cell antibodies as a result of foreign blood mixing. These antibodies can cross the placenta and attack the unborn child, a disease called hemolytic disease of the fetus and newborn (HDFN). HDFN can have devastating consequences including anemia, hyperbilirubinemia, and death. With close monitoring and timely treatment, babies with HDFN have a very high survival rate. Unfortunately, due to the rarity of alloimmunization and the variation in care practices around the world, well-managed pregnancies and ideal infant outcomes are not universal - but they can be!

WHAT CAUSES MATERNAL ALLOIMMUNIZATION?

Most women find out that they have a red cell antibody, or maternal alloimmunization, when their first trimester antibody screen comes back positive. This often comes as a shock since the antibodies weren't present/detected in the previous pregnancy. Our immune system creates antibodies when something foreign is detected in our bodies. The antibodies keep us safe by attacking the foreign thing (such as a virus) that is threatening us. This can happen when we are exposed to a blood type that is different from our own. Our body thinks the foreign blood is a threat, so our immune system creates antibodies specifically designed to destroy the different blood type. This exposure happens during pregnancy, childbirth or from a blood transfusion.

WHAT ARE THE RISKS?

Once your body has created antibodies you will have them for the rest of your life. They will not affect you or put you in danger unless you need a blood transfusion. The donor blood you are given must be matched to your specific antibodies or you could be at risk for a hemolytic transfusion reaction. It is important to tell your doctors about your antibodies for the rest of your life, and especially before a blood transfusion.

The biggest risk is to your baby during pregnancy and after birth. Your antibodies can cross the placenta during pregnancy and destroy your baby's red blood cells, causing the baby to become anemic. If fetal anemia is not treated properly during pregnancy, serious problems such as hydrops, organ damage, or death can occur.

If HDFN is not treated properly after birth, serious problems such as anemia, high bilirubin, brain damage, or death can occur. Infants with HDFN are also at risk for neutropenia and thrombocytopenia. Thankfully there are treatments that can be used to protect your baby from these risks.

Monitoring & Treatment

An exact monitoring and treatment plan will vary, but in general women can expect:

- Blood work (titers or quants) every 4 weeks until 24 weeks, then every 2 weeks until delivery.
- Weekly MCA Doppler Ultrasounds if the blood work comes back at or above a specific threshold (1:16 for most antibodies, 1:4 for anti-K).
- If the MCA Dopplers show signs of anemia, an intrauterine blood transfusion will be given.
- Weekly non-stress tests and biophysical profiles from 32 weeks until delivery.
- Delivery between 37 and 38 weeks.
- If there are signs of fetal anemia or IUTs were needed, delivery may be earlier.

ALLO HOPE
FOUNDATION

After Birth

An exact monitoring and treatment plan will vary, but in general families can expect:

- Blood work at birth to check for the baby's blood type, anemia, bilirubin, neutropenia, & thrombocytopenia.
- Blood work for bilirubin every 6-24 hours while in the hospital.
- Follow up labs every 1-2 days for the first couple of weeks to check on baby's bilirubin and hemoglobin levels.
- Weekly hemoglobin checks until 12 weeks of age.

Key Things

- Babies who were not anemic in the hospital can become anemic later.
- Medical literature says babies with HDFN should not be given iron supplements without a ferritin test.

WHAT ARE THE LONG-TERM OUTCOMES?

There is good news - over 90% of the babies born with HDFN survive, and most of them do so with no long-term effects. However, while most of the babies have no ill-effects, poor outcomes can still happen.

In the LOTUS study by Lindenburg and Smits-Wintjens, 291 children who had had IUTs due to HDFN were tested between ages 2-17. Cerebral palsy was found in 6 children (2.1%), severe development delay was found in 9 (3.1%), and bilateral deafness in 3 children (1%). The overall rate of neurodevelopmental impairment was 4.8% or 14/291. The factor that was the most likely to result in neurological impairment was the development of severe hydrops. Preventing fetal hydrops is the best way to avoid neurological issues.

CAN I HAVE MORE CHILDREN?

Absolutely! You will always have antibodies, even when you are not pregnant or when your titer is very low, but your antibodies do not have to limit your family size. It has been thought that subsequent pregnancies are affected at earlier gestations, and more severely, however that is not always the case. With improvement in care practices, and new treatment options, there are several choices available if you wish to have more children. While there are many ways to grow your family, there are also alternatives to natural conception that avoid the risk of HDFN altogether. If you want to learn more about how to prepare for another alloimmunized pregnancy, talk to your doctor before you get pregnant again. Alloimmunization does not have to limit your family size - you DO have options.