

## **Rhesus disease (patient information leaflet)**

### **What is your blood group?**

Blood comes in a number of different types or groups. These are given the letters O, A, B and AB. Each red blood cell has identifiers on its surface which correspond to the type of blood that it is. As certain blood groups are not compatible with each other when someone requires a transfusion the blood is cross matched against blood from the individual to whom it is to be donated so that the recipient does not react against the donated blood. As a general rule blood from O group individuals can be given to anyone.

### **What are Rhesus blood groups?**

In addition to the main blood groups then there are also rhesus blood groups which have been given the letters C, D and E. For the purpose of this information sheet we will only talk about the D group but in the main C and E act in the same way.

### **How is our Rhesus blood group determined?**

We each inherit a D or d rhesus blood group from each of our parents. That means we can be DD, Dd, dD or dd. Big D is what we call dominant and if either one or both of our rhesus D group is a big D then we are rhesus positive. If we are dd then we are rhesus negative. Being rhesus negative has not effect on us at all unless we come into contact with blood from a Big D group.

### **What is Rhesus sensitisation occur?**

If a rhesus negative person is injected with a small amount of rhesus positive blood then their body will recognise that blood as being foreign and in much the same way as we fight infection it will start to produce antibodies against that blood. Initially the response to the first challenge is quite weak but if this happens again then the body will remember that it has seen this foreign problem before and will produce large numbers of antibody to fight off the challenge. This is what happens with an infection. The first time we come across it we suffer the disease but produce some antibodies against it. The second time we come into contact with it our immune system produces the antibodies to stop us getting the same infection twice.

### **How does rhesus sensitisation occur?**

It can occur because of a miss matched blood transfusion although this is very unlikely. However in pregnancy it is not unusual for small amounts of the baby's blood to cross through the placenta into the mum's blood. This is more likely to occur if there is bleeding after the 12<sup>th</sup> week of pregnancy, if the mother has an amniocentesis or if there is significant trauma to the maternal abdomen such as in a car accident. In addition the baby's blood often enters into the mums circulation at the time of delivery. Such events are only likely to cause a problem if the mother is rhesus negative.

### **Why is being rhesus negative a problem?**

If you are rhesus negative and you are carrying a rhesus positive child then if some of your baby's blood enters your circulation this will potentially cause you to form antibodies against that blood type.

### **What is the effect of having rhesus antibodies?**

At very low levels (less than 4 international units) these have little or no effect. However, if the levels rise then they will cross through the placenta and start to attach themselves to the baby's blood. The baby then recognises these red cell as being covered in antibodies and will destroy those red cells. With low levels of antibodies the effect is small and the baby can compensate by simply producing more red blood cells. If the levels continue to rise then it will reach a point when the baby can no longer produce red blood cells faster than they are being broken down. At this point the baby starts to become anaemic. If the baby becomes very anaemic then it develops a condition called immune hydrops. This is a medical term for a baby who had developed fluid under the skin in the abdomen and in the chest. Left untreated the baby will become more and more anaemic and would eventually die.

### **Can the baby be treated?**

Yes. There are two ways to treat a baby. The first is to deliver the baby early and then treat the baby outside of the womb. The second is to treat the baby before delivery with a blood transfusion. Using ultrasound we identify either the site of the cord insertion into the placenta or a large blood vessel in the baby's abdomen. A needle is then passed through the mother's abdomen, again watching all the time on ultrasound, and into the baby's blood vessel. Blood is taken to see if the baby is anaemic and if this is confirmed blood is then transfused into the baby. The amount of blood given is dependant on the number of weeks pregnant you are and how anaemic the baby is. Although this will correct the anaemia it does not cure the problem and therefore further transfusions have to be given about every two weeks until delivery.

### **What are the risks of fetal blood transfusions?**

Fetal blood transfusions use very fresh blood that has been cross matched against the mother, we choose donors who we have tested for infection and are known to be healthy. The blood is treated so as to provide as minimal a risk as possible to the baby. This procedure is not without risk and like amniocentesis carries a risk of causing a miscarriage. That risk is in the order of 1 in a hundred for each transfusion that is performed.

### **How do we decide when a transfusion is necessary?**

a) Maternal antibodies.

All women have their antibodies checked as part of their routine booking bloods and again at around 28 weeks. If either of those tests suggest the presence of a blood group antibody these results will be discussed with you along with the further action required. Usually this just involves a repeat blood

test every 4 weeks. As long as the antibody levels are below 4 international units then they rarely cause a problem. If however they rise above this level then you will be referred for more ultrasound scans.

#### b) Ultrasound assessment.

It has been known for some time that we can screen for fetal anaemia by studying the blood flow in a blood vessel inside the baby's head. This sounds frightening but simply involves scanning the baby as was done at the booking visit or the time of the mid pregnancy scan. We then use a technique called colour flow Doppler which allows us to spot the blood flow inside the head. Once we know where the blood flow is it is very easy for the machine to record the flow inside the vessel and for us to calculate the maximum flow velocity. We usually take a number of recordings and then compare your result with the expected level at that stage of the pregnancy. Unfortunately the result can change quickly so we often have to repeat this measurement on a weekly basis. If the value is very high that suggests the baby is anaemic and we would then make a decision as to whether to deliver or treat.

#### **Delivery or transfusion?**

The decision to deliver or transfuse depends on a number of factors but as a general rule if the baby is less than 34 weeks then we would opt for a transfusion and if beyond that stage we would deliver.

#### **How common is it to be rhesus negative?**

15-17% of the white UK population are rhesus negative. It is much less common amongst those of an Asian background. The incidence of rhesus antibodies is rare as for many years we have had an ability to prevent it.

#### **How can we prevent this problem?**

If we know that a woman has had an incident that may cause the baby's blood to enter her blood stream we can do two things. One is to take blood from the mother and perform a test called a Kleihauer. This enables the lab to see if there is any fetal blood in the mum's blood stream and secondly if it is present it allows us to calculate how much we think there is. Secondly we can give the mother anti D. This is a dose of rhesus antibodies which will attach to the fetal red cells. Once coated in antibody the mother will destroy them before she has a chance to produce her own. This is why we give anti D after miscarriages which occur after 12 weeks, amniocentesis or episodes of bleeding.

#### **What happens after delivery with a rhesus negative mother?**

After delivery we take blood from the cord and from the mother. The cord blood enables us to check the fetal blood group. If the baby is rhesus negative like the mother then we need do nothing further. However if the baby is rhesus positive we would perform a Kleihauer and give an appropriate amount of anti D.

**Why was / am I being offered a dose of anti D at 28 weeks?**

We are aware that in a number of pregnancies silent bleeds from the baby to the mother can occur with no obvious precipitating cause. By giving the mother a prophylactic dose of anti-D we can hopefully have sufficient rhesus antibodies in her circulation to deal with such a bleed. This hopefully will reduce what is already a very small risk to a minuscule one.

**If I have had anti D at 28 weeks and bleed a week later do I need to report it?**

The answer to this is yes as we would always want to check out the cause and see if further anti D was required.