NON IMMUNE HYDROPS DUE TO PARVOVIRUS B19 IN PREGNANCY: A CASE REPORT

John Quigley [1*], Barry Doyle [2], Edwina Burke [1], Marie Culliton [1], Matias Diaz [1], Peter McParland [1]
[1]The National Maternity Hospital, Holles Street, Dublin 2, [2]The Irish Blood Transfusion Service, Dublin 8, Ireland

INTRODUCTION

Parvovirus

Human parvovirus B19 is a small non-enveloped single stranded DNA virus. Forty percent of women of childbearing age are susceptible to the virus which is capable of crossing the placental barrier. An infection in early pregnancy may cause profound fetal anaemia, fetal hydrops and fetal death.

MCA Doppler

MCA Doppler, a non- invasive ultrasound technique, can diagnose fetal anaemia by monitoring the blood flow through the middle cerebral artery (MCA). The rise in MCA peak systolic velocity (PSV) reflects an increased flow to the brain with decreased viscosity which correlates negatively with the fetal Hb concentration and may indicate a requirement for transfusion of the fetus.

Intrauterine Transfusion

An Intrauterine Transfusion (IUT) involves the transfusion of a pre-calculated volume of blood into the sedated fetus via the umbilical vein under ultrasound guidance, see Figure 1. It is an invasive procedure that carries a risk of fetal loss of between 1.7 - 8% after 20 weeks gestation. The aim is to enable the pregnancy to advance to a gestational age that will permit survival of the neonate. Packed red cells is transfused to minimise the number of procedures needed. In the case of parvovirus, one transfusion is usually necessary, however in the case of HDFN, many transfusions may be needed for the duration of the pregnancy.

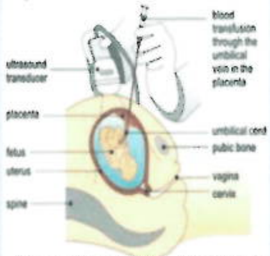

Figure 1. IUT Insertion into the umbilical vein under ultrasound guidance.

OBJECTIVES

To investigate the effect of fetal red cell transfusion for the treatment of fetal anaemia due to parvovirus B19 infection and to follow up the clinical outcome of the baby.

BACKGROUND

This was a retrospective individual case report. A 39 year old primigravida presented at 20 weeks with mild fetal ascites (Figure 2), slight cardiomegaly with mild pericardial effusions (Figure 3). Fetal anaemia was suspected and subsequently confirmed using the MCA Doppler which assesses the velocity of blood flow through the MCA (Figure 4) and then correlates the data to a graph (Figure 5). A history over the previous 3-4 weeks of pain in wrists and arms, ankle swelling and stiffness in the neck suggested an infection with Parvovirus as the likely cause. Serology tests on the maternal serum confirmed recent infection due to presence of parvovirus B19 IgM/IgG specific antibodies. The patient was referred for an urgent intrauterine transfusion. Fetal blood samples from the umbilical vein were obtained prior to transfusion and haemoglobin levels were tested pre, during and post transfusion. Fetal blood samples were also obtained for viral studies.

Figure 2. TS of fetal abdomen with rim of ascites visible as the dark shadow to the left of the image.

Figure 3. View of the fetal heart displaying mild cardiomegaly and slight pericardial effusions.

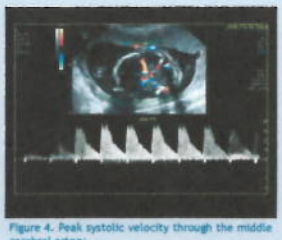

Figure 4. Peak systolic velocity through the middle cerebral artery.

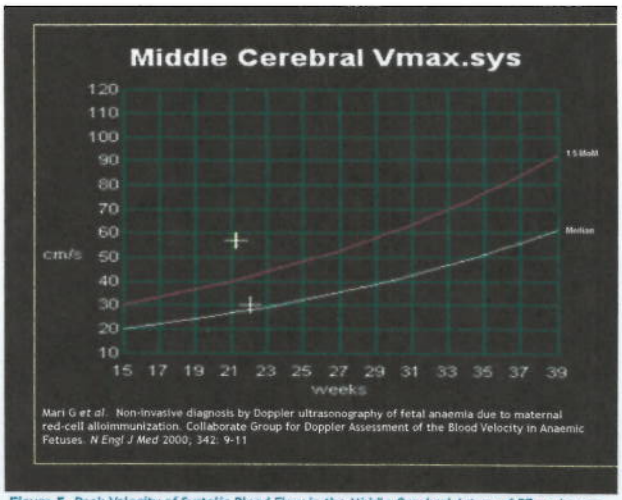

Figure 5. Peak Velocity of Systolic Blood Flow in the Middle Cerebral Artery of 57 cm/s was observed using the MCA Doppler. The grey curve indicates the median peak systolic velocity in the middle cerebral artery, and the red curve indicates 1.5 multiples of the median (MoM). This graph illustrates that at 21 weeks gestation this fetus had severe anaemia with a peak systolic velocity value above 1.50 times the median.

TREATMENT

The fetal haemoglobin increased from 2.7g/dl (pre IUT) to 11.7g/dl (post IUT). Viral studies confirmed the presence of parvovirus B19 in the fetus with a high parvovirus DNA load. 40mls of blood was transfused via the umbilical vein while the fetus was under anaesthesia. The MCA PSV returned to normal immediately following the procedure. A further examination was performed five days post IUT, during which it was observed that the baby was active and the ascites resolved. No follow up IUT was necessary, however fetal monitoring continued. A healthy baby was born at 39 weeks gestation. There were no reported medical interventions, relating to the fetal anaemia for this infant since delivery.

RECOMMENDATION

In Ireland and in the United Kingdom, parvovirus B19 screening of blood donations has not yet been established. While the technology is available, the benefits of screening every donor may not justify the cost implications. However screening could play an important role in the "at risk" groups such as the unborn fetus. In Germany, upon request, parvovirus B19 screening is carried out to make available B19 virus-safe blood components for certain susceptible groups. From a maternity point of view we would strongly recommend that parvovirus B19 screening should be considered a special requirement in selecting blood components for intrauterine transfusion, provided it does not cause undue delay in the availability of the blood component.

CONCLUSIONS

IUT is an invasive procedure that carries a risk of fetal loss of 1.7% (in Ireland). In the case of parvovirus, one transfusion is normally sufficient as packed cells are transfused to minimise the number of procedures needed. In the absence of randomised controlled trials the treatment of fetal anaemia for non-immune hydrops with IUT still remains controversial and should only be carried out in a centre of excellence for fetal medicine by an experienced fetal medicine consultant. The requirement to test for the presence of parvovirus infection in blood donors should be considered, especially in an antenatal setting, or if the donation is to be used for IUT given the asymptomatic nature of the disease in healthy individuals and the consequences for a fetus.

REFERENCES

1. Schild R L, Bald R *et al*. Intrauterine Management of Fetal Parvovirus B19 Infection. *Ultrasound in Obstetrics and Gynecology* **1999**;13:161-166.
2. Odibo A O, Campbell W A *et al*. Resolution of Human Parvovirus B19 Induced Non-immune Hydrops After Intrauterine Transfusion. *Journal of Ultrasound Med* **1998**; 17:547-550.
3. Dembinski J, Haverkamp F *et al*. Neurodevelopmental Outcome after Intrauterine Red Cell Transfusion for Parvovirus B19 Induced Fetal Hydrops. *International Journal of Obstetrics and Gynecology* **2002**; 109: 1232-1234.

jquigley@nmh.ie