Anti-D: getting it right

Although the use of anti-D is routine, confusion around when and how it should be administered is risking the health and lives of women and babies, as Katy Hurrell explains.

Administration of anti-D immunoglobulin is a routine occurrence in midwifery practice and has had a significant impact on the outcomes for babies previously at risk of haemolytic disease of the fetus and newborn (HDFN). Yet mistakes are worryingly common.

Within two decades of introducing anti-D for postnatal use in 1969, the death rate fell from 46 per 100,000 pregnancies to 1.6 per 100,000 (Pilgrim et al, 2009). It fell further when, in 2002, NICE recommended the introduction of routine antenatal anti-D prophylaxis (RAADP) for all RhD-negative women without immune anti-D during the third trimester of pregnancy.

But despite the drop in the death rate and the increased use of anti-D over the past 40 years, more recent figures highlight the rise in errors occurring – from 67 in 2004 to 354 in 2013. This increase seems likely to be a reflection of a better awareness of the need to capture error data as opposed to a correlation with the higher birth rate over recent years, for example.

These figures come from an annual report (Bolton-Maggs et al, 2013) by UK-wide scheme the Serious Hazards of Transfusion (SHOT), which was launched in 1996. While participation in SHOT is voluntary, 99.5% of NHS trusts/health boards reported incidents in 2012 (Bolton-Maggs et al, 2013).

As well as dealing with transfusion, SHOT investigates blood component incidents and errors relating to the use of anti-D. It says that every year mothers and babies are put at risk because clinicians and laboratory staff fail to follow the national guidelines on the safe use of anti-D (Bolton-Maggs et al, 2013). It seems there is a lack of knowledge of when and how anti-D should be administered.

This observation was reaffirmed at last year’s RCM annual conference when NHS Blood and Transplant (NHSBT) ran a fringe event on the use of anti-D. The feedback from those who attended was that they lacked confidence in its use. Yet it is vital that this isn’t the case.

Haemolytic disease

HDFN occurs when maternal antibodies cause the destruction of red cells in the fetus or neonate. This can happen if there is mixing of fetal and maternal blood in fetomaternal haemorrhage (FMH). The mother’s immune system may recognise the fetal cells as being foreign and will form antibodies, which is a process known as sensitisation; usually, the mother and pregnancy are unaffected.

However, the immune response becomes problematic in subsequent pregnancies with an RhD-positive fetus. The antibodies produced by the mother are then able to cross the placental barrier and cause haemolysis of the fetal red cells. This can cause HDFN, which can result in anaemia and jaundice. In severe cases of HDFN it can cause hydrops and the fetus to die in utero or the neonate to suffer brain damage due to kernicterus caused by very high bilirubin levels.

Any events occurring during pregnancy that are likely to cause an FMH are known as potentially sensitising events (PSEs). These can include: amniocentesis/chorionic villus sampling, antepartum haemorrhage/PV bleeding in pregnancy, ectopic pregnancy, evacuation of a molar pregnancy, miscarriage or threatened miscarriage, intrauterine death or stillbirth, delivery, or sharp/blunt abdominal trauma.

If there has been any PSEs, then anti-D should be administered to RhD-negative
women, along with RAADP, in order to cover any silent PSEs during the third trimester and postnatally, if the baby is RhD positive. This binds any RhD-positive cells and removes them from circulation before they sensitise the mother to produce antibodies.

Usually, a PSE will not cause a bleed of greater than 4ml but, in PSEs after 20 weeks’ gestation, it is important to take a sample for a Kleihauer test to establish how big the PSE has been, in case a larger-than-standard dose of anti-D is required to cover it.

**How anti-D works**

RhD is the most common blood group antigen capable of causing HDFN. By administering anti-D to an RhD-negative mother, it reduces the chances of her becoming sensitised. Birth is the time of greatest risk of FMH and anti-D should always be administered to an RhD-negative mother with an RhD-positive baby within 72 hours. If anti-D is omitted or given later than 72 hours after the PSE, the woman has the potential to become sensitised to the D antigen and develop immune anti-D.

Usually, the FMH at birth will be no more than 4ml, which is covered by the standard 500iu dose. However, a Kleihauer test should also be performed to establish if the FMH is greater than 4ml. If this is the case, the dose of anti-D will need to be adjusted. This is traditionally calculated as 125iu for each additional ml of FMH. In large FMH (greater than 100ml), intravenous anti-D should be considered. In RhD-negative mothers with RhD-negative babies, no anti-D is required, although some midwifery units have made the decision to cover all RhD-negative mothers with anti-D, regardless of the baby’s blood group, to reduce the risk of mistakes occurring.

In 2012, 65% of the errors that occurred were due to omission or late administration of anti-D (Bolton-Maggs et al, 2013). But with women being discharged so soon after giving birth, and sometimes to a different area, these errors could be occurring because timeframes are not being met. Issues around understaffing and transfer of care procedures, for example, could be contributory factors too. But whatever the reasons, this seems to indicate a need for maternity services to develop more robust processes to address this situation.

**New guidelines**

The British Committee for Standards in Haematology (BCSH) has recently published new guidelines on the use of anti-D (Qureshi et al, 2014). These also advise on the use of it for ectopic pregnancy and after cell salvage for CS, which had not been included before.

Aside from the BCSH document, there are a number of other national guidelines from organisations such as the RCOG (2011) and NICE (2012; 2011; 2008; 2006; 2005). Unfortunately, the guidance contains slightly differing views over the administration of anti-D in certain situations. So it is important for trusts/health boards to develop a consistent, robust local policy incorporating available guidance that is agreed between the clinical area and the laboratory. Midwives need to have a good understanding of how anti-D works and their local policy, so they can reduce the risk of harm to mothers and babies in their care.

---

**Katy Hurrell**

Patient blood management practitioner,
South West region, NHS Blood and Transplant

For references, visit the RCM website.