multidisciplinary team including the laboratory should be informed of the testing plan to prevent confusion and unnecessary interventions, for example, the laboratory requesting follow up samples in cases where the clinical team have decided that they are not required.

Foetuses at risk of HDFN should be delivered at not later than 37–38 weeks' gestation to minimise the duration of exposure to maternal blood group antibodies,[11] unless earlier delivery is indicated due to rising antibody levels or titres, or intra-uterine transfusions have been required.

Historically the majority of cases of anti-K in pregnant women were the consequence of previous K-positive transfusions in the UK. The incidence of anti-K can be reduced by selecting K-negative units for transfusion to females with potential for childbearing, unless known to be K-positive themselves.[48] Therefore, K-negative units should be selected for females under the age of 50 years who are themselves K-negative, or whose K type is unknown. However, emergency transfusions should not be delayed if suitable K-negative units are not immediately available.[5]

Testing of the father, discussed in Section 3, may be particularly relevant for women with anti-K as historically approximately 80% of anti-K detected in pregnant women results from previous transfusion and only 9% of the general population are K-positive (although a higher proportion of partners of women with anti-K are K-positive[48,49]). It remains important that the transfusion history of women with anti-K is established. K typing the father of the foetus should be considered to support counselling for the current and any future pregnancies. If the biological father's K type is unknown or he is K-positive the pregnant woman should be referred to a foetal medicine specialist when anti-K is first identified for counselling and monitoring.

If the father is K-negative and a confidential enquiry establishes paternity, no further samples are required until 28 weeks' gestation when further antibodies should be excluded (as for all women and any antibodies detected at 28 weeks). Any clinically significant antibodies identified, in addition to anti-K, should be monitored according to their specificity.

The K (*KEL*01*) status of the foetus of pregnant women with anti-K should be determined using cffDNA from a maternal peripheral blood sample if the father is heterozygous for the K antigen or if his antigen status is unknown. This technique currently has a false negative rate of <1% at or after 20 weeks gestation.[18] The result of this test can be used as a guide to the frequency and nature of ongoing monitoring (see Section 3). If the foetus is predicted to be K negative upon cffDNA testing the cffDNA test should be repeated to confirm the initial results,[18] monitoring should continue in the interim.

Recommendation

Samples from pregnant women with immune anti-D or anti-c should be assessed serologically at 4 weekly intervals to 28 weeks' gestation and at fortnightly intervals thereafter, until delivery. Such cases should be referred to a foetal medicine specialist if the antibody reaches the critical level and/or the level is rising significantly, where assessment of the need for further monitoring will be made (GRADE 1B).

Recommendation

Pregnant women with anti-K or other Kell system antibodies should be referred to a foetal medicine specialist when the antibody is first identified. If the foetus is known or assumed to be at risk (based on biological father or foetal typing) serological assessment at monthly intervals to 28 weeks' gestation and at fortnightly intervals thereafter is required (GRADE 1B).

Recommendation

In all cases where serial Doppler assessment of foetal middle cerebral artery peak systolic velocity (MCA-PSV) is being performed and antibody levels are in the high risk range, ongoing assessment of antibody strength is unlikely to be of value and can be discontinued at the discretion of a foetal medicine specialist[11] (GRADE 1C).

Recommendation

All women who have had an IUT in a previous pregnancy, for alloimmunization, should be alerted to the invasive foetal therapy service in any subsequent at risk pregnancy to facilitate workload planning (GRADE 1D).

Recommendation

Where possible, scheduled MCA-PSV monitoring is best performed at the beginning of the week to facilitate optimal access to the invasive foetal therapy service for IUT, when required, and availability of appropriate blood products (GRADE 2D).

## 6.4 | Pregnant women with other red cell antibodies

It is only IgG antibodies that are capable of entering the foetal circulation, and red cell antibodies with a significant IgG component are detectable by IAT. 'Cold reactive', IgM and low affinity antibodies to high prevalence antigens (e.g. CR1-related antibodies) have not been implicated in HDFN.

In addition to anti-D, -c and -K, the following specificities are most commonly associated with HDFN: anti-C, -e, -E, -Fy$^a$, and -Jk$^a$.[7,50–52] Many other specificities have however been reported as the cause of HDFN (Table 3). Less common antibody specificities may be identified, some of which may be more prevalent in women of a specific ethnic origin, such as anti-Ge3 in the Hispanic population,[53] and anti-M in the Japanese population[54]; the anti-M having caused a form of delayed HDFN, similar to that caused by anti-K, including suppression of erythropoiesis. Anti-Mur and anti-Dia are more prevalent in Chinese populations.[55] In most cases, re-testing at 28 weeks gestation' generally provides sufficient information to determine management of the pregnancy.

The situation is different for women with a previous history of a baby with HDFN and a clinical decision should be made regarding