BLOOD GROUP INCOMPATIBILITIES
Supporting information

This guideline has been produced with reference to the following:

NICE. Jaundice in newborn babies under 28 days. 2016. London. NICE

https://www.nice.org.uk/guidance/cg98

New HV, Berryman J, Bolton-Maggs PH et al. Guidelines on transfusion for fetuses, neonates and older children. Br J Haematol. 2016;175:784-828

https://onlinelibrary.wiley.com/doi/full/10.1111/bjh.14233

What is the best way of detecting foetal anaemia and hyperbilirubinaemia?
The most accurate method of testing for foetal anaemia (sampling foetal blood, or cordocentesis) is also the most invasive, and thus is usually the endpoint in a stepwise sequence beginning with less sensitive but non-invasive methods such as measuring maternal serum antibody titres. Cordocentesis has replaced amniocentesis as the definitive test since further evaluation by foetal-blood sampling of a high amniotic-fluid (Sikkel, 2002) has been a requirement before intervention (Saade, 2000).
Doppler ultrasound of the middle cerebral artery (MCA) to measure the peak systolic velocity (PSV) has been evaluated in several studies as an index of the hyperdynamic circulation to predict fetal anaemia with high sensitivity and specificity (Oepkes, 2006 & Moise, 2008). MCA-PSV >1.5 multiples of the median (MoM) will identify fetuses with mild-to-severe anemia with a sensitivity of 100% and a false-positive rate of 12% (Mari, 2000).
Studies on foetal DNA present in maternal plasma now provide an accurate (99.5%) means of determining the RHD status of the foetus (Rijnders, 2004; Rouillac le Sciellour, 2004).

Mari G, Deter RL, Carpenter RL et al. Collaborative Group for Doppler Assessment of the Blood Velocity in Anemic Fetuses. Noninvasive diagnosis by Doppler ultrasonography of fetal anemia due to maternal red-cell alloimmunization. N Engl J Med. 2000;342:9-14

Moise KJ Jr. The usefulness of middle cerebral artery Doppler assessment in the treatment of the fetus at risk for anemia. Am J Obstet Gynecol. 2008;198:161.e1-4

Oepkes D, Seaward PG, Vandenbussche FP et al. DIAMOND Study Group. Doppler ultrasonography versus amniocentesis to predict fetal anemia. N Engl J Med. 2006;355:156-64

Rijnders RJ, Christiaens GC, Bossers B, et al. Clinical applications of cell-free fetal DNA from maternal plasma. Obstet Gynecol 2004;103:157-64

Rouillac le Sciellour C, Puillandre P, Gillot R, et al. Large-scale pre-diagnosis study of fetal RHD genotyping by PCR on plasma DNA from RhD-negative pregnant women. Mol Diagn 2004;8:23-31

Saade GR. Noninvasive testing for fetal anemia. N Engl J Med 2000;342:52-3

Sikkel E, Vandenbussche FP, Oepkes D, et al. Amniotic fluid delta OD 450 values accurately predict severe fetal anemia in D-alloimmunization. Obstet Gynecol 2002;100:51-7

Evidence Level: IV

What are the indications for phototherapy?
The trigger for commencement of phototherapy is the total serum bilirubin (TSB) level, but sliding scales based on age and risk level are guided by little evidence and the TSB levels given are approximations (Anon, 2004).
A study in 276 infants (Maurer, 1985) found that phototherapy had no therapeutic effect in reducing the need for exchange transfusion in those with a positive Coombs test for haemolytic disease, but a 9.4% absolute risk reduction in those with a negative Coombs test (NNT 11; 95% CI 10-12).

Anon. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. Pediatrics 2004;114:297-316
http://pediatrics.aappublications.org/content/114/1/297.full

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Maurer HM, Kirkpatrick BV, McWilliams NB, et al. Phototherapy for hyperbilirubinemia of haemolytic disease of the newborn. Pediatrics 1985;75:407-12

Evidence Level: IV

What follow-up do these babies need, and for how long?
Studies that have investigated developmental outcome between 18 months and 5 years after intrauterine transfusion (Janssens, 1997; Stewart, 1994) have found this to be satisfactory when compared to both normal controls and those babies considered to be “high-risk” but who did not undergo transfusion.
No specific guidance on timing or follow-up for babies with RHD can be identified.

Janssens HM, de Haan MJ, van Kamp IL, et al. Outcome for children treated with fetal intravascular transfusions because of severe blood group antagonism. J Pediatr 1997;131:373-80

Stewart G, Day RE, Del Priore C, et al. Developmental outcome after intravascular intrauterine transfusion for rhesus haemolytic disease. Arch Dis Child Fetal Neonatal Ed 1994;70:F52-F53

Evidence Level: V

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