What are the indications for exchange transfusion (i.e. haemoglobin level in haemolytic disease of the newborn (HDN); bilirubin level in haemolytic disease jaundice/non-haemolytic disease jaundice)?

The neurodevelopmental risks associated with high total serum bilirubin levels in newborns are “not well defined” (Newman, 2006). The most recent sliding scale for exchange transfusion in infants >/= 35 weeks’ gestation is provided within a clinical practice guideline from the American Academy of Pediatrics (Anon, 2004). Although the general level of total serum bilirubin (TSB) at which exchange transfusion is recommended is 25 mg/dL (428 mol/L), this may be lower in younger infants (as little as 15 mg/dL (257 mol/L) at 24 hours of age) with more risk factors. A study of 41 infants with HDN (Gottvall, 1994) found that a foetal haemoglobin value below 95 g/L was a valid indication for exchange transfusion.


Is the umbilical venous route superior to umbilical artery/vein or peripheral artery/vein?

The umbilical venous route has been associated with portal vein thrombosis in infants with co-existent umbilical infection or traumatic damage resulting from catheterisation (Guimaraes, 1998). Other recorded complications include cardiac arrest or pronounced bradycardia (Rubaltelli, 1978), bladder rupture (Sayan, 1996), bacterial infection (Anagnostakis, 1975), necrotising enterocolitis (Livaditis, 1974), and intestinal perforation (Sommerschild, 1971; Corkery, 1968, Orme, 1968). This route has, however, been shown to be safer than the umbilical artery route, and the majority of adverse events are laboratory abnormalities that are asymptomatic and treatable (Patra, 2004). A study of exchange transfusion using the peripheral vessels, in 201 infants over a 5.5 year period (Fok, 1990), found this route to be safe and effective, with few complications. Recent reviews (Murray, 2004) suggest that there is little or no evidence for one route over another, but that “individual units should maintain a standard practice”.

No guidance on the preferred route is given in current UK guidelines (Anon, 2004). A retrospective review (Chen, 2008) of 123 exchange transfusions at a single hospital (24 via umbilical vein and 99 via peripheral vessels) found both approaches equally effective in reducing serum bilirubin. The peripheral approach was associated with fewer sever adverse events.


Chen HN, Lee ML, Tsao LY. Exchange transfusion using peripheral vessels is safe and effective in newborn infants. Pediatrics 2008;122:e905-10


Evidence Level: V

What investigations/monitoring procedures are required when performing exchange transfusion?
Although there is general agreement that the rate of adverse events associated with exchange transfusion is high (Patra, 2004; Jackson, 1997), no evidence-based guidance currently exists on investigations or monitoring procedures. A Cochrane review on the subject, which may help on this and a number of other decision-making points, is in preparation (Mills, 2001).

Jackson JC. Adverse events associated with exchange transfusion in healthy and ill newborns. Pediatrics 1997;99:e7


Evidence Level: V

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