Mini exchange plasma transfusion

There is frequently a delay in obtaining compatible blood for exchange transfusion, even in metropolitan areas. In cases of neonatal hyper-bilirubinaemia this may result in a risk of brain damage. A simple procedure which can effectively lower the serum bilirubin levels immediately is therefore worth reporting.

Case report

A male child, 3912 g, was born at term by spontaneous delivery after an uneventful pregnancy. Mother was para 6 and group O rhesus-positive. All babies except the first had had mild jaundice on the first day of life, which cleared in 2 days. This baby was group O rhesus-positive, and Coombs negative. He was noted to be jaundiced in the first day of life, and a serum bilirubin done when 32 hours old was 14.5 mg/100 ml. The course of the serum bilirubin and Hb is shown in the Fig. On the third day of life he was transferred from the district hospital to the county hospital because of increasing jaundice. On admission he was severely jaundiced, serum bilirubin being 25.5 mg/100 ml, the spleen was not palpable, the liver was not enlarged, and he was otherwise well. There was no adequate explanation for his jaundice. It was felt important to obtain a specimen of mother’s blood, as a rare blood group incompatibility was thought to be a possible cause of his jaundice. Mother had been a 48-hour discharge to a county area. There was thus considerable delay, and it was 5 hours after admission before mother’s and baby’s bloods were dispatched 140 miles to Dublin in order to obtain compatible blood for an exchange transfusion. It was then decided to go to a mini plasma exchange transfusion as a holding procedure. 50 ml reconstituted plasma was exchanged with the baby’s blood in aliquots of 10 ml via the umbilical vein. 12 hours later compatible blood was obtained and an exchange blood transfusion carried out. There was no evidence of a blood group incompatibility detected between mother and baby. A blood smear of a sample taken immediately before exchange transfusion showed 10% spherocytes. It is hoped to confirm the diagnosis of congenital spherocytosis by family studies.

Discussion

It is to be noted that only 50 ml plasma was exchanged with 50 ml blood, which represents 12 to 13 ml plasma/kg body weight. Despite the small volume exchanged, the total serum bilirubin concentration was reduced by almost 25%. This compares favourably with an average reduction of serum bilirubin by 50% in a complete exchange blood transfusion (Odell, Cohen, and Gordes, 1962). The plasma exchange had the theoretical advantage of enhancing the bilirubin binding capacity of the infant’s plasma. In the next 12 hours the bilirubin level remained almost static, there being no sign of a rebound phenomenon. When an exchange blood transfusion was then carried out, it was followed by a rise in the serum bilirubin level. The difference could possibly be explained by the extent of tissue saturation with bilirubin. However, the presence of rebound only after the exchange blood transfusion could also be caused by the metabolized Hb of damaged or old red cells from the donor’s blood. The rapid breakdown of even a small fraction of donor red cells may make a significant contribution to the need for repeated exchange transfusions. In this case the Hb dropped from 17.2 g/100 ml to 13.6 g/100 ml after the plasma exchange. An adequate Hb concentration is essential for the procedure, and a minimum of 14 g/100 ml is suggested.
The mortality rate from exchange transfusions even in healthy babies is real, and probably stands around 1% in most centres (Jablonski, 1962; Kitchen, 1970). As rhesus incompatibility becomes a preventable disease, it seems likely that most other causes of neonatal hyperbilirubinaemia could be managed on a multifaceted conservative approach, i.e. using phenobarbitone, phototherapy, early feeding regimens, and perhaps oral agar to interrupt the neonatal enterohepatic circulation of bilirubin (Lucey, 1971). It has recently been shown that early clamping of the cord can significantly decrease the need for exchange transfusion in the premature infant by reducing placental transfusion and consequent hyperbilirubinaemia (Saigal et al., 1972). Together these factors could make a significant reduction in the need for exchange transfusion. The category of babies in which these advances are likely to make the least impression would have findings similar to this case report. This is the fairly unusual group of babies who develop severe neonatal jaundice without it being anticipated in the antenatal period. They may thus have the added disadvantage of being born at home, or in a small hospital, where the necessary paediatric care is some distance away. It is suggested that where there is delay in obtaining compatible blood, a 'mini plasma exchange' is a satisfactory holding procedure. Previous workers have been concerned largely with albumin priming in an effort to increase the efficiency of an exchange blood transfusion. It has recently been pointed out that albumin priming can also be useful in severe neonatal hyperbilirubinaemia when blood is not immediately available for an exchange transfusion (Tsao and Yu, 1972). The decision to proceed to a 'mini exchange' rather than albumin priming depends on the Hb level.

**Summary**

A small exchange plasma transfusion of 12 ml/kg is a feasible and instantly available alternative to an exchange blood transfusion in the management of neonatal hyperbilirubinaemia when there is delay in obtaining compatible blood. The infant must have an adequate Hb for the procedure, and a minimum level of 14 g/100 ml is suggested. In the case described there was no significant rebound in the serum bilirubin after the plasma exchange, unlike that commonly observed after an exchange blood transfusion.

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**References**


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**Nephrotic syndrome in congenital syphilis**

The nephrotic syndrome is an uncommon complication of both congenital and acquired secondary syphilis. The case described below is the first in which the signs of the nephrotic syndrome developed after a patient had been treated with adequate penicillin therapy for congenital syphilis. The findings of a renal biopsy are described.

**Case history**

A 3-month-old boy was admitted to the Johns Hopkins Hospital because of eyelid oedema of one day's duration.

The patient's mother was found to have a VDRL of 32 units during her fourth month of pregnancy. She received 2.4 million units of penicillin G (benzathine and procaine in equal amounts) and her VDRL fell to 16 and 8 units on two consecutive occasions. She received no further penicillin therapy and was denied any further coitus. After an uncomplicated labour and delivery she delivered a physically normal term infant. The mother's VDRL at the time of delivery was 16 units and the infant's 4 units. The infant was discharged without being treated for congenital syphilis.

The infant was asymptomatic until 6 weeks of age when he developed mucopurulent rhinorrhea and a macular papular erythematous rash over his chin, perineum, palms, and soles. These findings persisted and at 10 weeks of age he was brought to the outpatient department. The diagnosis of congenital syphilis was confirmed by a VDRL of 64 and he was
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