Problems of the Newborn

Haemorrhage, Jaundice, and Other Neonatal Emergencies

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Haemorrhage

A haemorrhage reported in a baby must always be treated as an urgent emergency, for a baby may quickly reach a stage of irreversible shock, after which transfusion and other supportive measures are of no avail. Until the baby has been seen and examined, and an assessment made of the amount of blood loss, one can never be safe in assuming the loss is trivial, though of course in some cases this will be so. A baby who has bled and who is pale and collapsed, or who is showing signs of breathlessness (air hunger) needs transfusion at once, with blood, plasma, or plasma substitute. He should not wait for an hour before an ambulance arrives to take him to hospital. A transfusion of 10-20 ml per kilogram body weight is easily given into the umbilical vein.

When the baby's condition is apparently good, though there is a history of a bleed, an assessment of the amount lost may be practicable by inspecting the blood lost. The blood volume in a baby is about 86 ml blood per kilogram, and if he has lost more than 20% of this (18 ml per kilogram, 8 ml per lb) he probably needs transfusion even if apparently asymptomatic. Whether or not a transfusion is indicated, the baby needs further observation in case he deteriorates. The general condition of the baby and his respiration rate are the most important factors to observe; a quarter-hourly pulse chart usually ensures that he is looked at regularly.

Haemorrhage may occur before or after birth. When a baby is unexpectedly pale and collapsed at birth, haemorrhage is difficult to distinguish from birth asphyxia. Nevertheless, if there has been antepartum haemorrhage, twinning, or caesarean section where the placenta was incised, fetal haemorrhage should be suspected. A rapid transfusion of Group O rhesus negative blood (20 ml/kg) may be life saving.

Haemorrhage from the umbilical stump usually only occurs if ligatures are used which fail to maintain compression after the Wharton's jelly has been squeezed away. Light plastic spring clips or elastic bands are effective; if it is necessary to use ordinary cord ties, at least two ties should be applied, and the cord inspected and the ties tightened after an hour.

HAEMORRHAGIC DISEASE OF THE NEWBORN

Haemorrhagic disease of the newborn, due to low vitamin-K-dependent factors (II, VII, IX, X), characteristically occurs between the third to fifth days after birth. Usually the bleeding is gastrointestinal (haematemesis or melaena) but it sometimes occurs from the umbilical stump, mucous membranes, or from obstetric abrasions. A single dose of phytomendione (vitamin

K₁, Konakion) given orally or by intramuscular injection at birth is an effective prophylactic. Since breast milk contains less vitamin K₁ than cow's milk, and since breast fed babies get little milk (and therefore little vitamin K₁) in the first two days, it is the 3-day-old breast-fed baby who has not had vitamin K₁ at birth who is most at risk.

A generalized haemorrhagic tendency also occurs in babies of mothers with idiopathic thrombocytopenia, whether or not the mother has any symptoms at the time of delivery, and in babies with severe haemolytic disease, in hypothermic babies, and in babies with septicaemia.

Jaundice

In the continuous process of making red cells and destroying old red cells, which occurs both in the fetus and after birth, haemoglobin is broken down and bilirubin produced. This bilirubin is largely removed by the placenta during intrauterine life but after birth it must be conjugated in the liver to form glucuronides, which are water-soluble and can be excreted in the bile or urine. In every baby, therefore, the serum bilirubin levels rise for the first few days, after which they usually fall again as glucuronidation becomes efficient. Should this jaundice become visible at the third to fifth days after birth it is likely to be "physiological" jaundice.

In small preterm babies efficient glucuronidation takes longer to establish so that physiological jaundice lasts longer and reaches higher levels of bilirubin. Any haemolytic process, such as rhesus haemolytic diseases, increases the load of bilirubin to be cleared, causes visible jaundice within hours of birth, and, if untreated, may lead to dangerously high toxic levels and thus kernicterus. Kernicterus has been found at necropsy in small preterm babies who have been critically ill but whose bilirubin level never exceeded 12 mg per 100 ml. On the other hand, some term babies have had bilirubin levels of greater than 30 mg per 100 ml and escaped kernicterus. Thus, the occurrence of kernicterus is not directly related to bilirubin level, but it is generally agreed that if unconjugated bilirubin levels exceed 20 mg per 100 ml, the risk of developing kernicterus, with death or permanent neurological damage, is unacceptably high.

IMMEDIATE ACTION NEEDED

Thus the situations when jaundice in the newborn requires immediate action are these: visible jaundice appearing in the first 24 hours of life; jaundice that is very deep (bilirubin levels more than 16 mg/100 ml) at any age; jaundice which seems to be deepening at a time when it would be expected to be lightening; and jaundice for which the cause is not apparent. When jaundice is light a clinical estimation of bilirubin levels is reasonably safe; in deep jaundice, when bilirubin levels approach 15 mg/100 ml, the only safe way of determining levels is to measure the serum levels.

When visible jaundice appears in the first 24 hours of life, probably there is an active haemolytic process and bilirubin levels will soon be dangerously high; the baby should be in a hospital where exchange transfusion can be carried out if it becomes necessary. The rhesus factor of all mothers in our society should be known before the baby is born, but other haemolytic diseases—such as ABO incompatibility, or glucose-6-phosphate dehydrogenase deficiency in babies of Mediterranean, Asian, or African stock—may be responsible. When jaundice is very deep determinations of bilirubin levels are essential. If they are more than 20 mg/100 ml, exchange transfusion is needed, and if the level is near 20 a further level is needed after a few hours to see if the level is rising or falling. Where jaundice deepens at a time when it should be fading another factor causing this aggravation must be sought. An important possible cause is infection. Some drugs aggravate jaundice by competing for conjugation or by displacing bilirubin from the albumin-binding sites. Examples of such drugs, which are therefore contraindicated in the first week of life, are sulphonamide, vitamin K (Synkavit), oleandomycin, novobiocin, salicylates, and some steroids. Reabsorption of haemoglobin from extensive bruising or swallowed blood also aggravates neonatal jaundice.

It must also be remembered that jaundice may be among the presenting features of some metabolic diseases such as galactosaemia and cretinism.

TREATMENT

The most reliable and only rapid method of reducing serum bilirubin is exchange transfusion, but this major procedure is reserved for babies at immediate risk from kernicterus. For babies with moderate or slowly increased jaundice the most important single measure is to ensure an adequate amount of fluid and food, since this reduces the severity of the jaundice. Other methods which have been used are the induction of liver enzymes with phenobarbitone or bilirubin degradation with phototherapy. None of these measures can replace exchange transfusion in the serious case, but they may prevent the need for exchange transfusion when rates of rise of bilirubin levels are not great.

Fits in the Newborn

There are many possible causes for fits in the newborn, ranging from malformations or infections acquired in utero through perinatal problems to biochemical abnormalities presenting after birth. In practice, however, the most frequently encountered causes of fits may generally be diagnosed clinically from the age of onset of the fits together with knowledge of the birth history, birth weight and gestational age, and the feeding history.

Birth trauma and serious birth asphyxia usually cause a period of cerebral depression followed by a period of excitation, during which fits not infrequently occur. Such fits usually begin in the first 48 hours after birth, following an obvious perinatal problem.

Hypoglycaemia is an important and largely preventable cause of fits and neurological damage. It occurs mainly in babies who are small for gestational age who have not been given early feeding. Any baby of birth weight under 2.8 kg (6 lb) could be a small-for-dates baby depending on the gestational age at birth. If he is he should be identified as such and fed early to prevent hypoglycaemia. Other groups of babies who are known to develop hypoglycaemia are infants of diabetic mothers, babies who have had serious birth asphyxia, and babies with severe haemolytic disease. There are no clinical signs of hypoglycaemia, so that in every baby who has a fit a blood glucose estimation is necessary. The test strip Dextrostix is a convenient method of screening

at the bedside. The baby who is diagnosed as having symptomatic hypoglycaemia should be given glucose intravenously (0.5-1g/kg) at once.

Meningitis may cause fits, usually in an obviously ill baby, and often, but not always, at about the third, fourth, or fifth day of life. Neck stiffness and a bulging fontanella are late, and therefore unreliable, signs of meningitis in the newborn. The only safe way to exclude meningitis is by examination of the cerebrospinal fluid.

"Hypocalcaemic" fits usually occur late in the first week of life in a lusty baby who has fed well on large quantities of cows' milk preparations. He needs low-phosphate feeds, such as breast milk or well diluted cows' milk preparations. Fortunately, the long-term prognosis of hypocalcaemic fits is good.

The management of convulsions is to establish and treat the underlying cause and to use anticonvulsants. Essential investigations in most cases are measurements of the blood glucose, a lumbar puncture, urine analysis, and determinations of the serum calcium levels (this last in babies whose fits are after the fifth day). Drugs which are useful anticonvulsants in the newborn period are chloral hydrate, phenobarbitone, diazepam, and occasionally paraldehyde for status epilepticus. Whatever the cause of fits or the anticonvulsant used, the frequency tends to decrease after the first week but may, of course, recur later in life. Neurological follow-up is necessary. I believe personally that when a baby has had neonatal fits, pertussis immunization should later be withheld from his immunization schedule.

Poisoning

A baby is particularly vulnerable to the accidental inclusion of substances such as salt or boric acid, in mistake for sugar, in his feeds. In the breast-fed baby ointments applied to his mother's nipples have resulted in poisoning, and drugs given to her are partly excreted in the breast milk. Fortunately, the amount of drug imbibed in breast milk by the baby is usually insignificant, though treatment of the mother with antithyroid drugs is a contraindication to breast feeding. Some substances such as boric acid and some antibiotic creams applied to the baby's broken skin have caused poisoning, while others, such as pentachlorophenol, have caused poisoning by absorption through the intact skin.

The treatment of a baby with poisoning consists of supporting respiration and circulation while measures are taken to correct the biochemical consequences and to facilitate removal of the poison.

Hypothermia

The newborn baby, because of his small size and poor thermal insulation, needs a much warmer thermal environment than an adult. When he is naked for bathing and changing, temperatures which seem unacceptably hot to an adult may nonetheless represent a dangerous cold stress to a baby. Even when clothed, a baby needs a warm environment. A clothed, term baby being nursed in a cot needs a room temperature of about 75°F (23°C) and small or preterm babies may need even warmer conditions.

Prolonged conditions of inadequate warmth may aggravate any pre-existing problem such as a respiratory difficulty, and may possibly cause hypothermia and neonatal cold injury syndrome. The best treatment of hypothermia is to prevent it. Once a baby is seriously hypothermic there is a considerable risk that he may die as he is rewarmed. It is not known whether rapid or slow rewarming is the best method. Problems common in hypothermic babies are hypoglycaemia, infection, and a bleeding diathesis, one manifestation of which is a massive pulmonary haemorrhage.