Short reports

Haemolytic jaundice in a neonate after intra-amniotic injection of methylene blue

JANE CROOKS

Department of Paediatrics, Bristol Maternity Hospital, Bristol

SUMMARY A child developed haemolytic jaundice requiring exchange transfusion after intra-amniotic injection of methylene blue, a dye used for detecting premature rupture of membranes. Since no other cause of haemolysis could be found, methylene blue was strongly implicated as the causative agent and its use for this purpose should be avoided.

Premature rupture of the fetal membranes is associated with neonatal morbidity and mortality, and correct diagnosis is important. Generally diagnosis is simple, but in difficult cases obstetricians have used several techniques to differentiate between leaking liquor and urinary incontinence, including injecting dye into the amniotic cavity. The original report of this technique used Evans's blue as the marker,¹ but more recently methylene blue has been used. Although there are apparently no harmful effects of this dye on the mother, toxic effects on the baby, particularly haemolysis and hyperbilirubinaemia, have been noted.²⁻⁴

Case report

A 3.15-kg girl was born at 38 weeks' gestation to white parents, mother 30 years old, para 2+1. The date of the last menstrual period was uncertain although ultrasound scan at about 8 weeks' gestation determined gestational age to be 8 weeks. Pregnancy was complicated by a threatened abortion at 10 weeks and by hyperemesis at 12 weeks' gestation. At 37 weeks the mother was admitted to hospital with probable spontaneous rupture of the membranes, which could not be confirmed by speculum examination or by a pyrimidine test. Four days later amniocentesis was performed and about 7 ml of 1% methylene blue was injected into the amniotic cavity. Membrane rupture was not confirmed and the mother was discharged home. Three days later she was readmitted in labour, and subsequently delivered a daughter under epidural analgesia. At

birth the baby was stained bright blue and required nasopharyngeal suction and facial oxygen. Apgar scores at one and five minutes were 7 and 9.

At age 3 hours the baby was admitted to the special care baby unit with mild respiratory distress which settled in 6 hours without specific treatment. Chest x-ray film was normal.

At 23 hours, still minimally stained blue, the baby was noted to be jaundiced, although clinically well with no hepatosplenomegaly. Serum bilirubin concentration was 340 $\mu\text{mol/l}$ (19.9 mg/100 ml); no free bilirubin detectable; Hb 16 g/dl; reticulocyte count 12%; blood group O Rh-positive (mother O Rh-positive); Coombs's test negative. Phototherapy was started and a repeat bilirubin test after 2 hours showed the concentration had fallen to 295 $\mu\text{mol/l}$ (17.3 mg/100 ml). However, at 72 hours the bilirubin level had risen to 385 $\mu\text{mol/l}$ (22.5 mg/100 ml) (Hb 15.4 g/dl; reticulocyte count 16%) and so exchange transfusion was performed via umbilical artery and vein. Phototherapy was continued but at 93 hours the bilirubin concentration had again risen from the post-exchange level of 285 $\mu\text{mol/l}$ (16.7 mg/100 ml) to 385 $\mu\text{mol/l}$. A second exchange transfusion was performed. Serum bilirubin concentration subsequently remained low and phototherapy was stopped at age 7 days. Investigations performed included a full sepsis screen, TORCHES* and virology titres, pyruvate kinase, and G6-PD, all of which were normal. The mother had taken no drugs during pregnancy and was not breast feeding the baby. The baby was initially slow to feed, but was eventually discharged home at 17 days in good condition.

Discussion

There are several reports of haemolytic anaemia and hyperbilirubinaemia in the neonate after administration of methylene blue into the amniotic cavity.

* Toxoplasma, rubella, cytomegalovirus, herpes, echo, syphilis.

The time of administration has varied from 24 hours to 5 weeks before delivery,² and in most cases exchange transfusion or phototherapy, or both, was required to control the jaundice. In 2 cases respiratory distress was reported as well^{3,4} although it is difficult to determine whether or not this was related to the dye. In this case the L/S ratio at the time of amniocentesis was 2.4.

Although methylene blue was not looked for in the baby's urine, the high reticulocyte count of 16% is clear evidence of active haemolysis, and in the absence of blood group incompatibility, infection, or red cell enzyme defect it was felt that methylene blue was strongly implicated as the cause of the haemolysis in this patient. In addition, the amount of methylene blue administered was large (about 70 mg), being greater than the dose used in other reported cases²⁻⁴ and far exceeding the dose of 1.6 mg suggested by Plunkett² as insufficient to cause haemolysis.

A recent report⁵ of inadvertent intrauterine injection of methylene blue at 5½ weeks' gestation, followed by a normal delivery at term with no ensuing haematological problems, suggests that the dye does not necessarily affect the embryo and that its use for 'diagnosis of premature rupture of membranes should not be condemned'. It may be that the length of time between dye administration

and delivery is relevant with respect to the development of haematological problems, but since this length of time cannot be predicted and problems have been reported up to 5 weeks after administration of dye, this procedure may be potentially harmful at any gestation.

Methylene blue is not an innocuous drug and its use for detection of premature rupture of the membranes should be avoided.

References

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Correspondence to Dr Jane Crooks, Southmead Hospital, Westbury-on-Trym, Bristol BS10 5NB.

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Ventricular tap under direct ultrasound control

MALCOLM I LEVENE

Department of Paediatrics and Neonatal Medicine, Hammersmith Hospital, London

SUMMARY Real-time ultrasound was used for inserting a styletted needle into the lateral ventricle under direct vision. Eight successful taps have been performed using this method in a preterm infant with moderate ventricular dilatation after intraventricular haemorrhage.

The placement of a needle into the lateral cerebral ventricles may be performed as a therapeutic or a diagnostic procedure. Ventriculitis can be diagnosed only by the presence of organisms in the ventricular system, and instillation of antibiotics into the cerebral ventricles may be performed under certain circumstances. In addition, repeated ventricular taps may be undertaken in posthaemorrhagic ventricular dilatation before a shunt can be inserted. In this paper is described a method of inserting a needle

into the lateral ventricle under direct ultrasound control.

Methods

An ATL mechanical sector scanner fitted with a 5 MHz transducer was used to visualise the lateral ventricles in coronal section through the temporo-parietal bone of a 2-week-old girl born at 29 weeks' gestation with moderately dilated lateral ventricles (ventricular index 13-15 mm)¹ after intraventricular haemorrhage.

The infant was well wrapped up and placed supine on a mattress lying on a low table. Her head and neck were immobilised by an assistant's hand on either side of her head and she required no sedation. The ultrasound transducer was positioned just above and in front of the infant's ear to visualise the