posthaemorrhagic hydrocephalus, we should ask whether the aim of treatment is to maintain CSF pressure within the normal range, regardless of other circulatory factors, or whether the maintenance of cerebral perfusion is more important.

The wide normal range of cerebral artery BFV does mean that a single 'action line' is not appropriate for all infants. Study of longitudinal changes in individual infants may be a more fruitful approach which requires further investigation.

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Maternal carboxyhaemoglobinaemia

EDITOR.—We wish to report a case of maternal carboxyhaemoglobinaemia which resulted in evidence of fetal compromise and delivery by caesarean section. We believe the case highlights both a lack of management guidelines and adequate facilities for treating this serious condition in pregnancy.

Case report

A 21 year old, non-smoking primigravida at 39 weeks' gestation accidentally inhaled carbon monoxide from a faulty gas heater for approximately two hours. On arrival at accident and emergency, three hours later, she had a headache, felt drowsy, and had reduced fetal movements (blood pressure 155/75, pulse 100/min). She had been transferred in oxygen and had normal arterial blood gases (pH 7.43, carbon dioxide tension 4.27 kPa, oxygen tension 14.7 kPa, base excess -2.2 mmol/l) but the carboxyhaemoglobin percentage was raised at 13%. Fetal heart monitoring revealed fetal tachycardia, diminished variability, and decelerations. Emergency caesarean section was performed and 10 minutes after delivery a maternal carboxyhaemoglobin estimation was 3%.

The girl, with a birth weight of 3590 g, had normal Apgar scores but the carboxyhaemoglobin level in cord blood was 16.2%. After delivery no neurological compromise was noted and blood gases remained satisfactory in air. Mother and child were subsequently discharged at 5 days and no problems were noted at follow up.

Faulty gas heaters remain a major reason for 1000 deaths annually from carbon monoxide poisoning.¹ Stillbirths have been recorded at relatively low maternal levels of carboxyhaemoglobin because fetal carbon monoxide concentrations can exceed maternal concentrations at equilibrium and also there is an additional shift of the fetal haemoglobin dissociation curve to the left.² In this case we encountered a pregnant patient with mild to moderate carboxyhaemoglobinaemia who was symptomatic with evidence of fetal distress. Some authorities, particularly in the US, would advocate hyperbaric oxygen (HBO) in this situation,³ which might avoid the high anaesthetic risk in caesarean section. It would also reduce the considerable risk of delivering a neonate requiring intensive monitoring which might, if preterm, have in addition respiratory distress syndrome.

Our inquiries indicate that just 10 main-

land UK hyperbaric units accepted civilian carbon monoxide poisoning cases in 1988-90 and only one was actually equipped with operating facilities. Therefore HBO is a management option that few paediatric/obstetric teams can currently contemplate, though it has considerable potential clinical advantages.

The management of fetal distress in mild to moderate maternal carboxyhaemoglobinaemia, particularly in the preterm setting, needs clarification.

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Ureaplasma and mycoplasma central nervous system infections in neonates

EDITOR.—Waites *et al* describe two studies in Birmingham, Alabama in which *Mycoplasma hominis* and *Ureaplasma urealyticum* were isolated from the cerebrospinal fluid (CSF) of neonates.^{1 2} In the first study of 100 predominantly preterm babies, *U. urealyticum* and *M. hominis* were isolated from the CSF of eight and five of the neonates respectively.¹ The mothers were generally of low socioeconomic status and few had received antenatal care. In their second study, of 318 predominantly full term neonates, the mothers of whom had received private obstetric care, *U. urealyticum* was isolated from five infants and *M. hominis* from nine infants.² They suggested that culture for these organisms should be attempted on all CSF specimens from neonates with progressive hydrocephalus, CSF pleocytosis, or evidence of congenital infection.³

We prospectively studied the babies admitted to our neonatal intensive care unit over a 15 month period. We cultured 42 CSF specimens from 35 neonates for *M. hominis* and *U. urealyticum*, as part of the microbiological investigation of suspected sepsis or therapeutic tap for hydrocephalus. The mean gestational age was 32 weeks (range 24-41 weeks), mean birth weight 2140 g (range 700-4400 g), and mean age at first sampling was 10 days (range 8 hours-35 days). The mothers were from varied socioeconomic backgrounds and all had received antenatal care.

No CSF specimen yielded a growth of *M. hominis* or *U. urealyticum*. Although our study is small, our findings are more in keeping with the 0.7% *U. urealyticum* and 0% *M. hominis* prevalence rates reported by Shaw *et al*⁴ in Liverpool than those quoted by Waites *et al*. As UK rates of maternal colonisation with these organisms are similar to elsewhere it seems that other factors must be in play producing differences in neonatal central nervous system infection rates. Further studies are probably justified. However, like Shaw *et al* we do not feel that

CSF culture for these organisms is indicated in our population.

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Congenital diaphragmatic hernia: influence of associated malformations on survival

EDITOR.—In the interesting article by Sweed and Puri they made no mention of an important autosomal recessive condition that includes congenital diaphragmatic hernia.¹ Fryns' syndrome describes infants who have severe diaphragmatic hernia associated with skeletal, palatal, and renal abnormalities.²⁻⁵

The outcome for infants with Fryns' syndrome is universally poor. Rapid identification of this syndrome in a baby born in our unit with severe diaphragmatic hernia enabled us to save the child and family the trauma of an emergency transfer to a surgical unit, so that the baby could die with peace and dignity with both parents in attendance. Urgent diagnosis was achieved through immediate access to regional colleagues in neonatology and clinical genetics. In this case, in addition to a diaphragmatic hernia, there was cleft palate, palpable polycystic right kidney, facial dysmorphic features of mid-face hypoplasia, and a small left pinna and hypoplastic nails.

This recessive inherited syndrome is not uncommon. Of 121 cases of congenital diaphragmatic hernia reported in the Northern region between 1985 and 1992, five (4%) had Fryns' syndrome (Edmund Hey, personal communication). Knowledge of this syndrome, therefore, with its implications for immediate care and the risks in future pregnancies is important for colleagues working with newborn babies.

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