LETTERS TO THE EDITOR

Cyclical variation of blood pressure and heart rate in neonates

EDITOR—We read with interest the recent article by Cunningham et al on the cyclical variation of blood pressure and heart rate in neonates.1 Despite a lengthy discussion of the possible aetologies they conclude 'we have been unable to identify any factors that might have convincingly induced the waves ...'. We have observed similar cyclic changes that were due to causes not apparently discussed in the article: unrecognised bolus administration of vasoactive drugs and seizures.

Continuous infusion syringe pumps used in neonatal intensive care often deliver a series of small boluses due to the syringe plunger 'sticking' in the barrel. This problem is caused by the syringe, rather than the pump. We have observed that the phase relationship between heart rate and blood pressure changes is influenced by the nature of the drug being administered. Figure 1 shows an in-phase response due to the bolus delivery of dopamine, while fig 2 shows an out-of-phase response due to the bolus delivery of morphine. Cunningham et al report that they observed an association between the use of morphine and the cyclic pattern,1 and while they made no comment on the use of an inotrope, it is possible that an inotrope was administered given that 'blood volume support was needed (by 50% of the babies) during the wave episodes'.

Data from a neonate displaying seizure behaviour, and on no vasoactive medication, is shown in fig 3. Here a complex phase relationship exists between the heart rate and blood pressure. Of the 10 neonates reported by Cunningham et al to show the cyclic behaviour,1 seven were hypocalcaemic, eight had asphyxia, some were receiving morphine (itself a possible cause of seizures), and the waves could 'be altered just by touching the baby'. The cause of the cyclic behaviour may have been seizure activity.

Until iatrogenesis or seizures are excluded as causes we remain unconvinced that 'blood pressure waves ... equivalent to 50% of resting pressure' are likely to be due to physiological control mechanisms.

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1 Cunningham S, Deere S, McIntosh N. Cyclic variation of blood pressure and heart rate in neonates. Arch Dis Child 1993; 69: 64–7.

Dr Cunningham comments:

Drs Dunster, Colditz, and Joy offer a fascinating contribution to this puzzle. We alluded to the possibility of both electromechanical artefact and seizures having caused the blood pressure waves, but could find no supporting evidence.

Their data would suggest that our infants...
It is important to bear in mind that our observations take the form of a relatively small case-control study, as compared with the finding of the large multicentre randomised trials that have reported favourably upon the properties of Exosurf. It is possible that our observations are biased because of the lack of randomisation or of exhibiting a type I statistical error on account of chance. However, it may be that the overall beneficial effect discovered in the large multicentre trials hides a group of babies susceptible to adverse experience with this particular surfactant, although it is possible that some aspect of our management regimen rendered our patients susceptible to an adverse response to Exosurf. It is, for instance, our practice to use muscle relaxants almost routinely in ventilated preterm babies and it is possible that the absence of spontaneous respiratory efforts had an adverse effect on the distribution of surfactant within the lung. If there is a subgroup of babies, distinguished perhaps by the management protocol to which they are subjected, who actually do worse with Exosurf treatment then it is obviously very important for them to be distinguished from the majority who, according to published trials, will benefit.

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**Enterococcus faecium meningitis**

**EDITOR**—Neonatal meningitis is a medical emergency in which prompt diagnosis and treatment are of paramount importance. Although β haemolytic streptococci of Lancefield group B and Escherichia coli are most commonly responsible, infection with other agents is occasionally encountered. Enterococci are reported as causing neonatal sepsis with increasing frequency, and their antibiotic sensitivity profile can be different to other more common neonatal pathogens. We wish to report two cases of neonatal meningitis in preterm infants caused by *Enterococcus faecium*.

**Case reports**

**CASE 1**

A previously well boy of 34 weeks’ gestation presented aged 8 days with lethargy, abdomi- nal distension, and euglycemic hypernatremic dehydration. An infection screen was performed. Abdominal radiographs showed gaseous distension but no specific features of necrotising enterocolitis.

Enteral feeding was stopped and intravenous antibiotics commenced with flucloxacillin, netilmicin, and metronidazole. The cerebrospinal fluid contained only white cells/mm³ but *E faecium* was isolated on cultu- re. Blood cultures were sterile. Treatment was changed to ampicillin and gentamicin as the organism demonstrated only moderate sensitivity to penicillin, and resistance to chloramphenicol. Treatment was continued for 14 days. He made a satisfactory recovery and was discharged after 7 days. Feeds were successfully reintroduced after a week and the baby subsequently made satisfactory progress, with discharge aged 4 weeks.

**CASE 2**

A boy was born at 33 weeks’ gestation with an antenatally detected gastrochisis. After surgic- al repair on day 1 progress was satisfactory until day 16, when an infection screen was performed and enteral feeding stopped because of pyrexia and lethargy. Antibiotic treatment was commenced with flucloxacillin and netilmicin. *E faecium* was grown from blood cultures, but the cerebrospinal fluid contained no leucocytes and was negative on culture. Over the next three days the infant continued to have temperature instability, and antibiotics were changed to penicillin, netilmicin, and metronidazole because of abdomin- al distension and the presence of dilated bowel loops on an abdominal radiograph. Repeat blood cultures 48 hours later were negative, and antibiotics were stopped. Clinical condi- tion improved, but he remained intermittently feverish. A further examination of his cerebrospinal fluid on day 24 revealed 803 white cells/mm³. Direct culture yielded no bacilli growth, but on enrichment *E faecium* was isolated. Treatment with chlorampheni- col was commenced as the organism demonstrat- ed high level resistance to penicillin and gentamicin. Repeat cultures of the cerebrospinal fluid on day 28 were sterile, and chloramphenicol was continued for 14 days. The baby’s condition improved steadily, though cerebral ultrasound revealed ventric- ular dilatation which subsequently resolved with insertion of a ventriculoperitoneal shunt. At 9 months his development was assessed as being within normal limits.

Enterococci are part of the normal adult and neonatal gut flora, and are frequent isolates from clinical specimens. They are generally of low pathogenicity and infre- quently cause infection, though neonatal enterococcal bacteraemia revealed only four patients with meningitis, three of whom had central venous catheters in situ.1 Many studies of enterococcal sepsis do not differentiate between *Enterococcus* spp. Most
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