Correspondence

Cerebral blood flow velocity variability in infants receiving assisted ventilation

Sir,

We read the article by Rennie *et al* with great interest.¹

In the absence of any recording of blood pressure it is not possible to say whether perturbations in cerebral blood flow velocity result from transmission within the arterial system, or from the effects of changes in cranial venous volume, which are also known to affect it.² Unfortunately, as these different effects tend to be opposite in direction and out of phase with each other, it is not possible to distinguish between them by an analysis of cerebral blood flow velocity and respiratory phase alone. The lack of distinction between the two effects is underlined by a failure to find a difference in the coefficient of variation expressed as a percent (CV%) of the spectrum area between the apnoeic and synchronously ventilated groups. This is the more surprising as it is known that the effects of passive lung inflation *v* spontaneous inspiration on left ventricular output and intracranial venous volume are not only opposite in direction, but also quite different in magnitude. Our own work suggests that the CV% is inaccurate at low levels of variability such as those encountered during muscle paralysis and ventilation.³

Another potential inaccuracy in the use of the CV% of the spectrum area lies in its reliance on the relative frequencies of respiration and heart rate; if spontaneous respiratory effort is occurring irregularly or infrequently, then the duration of 10 cardiac cycles may not be sufficient to quantify the effects of this activity on cerebral blood flow velocity. We have found good correlation between the CV% over 20 cardiac cycles (used in Perlman's original work) and an estimate of respiration induced variability using spectral analysis, at least in aortic blood pressure, during spontaneous respiration.³

Perhaps the most important effect of any treatment designed to stabilise the pattern of respiration in the first days of life is to prevent episodes of crying, Valsalva manoeuvres, and pneumothoraces which can affect both intracranial venous volume and arterial blood pressure adversely.

References

- 1 Rennie JM, South M, Morley CJ. Cerebral blood flow velocity variability in infants receiving assisted ventilation. *Arch Dis Child* 1987;**62**:1247-51.
- 2 Cowan F, Thoresen M. The effects of interruption to the cranial venous drainage on cerebral haemodynamics in the newborn infant. In: Rolfe P, ed. *Neonatal physiological measurements*. London: Butterworth, 1986.
- 3 Bignall S, Bailey PC, Rivers RPA, Lissauer TJ. Quantification of cardiovascular instability in premature infants using spectral analysis of waveforms. *Pediatr Res* (in press).

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Drs Rennie and Morley comment:

We thank Drs Bignall and Rivers for their interest in our paper. Our present system allows the collection of only six seconds' worth of Doppler information, which was the reason for choosing 10 cardiac cycles, but the spectrum generated was from a fast Fourier transform and a Duplex system, which may bear more relationship to velocity than the continuous wave system used by Perlman and Volpe.¹ While accepting that the area under the curve measured with computer assisted planimetry is a relatively crude index of variability the method was sensitive enough to detect differences between synchronous and asynchronous ventilation and the values for variation are in good agreement with other estimates of variability in systemic arterial pressure.² We feel that the protocol, in which each infant acted as his or her own control and the velocity was measured with exactly the same technique in both types of ventilator interaction, adds confidence to what was a highly significant result ($p < 0.001$).

Further work is undoubtedly required on the underlying causes of variability and its accurate detection, and on the possible benefits of non-triggered synchronous ventilation. Changes in central venous pressure are important and have been shown to occur sometimes opposite to the systemic arterial pressure swings, meaning that the changes in cerebral perfusion pressure are more marked.¹ We plan to study this interesting phenomenon further with an improved method allowing rapid computer estimation over several minutes.

References

- 1 Perlman JM, Volpe JJ. Are venous circulatory abnormalities important in the pathogenesis of cerebral lesions? *Pediatrics* 1987;**80**:705-11.
- 2 Miall-Allen V, De Vries L, Whitelaw A. Mean arterial blood pressure and neonatal cerebral lesions. *Arch Dis Child* 1987;**62**:1068-9.

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Management of sexual abuse

Sir,

Drs Hobbs and Wynne stress the importance of reflex anal dilatation as a sign of anal sexual abuse.¹ In their reply to Dr Robert's scepticism concerning the reliability of the observation, they state 'We hold by our view that reflex dilatation of the anus correlates highly with continuing abuse . . . and is not found in diseases such as thrush, threadworms, or constipation'. While not wishing to dispute this statement entirely, we do not believe that