Fantoms

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Oxygen targeting

It is not yet known which target range for oxygen saturation is associated with the optimal balance of risks and benefits for preterm infants. For some time, epidemiological studies have been showing lower rates of morbidity, most notably retinopathy of prematurity, as higher saturations are avoided in favour of lower targets. In 2010 the short-term results of the SUPPORT trial[1] provided the first high quality evidence in this area since the 1950s and they suggest that relatively small differences in oxygenation patterns make a bigger difference to outcome than anyone thought. Results of similar trials in the UK, Canada, Australia and New Zealand are eagerly awaited. Oxygen targeting is likely to be high on the agenda in the coming years but achieving intended oxygen targets is not easy. Part of this may be that there has been a lack of strong evidence to convince clinical staff that it makes that much difference. Few would dispute that the input of the individual care giver is important. In this issue, Sink *et al* report their study of the effect of nurse:patient ratios on oxygen targeting. In the first 4 weeks after birth preterm infants in the study spent a disappointing average of 28% of the time in their intended saturation range. After controlling for other factors, achievement of targets was significantly influenced by nurse:patient ratios. This is important because the effects of oxygen targeting are likely to be determined over many weeks, long after the initial high acuity mandates the highest staffing ratios. ***See page F93.***

Resuscitation

The latest guidelines for newborn resuscitation say that a prompt increase in heart rate remains the most sensitive indicator of resuscitation efficacy.[2] This is based on observations in term infants and asphyxiated newborn animals where a rapid increase in heart rate follows the onset of effective ventilation. It is suggested that the effect of interventions is assessed each 30 s. Yam *et al* provide data on changes in heart rate after birth in a series of preterm infants <30 weeks gestation. The resuscitation equipment enabled continuous measurements of flow, pressure and volume and this information was combined with simultaneous measurements of heart rate from a pulse oximeter. Although a small number of infants showed an instantaneous increase in heart rate, the median duration of positive pressure ventilation before a heart rate >100 was obtained was 73 s. Initial inflation pressures were set at 30 cm H_2O so the observations are not simply due to a lack of inflation pressure. Traces from individual infants show that sometimes heart rate did not rise despite a series of inflations that generated tidal volumes that would be considered adequate. The authors discuss reflexes that may explain their observations and point out the differences in preterm lungs that might make them harder to recruit and stabilise. The bottom line is that, even with ventilatory support that generates reasonable tidal volumes, some preterm infants take more than 60 s before they show a gradual improvement in heart rate to more than 100 beats/min. Stopping to assess them every 30 s may interfere with this and prompt other interventions that may not be appropriate. However, if ventilation is inadequate the situation will not improve unless and until this is recognised, so frequent reassessment that ventilation is being achieved is still appropriate. In the case of preterm infants heart rate may not be the most sensitive indicator.

When it comes to cardiac compressions in the newborn the evidence now points reasonably clearly towards the two thumbs method being superior to the two-finger method. Christman *et al* show this in a manikin study using the currently recommended 3:1 ratio of compressions to ventilations. ***See pages F102 and F99.***

Neonatal functional cardiac MRI scanning

Groves *et al* demonstrate that functional cardiac MRI imaging is feasible in the newborn and offers the possibility of obtaining potentially useful haemodynamic measures that are more reproducible than conventional echocardiographic measurements. Clearly few will have access to this kind of imaging at the moment and it is not easy to see it being used in day-to-day practice. The authors recognise this but it is the potential for this technique to permit detailed haemodynamic studies of interventions that is exciting. This might help develop the right clinical trials of pragmatic interventions. ***See page F86.***

Cot-side EEG in preterm infants

West *et al* performed 2-channel electroencephalogram (EEG) in the first 48 h after birth in a series of preterm infants born before 28 weeks gestation. Surviving infants had developmental assessments at 18 months and the predictive value of the EEG for abnormal neurodevelopmental outcome (Bayley II MDI or PDI<70) was evaluated. The EEG, particularly when evaluated by a neurophysiologist, appeared to be potentially useful. Subclinical seizures were identified, with high associated mortality. Continuity was also important. Now that hypothermia treatment has made the necessary monitoring equipment so widely available it is likely that we will see more studies on this subject so that we can determine more fully whether EEG gives important additional information that should influence practice over and above that available from other simpler sources. ***See page F108.***

Neonatal organ donation: has the time come?

In the UK, organ donation does not presently take place from infants dying before 2 months of age, but UK infants occasionally benefit from transplanted organs obtained from outside the UK. Joe Brierley describes the background to the UK position and argues persuasively for change. ***See page F80.***

REFERENCES

1. SUPPORT Study Group of the Eunice Kennedy Shriver NICHD Neonatal Research Network, Carlo WA, Finer NN, *et al*. Target ranges of oxygen saturation in extremely preterm infants. *N Engl J Med* 2010;**362**:1959–69.
2. **Perlman JM**, Wyllie J, Kattwinkel J, *et al.*; Neonatal Resuscitation Chapter Collaborators. Neonatal resuscitation: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Pediatrics* 2010;**126**:e1319–44.