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# Highlights from this issue

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## LOW ENERGY INTAKE AND SEVERE RETINOPATHY OF PREMATURITY

Growth restriction at birth and poor postnatal weight gain have been linked with increased risk of developing severe retinopathy of prematurity (ROP). This study suggests that low energy intake during the first 4 weeks is more important than poor postnatal growth. In a remarkably detailed study, Elisabeth Sjöström and colleagues examined the records of all preterm infants born in Sweden before 27 weeks of gestation over a 3 year period. They extracted detailed nutrition and growth data, including actual intakes of all enteral and parenteral fluid from 14 442 patient days during the first 28 days of life of 498 of 504 eligible infants who survived to complete ROP evaluation. There were 172 (34.5%) infants who developed severe ROP (stages 3–5). The association of severe ROP with energy intake was strong. In multivariable analyses, total energy intake during the first 4 weeks was a significant predictor of ROP, with a change in energy intake of 10kCal/kg/day associated with a 24% change in the odds ratio for developing severe ROP. The mean energy intake of infants with severe ROP was 97kcal/kg day and for those with no ROP was 108kcal/kg/day. Analyses suggested that average intakes of more than 110kcal/kg/day would be required to minimise the risk associated with low energy intake. A leading article by Camilia Martin highlights the complexity of determining the balance of risks and benefits of modifying nutritional strategies using observational data and the need for focused research to achieve improved outcomes. *See pages F108 and F99*

## HYPOGLYCAEMIA AND HYPERGLYCAEMIA IN INFANTS WITH HYPOXIC ISCHAEMIC ENCEPHALOPATHY

Previous studies have suggested the potential importance of coincident hypoglycaemia in neonatal hypoxic ischaemic encephalopathy as a contributor to adverse outcome. Animal studies support this and also raise potential concerns about hyperglycaemia. Sudepta Basu and colleagues performed a post-hoc analysis of the CoolCap study. There were 234 infants with moderate to severe encephalopathy who were randomised to selective head cooling with mild systemic hypothermia versus standard care. There was data available for early post-natal plasma glucose (within 12 hours of randomisation) and follow up outcome for 214 (91%) infants. Of the 27 infants with hypoglycaemia (plasma glucose less than 2.2mol/l) within 12 hours of randomisation, 22 (81%) either died or

had unfavourable neurological outcome at 18 months compared with 45/93 (48%) of normoglycaemic infants ( $p=0.004$ ). Adverse outcome occurred in 68/102 (67%) of infants with hyperglycaemia (plasma glucose  $>8.3$ mmol/l). In multivariable analyses adjusting for possible confounding variables, both hypoglycaemia and hyperglycaemia remained significantly associated with poor outcome. The study cannot determine whether the relationships are causal or represent biomarkers of tissue injury but there is biological plausibility for both and the size and strength of the associations are impressive. Glucose measurements are now commonly available with the umbilical cord blood gases and are obtainable immediately in the neonatal unit, so hypoglycaemia and hyperglycaemia should usually be identifiable immediately in these infants. *See pages F149*

## APGAR SCORES AND OUTCOMES

Apgar scores provide useful information about the immediate condition and response to resuscitation in newborn infants but are poor predictors of individual later outcome. Two studies add further information to the growing body of evidence that Apgar scores may also influence the risk of later adverse outcome. Emily Tweed and colleagues used record linkage to relate the educational outcomes of more than 750 000 children attending Scottish schools between 2006 and 2011 to their five-minute Apgar scores. Low Apgar score was strongly associated in a dose dependent manner with need for additional educational support after controlling for confounders. Additional support needs were identified in 9.5% of children with five-minute Apgar scores less than seven, compared with 6.6% with scores of seven or more. The population attributable fraction of an Apgar score less than seven for additional support needs was 0.49% indicating that low Apgar scores do not contribute a large proportion of the overall population burden for additional support needs. Neda Razaz and colleagues studied 33,883 children born in Manitoba between 1999 and 2006. Children with Apgar scores  $<10$  had higher odds of developmental vulnerability at five years. This was true even for Apgar scores of nine and again, a dose dependent effect over the range of scores was apparent. As in other studies the sensitivity of low Apgar scores for identifying individual adverse outcomes was low. *See pages F114*

## PULSE OXIMETRY SCREENING

This review article by Ilona Narayan and colleagues gives a valuable and comprehensive

overview of the literature on pulse oximetry screening in newborn infants that will be helpful to anyone planning to implement it. Screening is becoming increasingly widespread but is not yet incorporated into professional guidance in many European Countries, including the United Kingdom. *See pages F162*

## END OF LIFE DECISIONS

Alarming variations between centres in the proportion of infants at the margins of viability who are provided with life-staining treatment are well recognized. Similar variation is apparent in decision making about withdrawal of life-sustaining treatment once there are serious concerns about prognosis. The causes of death and processes for end of life decisions were explored for 942 neonatal deaths that occurred in Canada in a two year period between 2008 and 2010 by Jonathan Hellman and colleagues and discussed further in an accompanying editorial by Brian Carter. In this health care system there were discussions about withdrawal of life sustaining treatment in 84% of neonatal deaths and the clinicians did not very often report difficulties reaching consensus with parents. However, despite this apparent openness to discussion, there was striking variation between centres in the proportion of deaths where discussion about withdrawal of life sustaining treatment took place in cases of death from preterm brain injury (10–86%, 28% overall) or birth asphyxia and hypoxic ischaemic encephalopathy (5–100%, 15% overall). *See pages F102 and F92*

## SUSTAINED INFLATIONS

This review by Karen McCall and colleagues provides comprehensive information about what is known about the risks and benefits of sustained lung inflations during initial stabilisation at birth and what still needs to be learned before it will be clear whether or not sustained inflations should be used routinely. *See page F175*

## CUFFED ENDOTRACHEAL TUBES

A review article and a letter to the editor, both by Rebecca Thomas and colleagues summarise the pros and cons of using cuffed endotracheal tubes for newborn infants. These are now available down to 3mm external diameter but are not yet in widespread use. In Australia and new Zealand most neonatal units never use them and a minority use them occasionally. *See pages F168 and F181*