that treatment of the presenting life threatening event takes precedence over such disadvantages.

Albumin is also used before exchange transfusion to enhance bilirubin removal but the evidence for this is debated.6 This means of treatment was employed extensively in the era of Rh haemolytic disease but is now much less often used.

RESPIRATORY DISTRESS SYNDROME

The facts that infants with respiratory distress syndrome are oedematous and have low serum albumin concentrations led to the idea that replacement may confer benefits. Greenough et al most recently expressed this possibility and showed that infusions caused a diuresis and weight loss in sick infants.7 However, such studies really only support the contention that infants with respiratory distress syndrome are hypovolaemic and therefore suffer from underperfusion.

What is unclear is whether this matters or not. Perhaps a more interesting line of study would be to look at the effects of plasma expansion early in postnatal life—there were studies in the late 1960s suggesting that umbilical cord oedema and serum albumin concentrations could be used as markers for the development of respiratory distress syndrome. What would happen now if we were to expand the circulating volume in the first few minutes of extrauterine life and then follow up with modern intensive care methods? It is unlikely that albumin will be curative but it might shorten or reduce the requirement for intensive care.

Conclusion

The use of these substances in neonatal care is widespread but poorly studied. This is unfortunate as any means of treatment must be formally assessed to ensure that it is properly used and maximum benefit obtained. Formal studies should be undertaken in order to achieve this goal.

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Is routine endotracheal suction justified?

New developments provide the opportunity to answer this and other questions quickly and inexpensively.

The precise role of routine endotracheal suction in intubated babies is controversial. Tracheobronchial suction can reduce respiratory system resistance1 and should be performed whenever secretions accumulate, to prevent airway obstruction. However there are many potential hazards, including atelectasis,2 bradycardia,3 decreased lung compliance,4 hypoxia5 transient increases in arterial and intracranial pressure and cerebral blood flow velocity,6 bacterialemia,7 and pneumothorax.8–10 Although they are less noticeable, fluctuations in physiological variables due to suction still occur after paralysis11 or when disconnection from the ventilator is avoided by using a side port adaptor.12 13 Some of these hazards, for example pneumothorax, may be particularly dangerous in very preterm infants within the first three days of life,14 a period when secretions are usually scanty. Because of the risks, some workers question whether routine endotracheal suction is justified.4 6 Nevertheless, in many neonatal units endotracheal suction at intervals of one to six hours is still a routine procedure for all intubated babies, regardless of age or gestation. We remain collectively uncertain not only whether routine endotracheal suction is justified, but how it should be done. Sometimes the baby is 'preoxygenated', sometimes not. Usually suction is preceded by instillation of 0.25–0.5 ml normal saline but occasionally as much as 2–0 ml is used.10 Sometimes the baby gets chest physiotherapy, which can increase the weight of secretions obtained15 but may exacerbate hypoxia.

Endotracheal suction may be needed more often when inspired gas is poorly humidified, because this inhibits mucociliary clearance and thickens tracheobronchial secretions. In a non-randomised study, Lomholt et al reported a tenfold increase in the risk of plugging of the endotracheal tube with viscid secretions when inspired gas was less than 70% saturated at 37°C, which is equivalent to an absolute humidity of 31 mg H2O/l.16 It might then be sensible to arrange for the hospital medical physics department to check periodically that intubated babies do not breathe gas of lower humidity than this, because inspired gas humidity varies widely during routine clinical practice (MFD O'Hagan et al, unpublished observations).

For the working neonatologist, these issues raise important practical questions. Is it better to have a policy of suction only when impending airway obstruction is suspected than a policy of routine suction? If so—for which babies? Should endotracheal suction be preceded by chest physiotherapy?

These questions are most likely to be answered successfully in a large randomised controlled trial in which infants within each centre are randomly assigned to different policies. This would ensure that variations in case mix or clinical practice, which are inevitable, were balanced evenly between centres. To allow more than one question to be answered simultaneously a factorial design could be used so that infants were randomly assigned to either (a) routine endotracheal suction or (b) suction only when impending airway obstruction was suspected and, after the first 72 hours of life, to either (c) routine physiotherapy or (d) physiotherapy only when specifically indicated. Essential measures of outcome might include pneumothorax, duration of treatment with supplementary oxygen and with artificial ventilation, length of hospital stay, and abnormal ultrasound appearances at 6 weeks of age. It would be realistic to expect only a moderate reduction in the rate of any single adverse outcome, for example from 20% to 15%. A study would have a good chance (80% power) of showing such a reduction at a conventional level of significance (2p=0.05) if it recruited a total of 2000 infants.

Now that paediatricians, nurses, epidemiologists, and parents are collaborating on an unprecedented scale to investigate the role of surfactant in the OSIRIS and CURE-
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SURF 4 trials*, studies of this size have become feasible. In both these surfactant trials, a common ‘core database’ of descriptive variables and essential outcome measures (including those just described) is routinely collected. If this large collaborative network continued, other important questions could be answered quickly and inexpensively. Perhaps the first step is to agree an agenda of questions to be addressed.17 This might cover several other issues in respiratory management, such as the role of nasal or facemask continuous positive airway pressure before intubation in moderate respiratory disease,18 19 or the optimum range of carbon dioxide or oxygen tension for mechanically ventilated preterm infants.20 The advent of large scale cooperation among those who care for the newborn is a major development, and we should seize the opportunity to make it permanent.

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*Information about the OSIRIS trial can be obtained from Dr Adrian Grant, Director, Perinatal Trials Service, National Perinatal Epidemiology Unit, Radcliffe Infirmary, Oxford OX2 6HE and about the CORUSURF 4 trial from Dr Henry Halliday, Neonatal Unit, Royal Maternity Hospital, Grosvenor Road, Belfast BT12 6BB.


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