Neonatology—then and now (C H M Walker)**Assisted ventilation in the newborn (1964)****Assisted ventilation in terminal hyaline membrane disease**

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Goldsmith and Karotkin¹ researched the history of assisted ventilation and found that a record of mouth to mouth methods goes back to Old Testament times, and Hippocrates himself reported his experience with tracheal intubation to support pulmonary function. These skills were ignored for about 2000 years as it was not until the 16th century that attention was again paid to this subject when bellows and an oral tube were used. Assisted ventilation in the newborn does not seem to have been used until the 1800s by which time methods for mechanical ventilation in adults were established. Through the 1950s positive and negative ('iron lung' type) pressure devices were tried as were intragastric oxygen, body tilting, phrenic nerve stimulation, and manual bag with mask or tube. Ian Donald and his colleagues, in 1953, were probably the first to use a positive pressure patient cycled respirator in the newborn, but it is strange that, like the early work on penicillin and phototherapy, the significance of their pioneering efforts seemed to go unrecognised. This certainly was the case concerning ventilation in the newborn in the United Kingdom as about another 10 years passed before a paper on assisted ventilation in hyaline membrane disease appeared in the *Archives*.

This 1964 article from Toronto cited reports from only three other centres, one each in a Scandinavian, a South African, and an American journal, from the 11 years between. And even in 1964 it was still considered by many as ethical to use assisted ventilation in only the virtually moribund baby. Not much wonder that out of 18 babies only one survived. Birth weights were given of 12 of those who survived more than an hour of ventilation and they ranged from 1200 g to 3900 g. All but one had a pH below 7.00, a PCO₂ above 100 mm Hg and eight had a carbon-dioxide content below 20 mm/l. The discussion continues:

'Infants in the worst condition evinced no appreciable clinical or biochemical response (to ventilation). The necropsy finding of massive pulmonary haemorrhage associated with hyaline membranes explains the failure of assisted ventilation to achieve gas exchange'.

'It seems that if the stage of clinical death is not too far advanced the condition is potentially reversible'.

'Our results suggest that the best hope of success with this treatment lies with its application in the pre-terminal rather than in the terminal state'.

Today. With hindsight one could have predicted the high mortality due to very late initiation of ventilation and gross prolonged acid/base imbalance. It is probably hard for younger paediatricians to appreciate that ventilators were, for these reasons and for some considerable time, regarded by many as 'death machines'. Such was the state of the art

even in the mid 1960s that it was very difficult to convince the caring team, especially the nurses, that ventilation should be started much earlier in the course of hyaline membrane disease. It is interesting that the massive pulmonary haemorrhages mentioned are now a relatively rare phenomenon, due no doubt to the integrity of the vascular system being maintained by regular biochemical adjustments and to better techniques and controls. Unfortunately, however, other pathologies have taken their place, for example, bronchopulmonary dysplasia, air leaks, and tracheal stenosis.

Thus 25 years on, having passed through the era of the Gregory box and sternal traction we have a new language (PIP, PEEP, IPPV, CPAP) and different uncertainties (synchronous ventilation, paralysis, surfactant, rates, rhythms, and pressures). Let us hope that the encouraging reports about surfactant not only in assisting ventilation but also in reducing the incidence of associated pneumothorax and intraventricular haemorrhage² are confirmed and that it will not take us another 25 years to learn how best to use the technology now at our disposal.

References

- 1 Goldsmith JP, Karotkin EH. Introduction to assisted ventilation. In: Goldsmith JP, Karotkin EH, eds. *Assisted ventilation of the newborn*. London: W B Saunders, 1981:1-17.
- 2 McCord FB, Curstedt T, Halliday HL, McClure G, Reid M, McC, Robertson B. Surfactant treatment and incidence of intraventricular haemorrhage in severe respiratory distress syndrome. *Arch Dis Child* 1988;**63**:10-6.

Paul R Swyer, a Londoner, might be regarded as one of the many who made up the 'Brain Drain' after the second world war. The medical 'market' was flooded with demobilised doctors who retrained in all the specialties and for a good many years there was a 'log jam' of senior registrars seeking consultant posts. Professor Swyer, now Emeritus, graduated in 1943 at Christ's College, Cambridge and won the top scholarship to the Middlesex Hospital Medical School. He showed his aptitude for teaching early as a student demonstrator in haematology. He served in the Royal Army Medical Corps in North West Europe and after work at the Brompton Hospital turned to paediatrics in 1949. Like so many others he was enticed to remain abroad in Toronto after a British Council Fellowship there and eventually rose to become Director of Perinatal Medicine and Professor of Paediatrics, University of Toronto.

He is well known for many publications on respiratory and metabolic problems in the newborn, the results of a very active research programme. As author, editor, and reviewer he has made a signal contribution to our knowledge and clinical care of the newborn and through his extensive committee work he has contributed greatly to the organisation of neonatal care in Canada. He has been Visiting Professor in several places in Europe and Scandinavia and was awarded an honorary MD (Lausanne 1984) and a WHO Fellowship in 1985.