Air embolism in ventilated very low birthweight infants

T R FENTON, S BENNETT, AND N McINTOSH

Department of Child Health, St George’s Hospital Medical School, London

SUMMARY

Five cases of air embolism in ventilated very low birthweight infants are reported. In all cases the outcome was fatal with the babies dying at about 15 hours of age.

Pulmonary air leaks are well recognised complications of ventilatory support in the newborn period. Most of these leaks are confined to the tissue spaces within the thoracic cavity but in 1970 Gregory and Tooley reported a case of air embolism diagnosed on an x-ray film taken at necropsy. We report five cases of this uncommon complication seen in this hospital in the last six years and draw attention to the clinical features of this uniformly fatal condition.

Case reports

Case 1. A girl weighing 960 g was born after spontaneous onset of labour at 26 weeks’ gestation. Only minimal resuscitation was required (Apgar scores 8 and 10) but she rapidly developed increasingly severe respiratory distress necessitating ventilation, and severe generalised pulmonary interstitial emphysema was noticed on chest radiography. Her condition deteriorated and she died at 19 hours of age. Just before death a sample from the umbilical artery catheter was seen to contain bubbles of air and bubbles of gas were seen to appear from a heel prick performed to sustain the diagnosis of air embolism; this was confirmed by an x-ray film taken before necropsy.

Case 2. A boy weighing 1175 g was born by elective caesarean section at 28 weeks’ gestation because of an antepartum haemorrhage. An earlier premature onset of labour at 24 weeks’ gestation had been halted with intravenous salbutamol. He required ventilation from birth but quickly developed pulmonary interstitial emphysema and it proved impossible to maintain his oxygenation. Just before his death, at 14 hours of age, sampling of the umbilical artery catheter showed air in the vessel and air embolus was confirmed on an x-ray film taken immediately after death.

Case 3. A boy weighing 1170 g was delivered by emergency caesarean section at 28 weeks’ gestation after a prolonged liquor leak after the mother’s membranes had ruptured at 24 weeks. He was intubated from birth and it was difficult to maintain adequate ventilation. At 14 hours of age the baby suddenly deteriorated; the legs and abdomen became white and air was seen in the blood sample drawn from the umbilical artery catheter. The transcutaneous oxygen electrode was reading 18 kPa at the time. A chest x-ray film taken before death showed a right pneumothorax, pneumomediastinum, and air in the ventricular cavity and outlining the major vessels.

Case 4. A boy weighing 880 g, the second of twins, was born by a breech delivery at 28 weeks’ gestation after spontaneous rupture of the membranes 48 hours before. He was intubated from birth and his condition remained stable until at 15 hours of age he became visibly white with no cardiac output. The cardiac monitor registered a supraventricular tachycardia. The air entry on the right side was reduced and the insertion of a chest drain resulted in spontaneous resolution of the supraventricular tachycardia to sinus rhythm. A pneumothorax occurred on the left side almost simultaneously. There was still no cardiac output and because the indwelling umbilical artery catheter oxygen electrode was reading >20 kPa blood was withdrawn from the umbilical artery catheter and this contained air bubbles. A chest x-ray film taken just before death showed bilateral pneumothoraces, pneumomediastinum, and air in the ventricles and outlining the major vessels (figure).

Case 5. A boy weighing 630 g was delivered at 24 weeks’ gestation by an emergency caesarean section four days after an amniocentesis for polyhydram-
The mother had been treated with antibiotics before delivery because of a fever and the infant received antibiotics from birth. The baby required ventilation from birth because of severe respiratory distress that appeared on chest x radiography to be due to surfactant deficiency. By 18 hours of age his respiratory condition had worsened despite the use of tolazoline and volume support and he required very high pressures to maintain his oxygenation. At 19 hours of age he suddenly deteriorated becoming mottled and blue despite the indwelling oxygen electrode reading 18 kPa. 'Squelchy' heart sounds were heard on auscultation and a chest x ray film showed air in the chambers of the heart and great vessels and support was withdrawn.

The clinical details of the five infants are shown in the table.

### Discussion

All five of these babies suffered massive air embolism with no evidence of accidental injection of air.
Air embolism in ventilated very low birthweight infants

Clostridium difficile and acute enterocolitis

E H PRICE,* V M WRIGHT,† J A WALKER-SMITH,‡ AND S TABAQCHALI§

*Departments of Microbiology, †Surgery, and ‡Child Health, Queen Elizabeth Hospital for Children, London, and §Department of Microbiology, St Bartholomew’s Hospital Medical College, London

SUMMARY Clostridium difficile belonging to groups not normally detected in infancy was the only potential pathogen detected in the stools of two infants with severe enterocolitis. Further information regarding the virulence of this organism was obtained by use of a recently introduced typing scheme.

Clostridium difficile is not usually considered to be of clinical importance in stool specimens from infants because this organism can also be found as part of their normal gut flora.1 In adults, C difficile is rarely isolated from normal faecal specimens and its overgrowth with production of toxin, secondary to antibiotic treatment, can result in the development of pseudomembranous colitis. In infancy there are only occasional reports of this condition.2 3 The