Resuscitation of a preterm infant with massive air embolism

Immediately after surfactant administration, a ventilated preterm male infant of 27 weeks g.a. developed massive pulmonary obstruction, apparent from the ventilator’s display, loss of pulse wave from the arterial umbilical catheter, severe bradycardia, extreme pallor of the legs and cyanotic appearance of the abdomen. Chest compression was started instantaneously, and emergency X-ray revealed massive air embolism with ingress of gas into all cardiac cavities and surrounding great vessels (figure 1). Immediate aspiration yielded 3 mL gas through the umbilical venous catheter, further 2 mL were drained by cardiocentesis and spontaneous circulation and adequate oxygenation could be re-established.

Later, cerebral sonography revealed signs of periventricular leukomalacia, while the EEG was unremarkable, but stromomotor deficiency, muscular hypotonia of the trunk, microcephaly and poor feeding were apparent. At discharge, disturbed myelinisation and signs of hypoxic cerebral damage with diffuse white matter disease were noted on MRI. Severe motor and neurocognitive deficits persisted.

Air embolism is not infrequent in preterm infants with respiratory distress syndrome, but in this case, surfactant treatment may well have been a significant causal factor, too.1

Increasing ventilation pressure produces extra-alveolar air leak (pulmonary interstitial emphysema, pneumothorax, pneumopericardium, etc), which sometimes is also noted incidentally on chest X-ray as gas in pulmonary arteries or veins, after ingress of gas from the airway lumen through the interstitium into the vasculature. However, massive air embolism is extremely rare in newborns, and only few patients survive.2–4 Immediate evacuation through a central venous catheter of adequate size and/or by cardiocentesis may be life saving.

Roland Hentschel 1, Christoph Müller,1 Simone Hock,1 Markus Uhlf
1Neonatology/Pediatric Intensive Care, Medical Center and Faculty of Medicine, University of Freiburg, Universitaetsklinikum Freiburg, Zentrum fuer Kinder-und Jugendmedizin, Freiburg, Germany
2Radiology, Medical Center and Faculty of Medicine, University of Freiburg, Universitaetsklinikum Freiburg, Zentrum fuer Kinder-und Jugendmedizin, Freiburg, Germany

Correspondence to: Professor Roland Hentschel, Medical Center and Faculty of Medicine, University of Freiburg, Universitaetsklinikum Freiburg, Zentrum fuer Kinder-und Jugendmedizin, Division Neonatology/Pediatric Intensive Care, 79106 Freiburg, Germany; roland.hentschel@uniklinik-freiburg.de

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Reprints: Roland Hentschel, Medical Center and Faculty of Medicine, University of Freiburg, Universitaetsklinikum Freiburg, Division Neonatology/Pediatric Intensive Care, 79106 Freiburg, Germany; roland.hentschel@uniklinik-freiburg.de


Images in neonatal medicine

Figure 1 Chest and abdomen X-ray immediately after massive air embolism before evacuation through the umbilical venous catheter. Note gas accumulation filling up all cavities of the heart and visible also in multiple intra-abdominal blood vessels. Note complete lack of usual manifestations of extra-alveolar air leak (pneumothorax, pneumomediastinum, pneumopericardium and skin emphysema) and normal aeration of the lung.