Spontaneous resolution of pneumopericardium in a preterm infant

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DESCRIPTION

A preterm neonate was born by vaginal delivery. He had difficult perinatal transition and required positive pressure ventilation for 60 s. He had respiratory distress since birth for which nasal continuous positive airway pressure (CPAP) support was given. The chest X-ray was suggestive of hyaline membrane disease (HMD), but due to financial constraints surfactant could not be given. The respiratory distress worsened, for which he needs to be intubated and ventilated. He required quite high ventilatory support (peak inspiratory pressure and peak end-expiratory pressure of 24 cmH₂O and 7 cmH₂O, respectively). The baby was referred to us on manual intermittent positive pressure resuscitation on day 3 of life. On evaluation, he had bilateral equal air entry but muffled heart sounds. Therefore the possibility of pericardial effusion or pneumopericardium was considered and a chest X-ray was done. The chest X-ray shows a rim of air around the heart (figure 1) with almost white-out lungs, suggestive of isolated pneumopericardium. Since the baby was otherwise haemodynamically stable and was maintaining good saturation, we took an informed decision of 'not to drain' the pneumopericardium. Gradually the baby improved and was successfully extubated to nasal CPAP after 24 hours. Repeat chest X-ray while on CPAP support shows resolution of pneumopericardium with improved aeration of the lungs (figure 2). He was weaned off CPAP to room air by day 6 of life.

Figure 1 Chest X-ray showing the rim of air in the pericardial space and almost white-out lungs.

Figure 2 Chest X-ray showing resolution of pneumopericardium.

Various forms of air leaks such as pulmonary interstitial emphysema, pneumomediastinum, pneumothorax and pneumopericardium can occur in neonates.¹ The postulated mechanism for air leaks is alveolar rupture and dissection of air along the connective tissue sheaths to the hilum. This air then enters the pericardium, where pericardial sac reflects over the pulmonary veins near the ostia of the pulmonary veins.² This area of pericardial sac is identified as a potentially weak area because of lack of collagenous tissue. The risk factors for pneumopericardium described are surfactant deficiency, mechanical ventilation and positive pressure ventilation. Neonates with HMD are more prone to alveolar rupture, and exposure to mechanical ventilation appears to further contribute to the development of pneumopericardium.³ The spectrum of pneumopericardium can vary from asymptomatic to features such as respiratory distress, muffled and absent heart sounds, and severe haemodynamic instability.⁴ Pneumopericardium in neonates is managed conservatively, unless there is evidence of impending tamponade (ie, haemodynamic compromise). In the index case, the air leak was probably due to high ventilator pressures as well as poor compliance of the lungs. Antenatal corticosteroids and early CPAP are known to reduce the incidence and severity of HMD, but the findings cannot be generalised to lower income countries.⁵ Evidence suggests that early selective surfactant administration in HMD requiring assisted ventilation leads to an almost 40% reduction in the incidence of

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air-leak syndrome.⁶ In low-income to middle-income countries, where timely surfactant administration is not always feasible, the incidence of air-leak syndrome tends to be higher and contributes significantly to morbidity and mortality. Following extubation, resolution occurred rapidly probably due to the rapid decrease in mean positive airway pressure which promotes air leak to continue.

Learning points

- Pneumopericardium, although a rare complication, should be suspected in neonates with hyaline membrane disease and on invasive mechanical ventilation.
- Muffled heart sound is an important clue of a collection in the pericardium, be it air or fluid.
- However impressive a pneumopericardium appears on X-ray, and if the neonate is haemodynamically stable it can be managed conservatively.

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REFERENCES

- 1 Jeng MJ, Lee YS, Tsao PC, *et al.* Neonatal air leak syndrome and the role of high-frequency ventilation in its prevention. *J Chin Med Assoc* 2012;75:551–9.
- 2 Mansfield PB, Graham CB, Beckwith JB, *et al.* Pneumopericardium and pneumomediastinum in infants and children. *J Pediatr Surg* 1973;8:691–9.
- 3 Yeh TF, Vidyasagar D, Pildes RS. Neonatal pneumopericardium. *Pediatrics* 1974;54:129–33.
- 4 Roychoudhury S, Kaur S, Soraisham AS. Neonatal pneumopericardium in a nonventilated term infant: A case report and review of the literature. *Case Rep Pediatr* 2017;2017:1–4.
- 5 Vogel JP, Oladapo OT, Pileggi-Castro C, *et al.* Antenatal corticosteroids for women at risk of imminent preterm birth in low-resource countries: the case for equipoise and the need for efficacy trials. *BMJ Glob Health* 2017;2:e000398.
- 6 Bahadue FL, Soll R. Early versus delayed selective surfactant treatment for neonatal respiratory distress syndrome. *Cochrane Database Syst Rev* 2012;11:CD001456.

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