CASE REPORT

Anteromedial pneumothorax in a neonate: 'The diagnostic dilemma' and the importance of clinical signs

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SUMMARY

A premature neonate born at 32 weeks of gestation was admitted to the neonatal unit with respiratory distress syndrome. The infant received late rescue surfactant therapy with continued mechanical ventilation in view of continuous positive airway pressure (CPAP) failure. Owing to worsening distress and an air leak, he was switched over to high-frequency oscillatory ventilation. The air leak required drainage for possible pneumopericardium. This was initially attempted ineffectually with echo-assisted pericardial drainage, and later successfully with the use of chest tubes for anteromedial pneumothorax.

BACKGROUND

Air leaks requiring intervention are commonly seen in neonates on ventilation. The type of intervention varies from judicious ventilation to chest drains. The neonate in our indexed case was suspected to be worsening due to pneumopericardium and hence underwent pericardial drainage. Transillumination of the chest was positive and the infant was treated with chest drains. The differentiation between pneumopericardium and anteromedial pneumothorax is marginal, which interferes with the type of intervention: pericardial drain versus chest tube drain. Clinical signs such as positive transillumination possibly widen the margin.

CASE PRESENTATION

A premature neonate, born at 32 weeks of gestation, required delivery room resuscitation in the form of positive pressure ventilation and delivery room continuous positive airway pressure (CPAP). The baby was admitted to the neonatal intensive care unit and was continued on CPAP support. His respiratory distress worsened and he was given late rescue surfactant therapy at 18 h of age with continued mechanical ventilation (figure 1). His ventilatory requirements were increasing and there was evidence of an air leak, so he was switched over to high-frequency ventilation (figure 2). There was also a haemodynamic compromise that was supported with volume bolus and multiple inotropes. Echocardiography revealed a structurally normal heart. Pericardial tapping of air was performed in view of suspected pneumopericardium causing haemodynamic compromise. There was no improvement after tapping and the baby's condition was

Figure 1 Initial X-ray showing respiratory distress syndrome; surfactant replacement therapy given.

worsening. Ultrasound of the chest was taken but was not of much help. The chest transillumination test was positive (figures 3 and 4) and the possibility of pneumothorax over pneumopericardium was higher, so chest tubes were inserted bilaterally (figure 5). A gradual improvement was seen in the clinical status and the baby was able to be weaned from the inotropes completely over the next 48 h, and also was extubated to CPAP (figures 6 and 7). There was evidence of early onset sepsis for which antibiotic coverage was given. Feeds were started after haemodynamic stability was achieved and the neonate was discharged at 3 weeks of age.

INVESTIGATIONS

Radiological investigations attached.

Figure 2 X-ray showing lucency/air leak around the cardiomeastinal border simulating pneumopericardium but persisting after pericardial tapping.

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Figure 3 Transillumination right positive.

DIFFERENTIAL DIAGNOSIS

- ▶ Pneumopericardium
- ▶ Pneumomediastinum

TREATMENT

- ▶ Surfactant replacement therapy
- ▶ Ventilation
- ▶ Chest tube drainage
- ▶ Parenteral antibiotics

OUTCOME AND FOLLOW-UP

The baby was discharged home healthy.

Figure 4 Transillumination left positive.

Figure 5 Bilateral chest drain for anteromedial pneumothorax.

DISCUSSION

Air leaks in preterm neonates with respiratory distress vary from 3% (receiving mechanical ventilation) to 9% (receiving CPAP support).¹ Types of air leaks vary from simple pneumothorax to tension pneumothorax. Anteromedial pneumothorax is seen in ventilated newborns in supine position. Anteromedial pneumothorax, otherwise known as supine pneumothorax, appears as lucency of the upper quadrants of the abdomen or cardiomeastinal border, and sharp superior surface of the diaphragm and double diaphragm.² A deep sulcus sign and angular sharp appearance of costophrenic angle are also seen in supine pneumothorax.^{3 4} The pleural air collects in the anteromedial aspect or anterobasal

Figure 6 X-ray showing clearing of air after placing chest tubes and normal X-ray before discharge.

Figure 7 X-ray showing clearing of air after placing chest tubes and normal X-ray before discharge.

aspect in the ventilated neonate in supine position. Transillumination of the chest in a deteriorating neonate on ventilation is always a priority, but the type of transillumination shown in plate 1–2 points towards diagnosis of pneumothorax rather than pneumomediastinum, thereby aiding in the management.

Learning points

- ▶ Chest tube drains should be considered in anteromedial pneumothorax with cardiovascular compromise or worsening pulmonary status.
- ▶ Air leaks simulating pneumopericardium with positive transillumination point towards possibility of anteromedial pneumothorax.
- ▶ A transillumination test should be performed in all neonates with air leaks.

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