



## Pneumopericardium with Pneumothorax in a Non-ventilated Pre-term Neonate with Spontaneous Resolution

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

### Abstract

Neonatal pneumopericardium (PPC) is an uncommon form of air leak syndrome leading to high morbidity and mortality. Air leak syndrome in a newborn is usually associated with active resuscitation, hyaline membrane disease (HMD), meconium aspiration syndrome (MAS) or mechanical ventilation. Neonatal PPC is sometimes associated with pneumomediastinum, pneumothorax, and subcutaneous emphysema. PPC in a non-ventilated neonate is a rarity. We report a non-ventilated neonate of PPC with pneumothorax who responded to conservative management without the need for pericardiocentesis.

**Keywords:** Pneumopericardium; pneumothorax; spontaneous

### Introduction

Neonatal pneumopericardium (PPC) is a rare clinical condition, often found in association with other air leak syndromes and commonly occurs as a complication of mechanical ventilation, especially in premature neonate with hyaline membrane disease (HMD)[1–3]. In term infants, it is a complication of meconium aspiration syndrome (MAS) or mechanical ventilation. The PPC occurring in a non-ventilated neonate is a rarity [4-6]. It can lead to cardiac tamponade, resulting in significant morbidity and mortality [1, 2]. These children often require aggressive management with pericardiocentesis. We report a neonate with PPC and pneumothorax, who responded to conservative management.

### Case Presentation

A preterm neonate, born to 25 years old primigravida by vaginal delivery at 31 weeks and 6 days of gestation, was admitted to sick newborn care unit in our hospital with perinatal asphyxia. The baby didn't cry immediately after birth and required bag and mask ventilation for 30 seconds. APGAR at 1 and 5

minutes were 5 and 8 respectively. Her heart rate was 148/min, respiratory rate 54/min and SpO<sub>2</sub> – 94% on room air.

At 4 hours of life, she developed respiratory distress (tachypnea with intercostal recession). Chest auscultation revealed decreased breath sounds on right side. In view of respiratory distress, continuous positive airway pressure (CPAP) was started with nasal prongs @ 2 L/min with FiO<sub>2</sub> 30%. Patient maintained SpO<sub>2</sub> of 92 to 96%. Chest radiograph revealed pneumopericardium with right sided pneumothorax (Fig. 1A). Haemodynamically, the baby was stable and on echocardiography also, there was no evidence of cardiac tamponade. Baby remained stable on nCPAP. Chest X-ray after 36 hours showed resorption of pneumopericardium and pneumothorax (Fig. 1B).

On day 3 of life, baby developed lethargy, weak cry, hypotonia, absent neonatal reflexes, dilated pupils with sluggish reaction to light. Sepsis screen was negative and neurosonogram showed germinal matrix haemorrhage grade 1. She had an episode of apnoea

and was not maintaining SpO<sub>2</sub>, so she was intubated and put on mechanical ventilation. Later, baby developed necrotising enterocolitis and succumbed to the illness.

### Discussion

The PPC is a life threatening condition. Before the advent of exogenous surfactant, the incidence of air leak syndromes was high, as neonates with HMD were aggressively managed by mechanical ventilation [2]. Mechanical ventilation may predispose a neonate to this condition. PPC is rare in non-ventilated neonates, as is the simultaneously occurring PPC, pneumothorax, and pneumomediastinum [4,5]. Although, the index neonate required bag and mask ventilation for 30 seconds, he remained well for 4 hours and then developed PPC with pneumothorax without mechanical ventilation.

The incidence of air leak syndromes has significantly decreased with the use of surfactant, antenatal corticosteroids and better mechanical ventilation techniques. The pathogenesis of spontaneous PPC is still not clear. One hypothesis is, as pleura and pericardium have common embryological genesis, a developmental defect may lead to communication between these two cavities. First few breaths by neonates or rise in intrathoracic pressure may lead to brochoalveolar rupture and subsequeute air leaks (1,5-7).

The clinical features of PPC in neonates may range from being asymptomatic to features of cardiac tamponade. The clinical presentation in these neonates depends upon the rate and the amount of free air accumulation [8]. The index baby was hemodynamically stable. It is sometimes difficult to differentiate PPC from pneumomediastinum. Halo sign in PPC and Sail sign in pneumomediastinum on chest X-ray can help in differentiating these two conditions. Moreover, lateral chest X-ray film shows air behind the sternum in pneumomediastinum while in PPC it is around the heart (3).

### Legends

**Figure 1: Chest radiograph (anteroposterior view) showing pneumopericardium and right pneumothorax**

**Figure 2: Chest radiograph (anteroposterior view) showing resolution of pneu-mopericardium and right pneumothorax**

The association of PPC with other air leaks is a poor prognostic marker, as reported by various workers and has been suggested to manage these neonates with pericardiocentesis even if they are asymptomatic [1,7]. PPC in index neonate resolved spontaneously without invasive treatment, suggesting that conservative management with close monitoring may be a reasonable choice for PPC in asymptomatic neonates.

To conclude, our case developed PPC with pneumothorax with spontaneous resolution without need for pericardiocentesis. We reported this case to highlight the possibility of conservative management with clinical monitoring without pericardiocentesis in asymptomatic non-ventilated neonates.

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