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Brief Report

A full-term healthy neonate with respiratory distress

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Abstract Pneumopericardium, defined as air in the pericardial cavity, is a rare condition with potentially severe complications and mortality. In the neonatal period, pneumopericardium is associated with prematurity, very low birth weight, and assisted ventilation. We report the occurrence of spontaneous pneumopericardium in a healthy full-term neonate who did not receive any supportive ventilation.

Keywords: Neonatology; pneumopericardium; spontaneous

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Case presentation

A boy was born at a gestational age of 38 weeks and 6 days by a Caesarean section because of maternal complications during previous parturition. The pregnancy was uncomplicated, with no cardiac abnormalities on the 20-week ultrasound. His Apgar scores were 9/9/10, after 1, 5, and 10 minutes, respectively, and he did not require support or resuscitation after birth. His birth weight was 3900 g (p90). On the 1st day, he developed signs of respiratory distress with grunting and nasal flaring. His saturation declined to 92%. His vital parameters showed a temperature of 37.4°C, a heart rate of 133/minute, and a respiratory rate of 42/minute. Blood pressure was 55/30 mmHg and he had a capillary refill of 2 seconds. On examination, normal heart sounds and symmetrical breathing sounds were heard, without crepitations or wheezing. Laboratory assessment showed a respiratory acidosis (pH 7.28; pCO2 6.78 kPa, base excess −2.8) and low infection parameters (C-reactive protein 12 mg/l; leucocytes 13.9×10^9/l). A chest X-ray revealed a demarcation around the heart filled with air, indicating a pneumopericardium (Fig 1), as well as an increased density of the left lung. There were no radiological signs of a pneumothorax or a pneumomediastinum.

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Respiratory support was initiated, consisting of nasal airflow with 100% oxygen, elevating his saturation to 95%. Considering the potential complications of a pneumopericardium, the infant was transferred to a neonatal ICU. Echocardiographic examination showed a structural and functional normal heart. Follow-up chest X-rays showed resorption of the air trapped in the pericardium. On the 4th day of hospitalisation, a complete resorption of the pneumopericardium was confirmed. However, mild atelectasis of the upper left lobe remained present. The boy was monitored for another 4 days and showed no relapse of his respiratory distress. A follow-up chest X-ray after 6 weeks showed complete recovery.

Discussion

Pneumopericardium, defined as air in the pericardial cavity, is a rare condition with potentially severe complications and mortality. Similar to pericardial effusions, a pneumopericardium can also lead to cardiac tamponade. This has been reported previously in a case of a newborn with acute respiratory distress syndrome, subjected to mechanical ventilation assistance, who developed cardiac tamponade owing to a pneumopericardium, leading to decreased atrial and ventricular filling and cardiac output.[1] For this potential risk, our patient was transferred to a neonatal ICU where pericardiocentesis could be safely performed if necessary. Fortunately, the course was

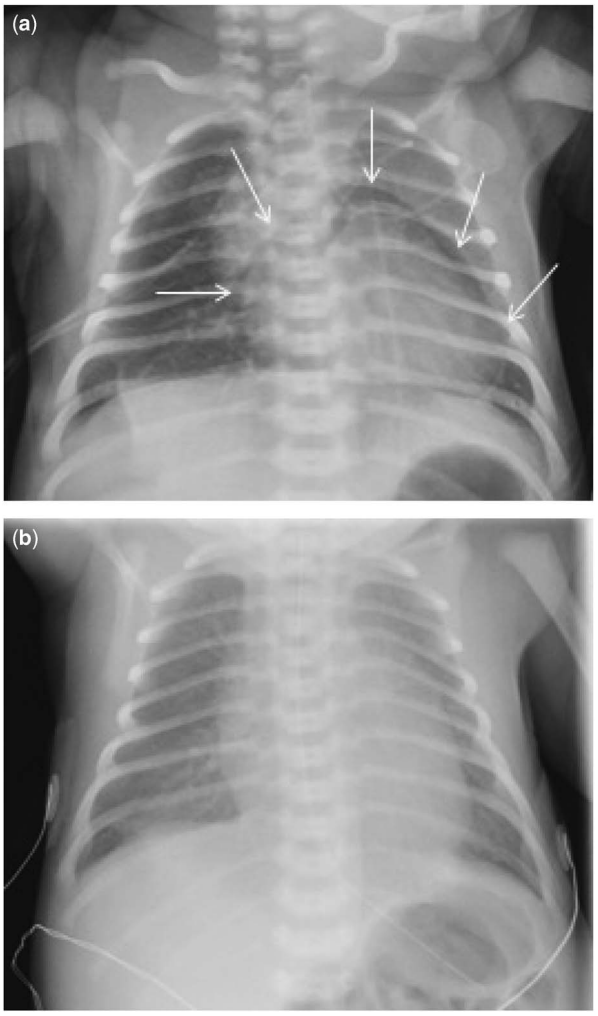

Figure 1.
*Chest X-ray at day 1 (**a**), showing the characteristic hypodense area around the heart, demonstrating a pneumopericardium, and at day 4 (**b**), showing complete resolution of the pneumopericardium.*

uneventful with spontaneous resorption of the pneumopericardium.

Pneumopericardium in the neonatal period is associated with prematurity and very low birth weight.[2] Resuscitation and assisted ventilation are potential risk factors for the development of this condition.[3] Hook et al reported a retrospective cohort group analysis with increased occurrence of pneumopericardium in very low birth weight infants if ventilation support was given.[2] Spontaneous pneumopericardium is rare. Only two case reports presented a full-term neonate with spontaneous pneumopericardium over the past decennia.[4,5] In both of these cases the babies received no supportive ventilation. However, one baby was delivered by forceps because of foetal distress, and repeated airway suctioning was performed.[4] Our patient was not ventilated, nor did he receive positive end expiratory pressure.

The pathophysiology of pneumopericardium is uncertain. It has been hypothesised that the rupture of alveoli leads to air passing over the perivascular connective tissue sheath towards the mediastinum.[6] Assisted ventilation or diffuse atelectasis may lead to greater pressure gradients being applied across the alveolar walls and cause alveolar rupture.[7,8] To our knowledge, no experimental studies concerning pneumopericardium or pneumomediastinum have been performed to date to further elaborate on the pathophysiology.

In conclusion, pneumopericardium is a rare and potentially life-threatening condition that is usually associated with assisted ventilation and preterm birth. Clinicians and paediatricians should be aware that this condition can also occur in the healthy full-term neonate, which demands instant diagnosis and close follow-up.

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Conflicts of Interest

None.

Ethical Standards

Consent of patients' parents was obtained.

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