JMS 2024; Vol 7 (1):188-192
UDC:616.24-008.4-053.31
https://doi.org/10.55302/JMS2471188nt

AIR LEAK SYNDROME IN A NEWBORN WITH RESPIRATORY DISTRESS CASE REPORT

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Abstract

Air leak syndrome is air accumulation into extra alveolar spaces where it is not normally present, most often resulting from an alveolar rupture with air trapping in the extra pulmonary space. It is more common in neonates with lung diseases such as respiratory distress (RD) or meconium aspiration syndrome (MAS).

Air trapping in the extra pulmonary space can create life-threatening conditions by compression of the lung or major blood vessels and the gas exchange or blood flow can be severely compromised.

Air leak syndrome includes the clinical presentation of a group of diseases that have a similar pathophysiological mechanism, such as pneumothorax, pneumomediastinum, subcutaneous emphysema, pulmonary interstitial emphysema, pneumopericardium and pneumoperitoneum. Of particular importance has the manifestation of pneumothorax due to the risk of airway collapse, clinical condition call tension pneumothorax. This is a medical emergency that requires immediate medical attention. We present a premature newborn with respiratory distress and air leak syndrome (pneumothorax, pneumomediastinum and subcutaneous emphysema).

Key words: newborn, air leak syndrome, pneumothorax, pneumomediastinum, respiratory distress

Introduction

Air leak syndrome is clinical phenomenon associated with the leakage of air from cavity that contains air into spaces the usually do not have air. The terminology air leak syndrome is the presence of air leak with associated symptoms of respiratory distress. Air leak syndrome includes pneumothorax, pneumopericardium, pneumomediastinum and subcutaneous emphysema.[1]

Spontaneous pneumothorax is a common manifestation of air leak syndrome in the neonatal period. Represent accumulation of air between the visceral and parietal pleura. Depending on the size of the lung collapse, pneumothorax can be partial or complete, unilateral, or bilateral [2,3].

The incidence of pneumothorax in newborns is 0,5% to 3%, but in preterm newborns with underlying lung disease such as respiratory distress may increase the risk of pneumothorax from 1.5% to 20%.[4,5].

The clinical presentation can be asymptomatic in newborns with partial pneumothorax, or manifested with cyanosis, tachypnea, dyspnea, tachycardia, low blood pressure and absent breathing in tension pneumothorax. This pneumothorax is a life-threatening emergency wherein a large air collection in the pleural space compromises respiration and cardiac function [6].

Timely recognition is important for survival rate. The diagnosis is made with physical and imaging examination.[7,8].

An X-ray of the lungs and a CT scan of the chest confirms the diagnosis. The treatment includes thoraces drainage placing on the affected side [9].

Pneumopericardium is an accumulation of air in the pericardial space, manifested in 2% of newborns with low birth weight. When leading to cardiac tamponade, it can be life-threatening. If asymptomatic, only close monitoring is required. The diagnosis is confirmed on X-ray lung imaging, by the typical finding of a "halo sign", which present the heart surrounded by air, and successful pericardiocentesis results in 75-80% survival and is only indicated in case of hemodynamic instability and cardiac tamponade [10].

Pneumomediastinum is an accumulation of air in the mediastinal space manifested in newborns with moderate respiratory distress. The incidence is approximately 2.5/1000 live births and in 0.1% of neonates hospitalized in intensive care units [11].

Pneumoperitoneum and Subcutaneous emphysema are rare complications in newborns occurring secondary to pneumothorax and pneumomediastinum [12-14].

Case report

This case report presents a premature newborn with respiratory distress and air leak syndrome manifested by pneumothorax, pneumomediastinum and subcutaneous emphysema.

The baby was born in 36 gestation week by Section Caesarea (because of Mather unexpectedness for normal birth) with birth weight of 2640 g and APGAR 7/8. Immediately after the birth, the newborn baby has weaker cry and irregular breathing so was aspirated and placed on oxygen support. Due to decreased of oxygen saturation to 83% and worsening of dyspnea, it was transferred to the neonatal intensive care unit (NICU) at the University Children's Hospital for further treatment.

On admission in NICU the preterm newborn has manifested tachycardia, tachydyspnea and perioral and acral cyanosis. Because of findings of respiratory distress in initial chest X-ray, in the birth center, (Figure1), the newborn was put on non-invasive mechanical ventilation with B-CPAP. However, due to potentiation of respiratory insufficiency with a decreased saturation to 73% and deepening of respiratory acidosis, an X-ray was taken, which showed a right-sided pneumothorax (Figure 2). A passive thoracic drainage was placed by a pediatric surgeon and the newborn was put on invasive ventilation.

The control X-ray of lungs (Figure 3) was with some re-expansion, but with the appearance of pneumomediastinum.

Fig.1 Shows respiratory distress on chest X–ray

Fig.2 Shows right- sided pneumothorax on chest X- ray

Fig.3 Shows Pneumomediastinum on chest X-ray

Due to the presence of shadows in the mediastinum, a diaphragmatic hernia was considered as a differential diagnosis. An intestinal passage (Figure 4) and chest CT (Figure 5) were performed, and the existence of the diaphragmatic hernia was excluded.

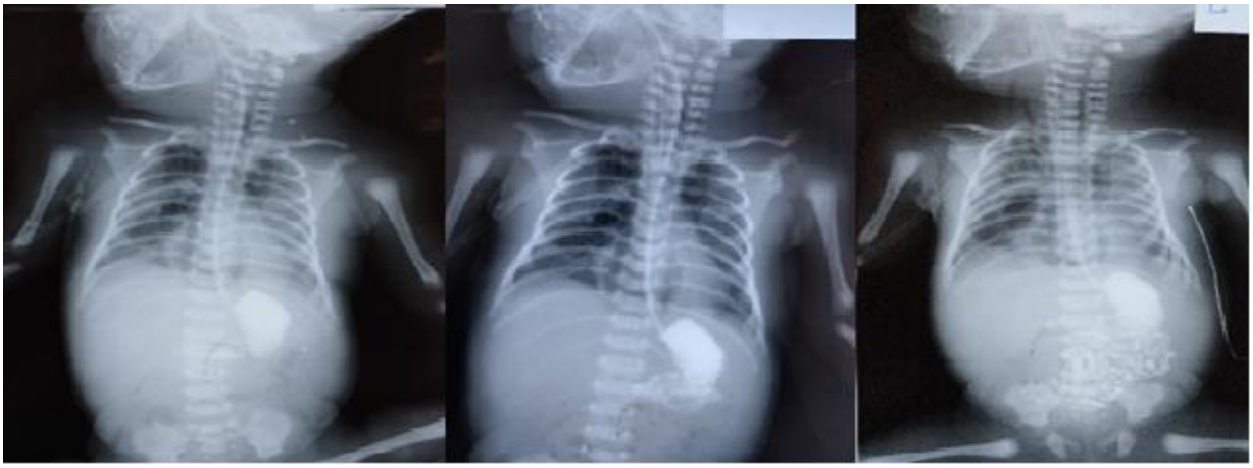

Fig. 4 Shows intestinal passage of the stomach and small intestinal

Fig.5 Shows pneumomediastinum and right- sided pneumothorax on CT lungs

Due the finding of reexpansion of the lung (Figure 6), the thoracic drain was removed, but pneumomediastinum was still present, but also have the appearance of subcutaneous emphysema (Figure 7).

During the treatment, at first, the baby was put on total parenteral nutrition, then with adapted milk formula through a nasogastric tube. The newborn was extubated on the tenth day of hospitalization and was put on oxygen mask support. After that it was transferred to the Neonatal department with stable condition and normal X-ray findings of the lungs (Figure 8).

Fig.6 Shows re-expansion on the right side of the lung with still present pneumomediastinum on chest X-ray

Fig. 7 Shows subcutaneous emphysema on chest X-ray

Fig.8 Shows normal chest X-ray

Discussion

In our case the preterm newborn has underlying lung disease such as respiratory distress, which increased the risk of occurrence spontaneous pneumothorax. When the newborn showed signs of potentiation of respiratory insufficiency with a decreased saturation, the X ray of the lungs confirmed the manifestation of pneumothorax. A thoracic drain was immediately placed, which reduced the risk of occurrence and development of tension pneumothorax.

Not all preterm newborn manifested an air leak syndrome but every neonate with respiratory distress and a significant clinical worsening condition, close monitoring is essential to identify complications and the need for intervention. Most neonatal air leaks resolve spontaneously [15,16].

The case presented, mainly for its clinical evolution and importance of prevention, timely diagnosis, and adequate management of neonates with respiratory distress syndrome.

Conclusion

The most common clinical presentation of air leak in late preterm newborns with respiratory distress is the unilateral spontaneous pneumothorax. It may evolve to tension pneumothorax, which can lead to sudden cardiovascular collapse. But in our case timely imaging diagnostics and appropriate treatment with thoracal drenage placeing could improve the treatment and outcomes of air leak syndrome in newborn with respiratory distress.

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