PNEUMOMEDIASTINUM WITH UNDERLYING CAUSE OF CONGENITAL PNEUMONIA IN A PRETERM INFANT: A CASE REPORT

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SUMMARY: Pneumomediastinum is defined as a mediastinal air leak. Neonatal pneumomediastinum occurs in approximately 2.5 per 1000 live births. The diagnosis is usually confirmed by frontal chest roentgenogram. In this case we want to report pneumomediastinum with a rare underlying cause of congenital pneumonia and to highlight the diagnosis could not always be done simply based on chest X-ray and also should benefit from other ancillary imaging methods.

Key words: Congenital pneumonia, Neonatal pneumomediastinum, Preterm infant

INTRODUCTION

Pneumomediastinum is defined as a mediastinal air leak. Neonatal pneumomediastinum (PM) occurs in approximately 2.5 per 1000 live births. The infants are often asymptomatic. This condition may follow gas trapping associated with the neonatal respiratory distress syndrome, pneumonia, or the use of mechanical ventilation (1). The diagnosis of PM is usually confirmed by frontal chest roentgenogram, including the cervical region. In this case we want to report PM with a rare underlying cause of congenital pneumonia and to highlight the diagnosis could not always be done simply based on chest X-ray and also should benefit from other ancillary imaging methods.

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CASE REPORT

A male newborn with 32 weeks gestational age was borned to a 38 year old with gravida 5 para 4 mother by cesarean section because of placenta previa. The history of mother did not reveal any problem except placenta previa. The APGAR scores in one and five minutes were 1 and five respectively. He was 1750 g in weight and 38 cm in height with no any dysmorphic appearance.

He was transferred to our neonatal intensive care unit (NICU) and put on mechanical ventilator for respiratory support. Initially the infant was treated with crystalized penicillin and gentamycin. At first appearance he had increased antero-posterior diameter of chest with increased respiratory rate (70/min). On conventional ventilation positive inspiratory pressure was adjusted 20 cm H_2O pressure and positive end-expiratory pressure 5

cmH_2O pressure with FIO_2 = 1,0 on admission in our NICU. Pulseoximetry revealed 90-95 %. Initial complete blood cell counts and serum biochemistry profile including C-reactive protein were within normal limits. Arterial gas analysis was consisted with respiratory acidosis and chest X-ray showed diffuse reticulogranular pattern which was consistent with mild pulmonary respiratory distress (Figure 1), and surfactant therapy was administered (Curosurf ® 200 mg/kg). However despite the administration of surfactant, respiratory failure did not improve.

The serial chest X-ray revealed localized uncertain increased air with no consolidation on the apical and medial of right lung of the infant (Figure 2) which this suspicious image led us to suspect of diaphraghmatic hernia initially. And we performed X-ray roentgenogram with administering barium by orogastric tube to let contrast material pass into the intestines to demostrate in mediastinum if it was diaphragmatic hernia as we had suggested. But the serial X-ray graphies after barium administration did not demonstrate any intestine loops with contrast material in mediastinum which invalidated our argument at the beginning of the procedure (Figure 3). Thus we planned to have the baby screened with chest computerized tomography (CT). The CT revealed fibrotic changes with consolidated area and accompanied ground glass appearance with increased density at the superior apical and medial segment of medium lob of right lung. In addition, the consolidations with ground glass appearance were detected on the inferior lob of the left lung. And finally on the either apex of lungs there was free air as well as in the mediastinum which had been recognized on the chest CT (Figure 4).

Intubation and ventilation was discontinued on the 8th day and the baby was put on nasal CPAP, followed by with free oxygen on the 10th day of life. Following with daily chest X-ray, the air in the mediastinum resolved spontaneously by the 14th day with no need of respiratory support.

DISCUSSION

The experimental works of Macklin and Macklin provided insights into pathophysiology of PM (2, 3); alveolar rupture occurs because of a pressure gradient between the alveolus and the surrounding tissues. This gradient develops either through overinflation of the

Figure 1: Chest X-ray consistent with diffuse reticulogranular pattern which was consistent with mild pulmonary respiratory distress.

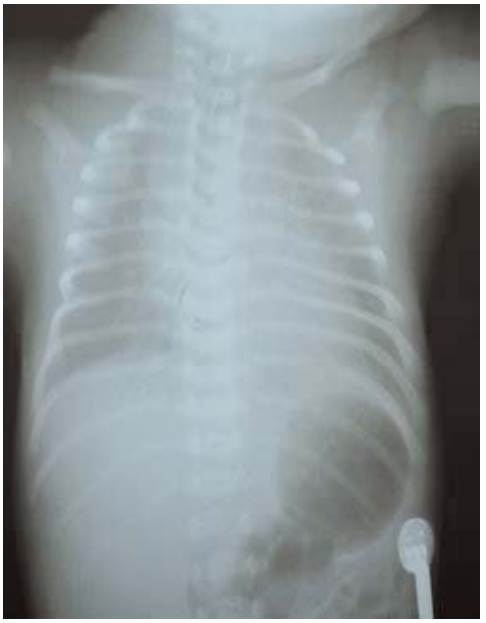


Figure 2: Chest X-ray demostrating uncertain air cluster on the right upper and medial side of the lung with minimal changes on the left.

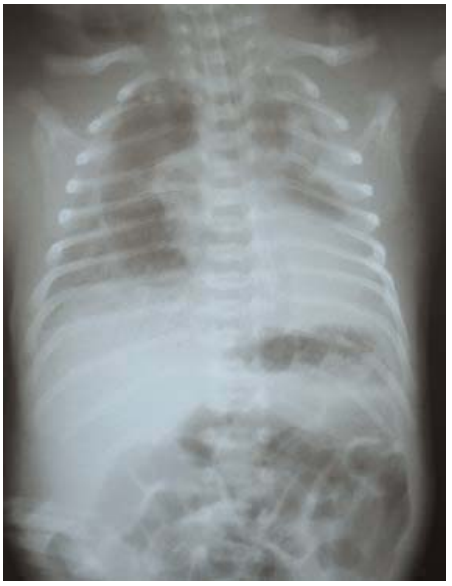


Figure 3: X-ray with no evidence of mediastinal intestines with contrast material after orogastric barium procedure.

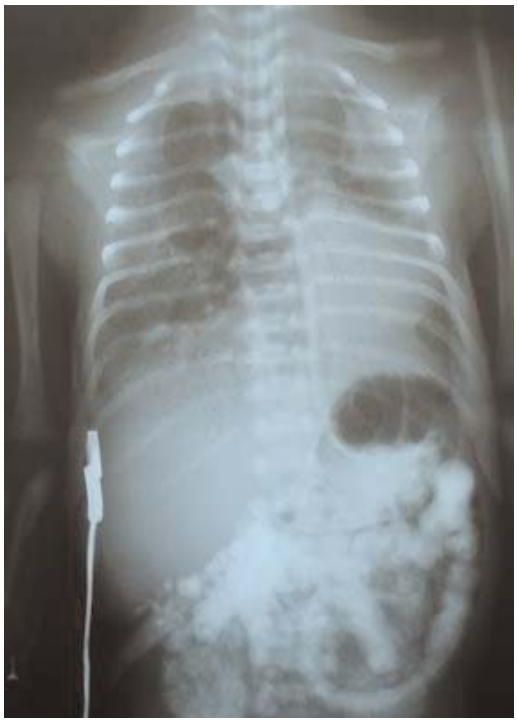
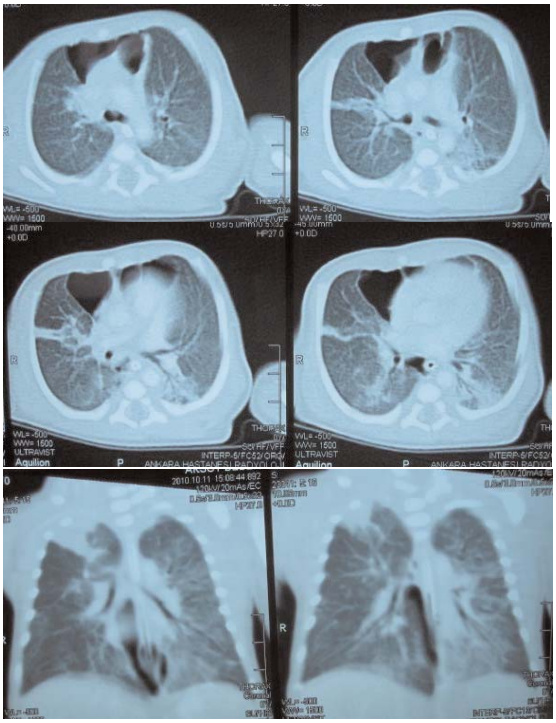


Figure 4: Chest CT imaging with fibrotic changes and consolidated areas and air in the mediastinum.



alveolus or a reduction of interstitial pressure. The air that subsequently leaks into the interstitial tissue diffuses across the peribronchial and perivascular tissue, and then the mediastinum, the neck and into the subcutaneous tissue. However, due to pressure equalisation between the affected and adjacent alveoli in the lungs, the inter alveolar walls remain intact and the lungs inflated.

The majority of neonatal pneumomediastinum occur during performing assisted ventilation with underlying premature or diseased lungs. Annik et al. have reported nine neonatal cases presented with symptoms of respiratory distress and four cases of neonatal PM attributed to pulmonary infection, immature lungs and ventilatory support (4). In our case the primary underlying cause of PM was congenital pneumonia probably complicated with assisted ventilation which is a rare cause of PM as reported in literatures (4, 5). In a study the incidence of pulmonary air leak in ventilated infants was 41% with % 3 of pneumomediastinum (5). In this study the primary respiratory diagnoses in the infants who developed pulmonary air leaks on mechanical ventilation were hyaline membrane disease (79%), pneumonia (10%), apnea of prematurity (6%), and respiratory depression from birth asphyxia (5%).

The diagnosis of PM is essentially confirmed by frontal chest roentgenogram, including the cervical region. Typical radiological signs of PM include the continuous diaphragm sign and linear bands of mediastinal air parallelling the left side of the heart and the descending aorta with extension superiorly along the great vessels into the neck. It is usually diagnosed by chest X-ray alone. As we report in our case, it is not always as easy as usual to make the diagnosis simply by the route of chest X-ray alone, but also the ancillary diagnostic methods should be necessitated to make the decision. In conclusion, we want to report a case, with congenital pneumonia the rare underlying cause of PM and to highlight the importance of ancillary imaging methods of diagnosis.

REFERENCES

1. Doug Hacking and Michael Stewart: Neonatal pneumomediastinum. N Engl J Med, 344:1839, 2001.

2. Macklin MT, Macklin CC: Malignant interstitial emphysema of the lungs and mediastinum as an important occult complication in many respiratory diseases and other conditions: an interpretation of the clinical literature in the light of laboratory experiment. Medicine, 23:281-358, 1944.

3. Macklin CC: Transport of air along sheaths of pulmonic blood vessels from alveoli to mediastinum: clinical implications. Arch Intern Med, 64:913-926, 1939.

4. Annik Hauri-Hohl, Oskar Baenziger, Bernhard Frey: Pneumomediastinum in the neonatal and paediatric intensive care unit. Eur J Pediatr, 167:415-418, 2008.

5. VYH Yu, PY Wong, B Bajuk, W Szymonowicz: Pulmonary air leak in extremely low birth weight infants. Archives of Disease in Childhood, 61:239-241, 1986.

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