

## Pneumothorax in a Preterm Neonate: A Case Report

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### ABSTRACT

A pneumothorax is an abnormal collection of air in the pleural space between the lung and chest wall. Although this condition commonly occurs in adults, it can also present as complication in neonates requiring assisted ventilation and has high morbidity and mortality. Chest tube placement and needle drainage are some common approaches in management. A late preterm infant born at 35+2 weeks of gestation was admitted in Neonatal Intensive Care Unit for the management of respiratory distress. He was kept on mechanical Continuous Positive Airway Pressure owing to worsening respiratory distress. Chest X-ray revealed pneumothorax that was successfully managed with venous catheter drainage on second intercostal space with underwater seal. He was discharge on 10th day of Neonatal Intensive Care Unit admission with stable vitals and normal breathing pattern.

**Keywords:** *needle thoracostomy; pneumothorax; preterm infants.*

### INTRODUCTION

Pneumothorax is a condition where there is free air in the pleural space. In preterm neonate, it has been associated with an increased risk of intraventricular hemorrhage and mortality.<sup>1,2</sup> Although the use of postnatal surfactant has reduced the risk of pneumothorax in neonates,<sup>3,4</sup> it remains an important complication. Timely diagnosis and appropriate treatment are crucial to reduce complications and mortality due to pneumothorax. Here, we present a case of management of pneumothorax with a venous catheter inserted in second space with underwater seal in a late preterm with respiratory distress that was kept on mechanical continuous positive airway pressure.

### CASE REPORT

A preterm male neonate was delivered to multipara mother at 35 weeks and two days of gestation via emergency lower segment caesarean section for fetal distress. Baby had an APGAR score of 8/10 and 9/10 at 1 minute and 5 minutes respectively and birth weight of 2.2kg. Baby was admitted in NICU for further management. Baby developed tachypnea up to 80 breaths per minute for which baby was kept on Mechanical Continuous Positive Airway Pressure (CPAP) at Positive End Expiratory Pressure (PEEP) of 5

cm of H<sub>2</sub>O. Surfactant was not considered as the baby was maintaining oxygen saturation at FiO<sub>2</sub> of 25% and chest X-ray was normal. IV antibiotics Ampicillin and Amikacin were started as per unit protocol in view of raised C- reactive protein. Other parameters of initial sepsis screening were normal.

At 19<sup>th</sup> hour of life, baby had worsening respiratory distress with increased tachypnea, severe intercostal, sub-costal and supra-sternal retractions. The FiO<sub>2</sub> requirement increased up to 50%. An urgent chest X-ray was done which revealed a right-sided pneumothorax along with mediastinal and tracheal shift to the opposite side which was suggestive of tension pneumothorax (Figure 1).

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Figure 1. Right sided pneumothorax with mediastinal shift.

As tension pneumothorax is an emergency condition it was managed with IV cannula drainage at second intercostal space and which was later connected to an underwater seal. Respiratory distress began to subside significantly. Antibiotics was upgraded to Piperacillin/Tazobactam and baby was kept nil per oral. The IV cannula placed in the chest was removed accidentally at 42<sup>nd</sup> hour of life. There was no worsening of tachypnea, chest retraction and laboured breathing. FiO<sub>2</sub> requirement and Silverman score significantly decreased. Chest X-ray was repeated after four hours which showed resolving pneumothorax (Figure 2).



Figure 2. Repeat chest X-Ray showing resolved pneumothorax.

Feeding was gradually increased without complications and kept on full feed. As the respiratory distress settled and FiO<sub>2</sub> requirement decreased, baby was weaned to nasal prong on 5<sup>th</sup> day of life, baby was comfortable on room air on 7<sup>th</sup> day of life. Baby was successfully discharged on 10<sup>th</sup> day with stable vitals, normal respiratory pattern and activity.

## DISCUSSION

Pneumothorax in preterm neonates with respiratory distress vary from 3% (receiving mechanical ventilation) to 9% (receiving CPAP support).<sup>6</sup> Worsening tachypnea, chest retractions, nasal flaring, grunting and cyanosis are few clinical signs of pneumothorax in a neonate. Respiratory distress syndrome, meconium aspiration syndrome, pneumonia and transient tachypnea of newborn are some of the risk factors. Mortality is very high when pneumothorax is untreated or treatment is delayed. The development of a pneumothorax with ensuing hypoxia and hypercapnia is a potentially life-threatening condition and 30% of the infants die in NICU.<sup>7</sup> In our case, early recognition and treatment of pneumothorax was key in good outcome. Pneumothorax is most commonly encountered in the first three days. This is probably due to high transpulmonary pressure caused by the onset of new breathing.<sup>8</sup> Our case was identified as pneumothorax at 19<sup>th</sup> hour of life.

Chest tube placement is the most common treatment approach in management of severe neonatal pneumothorax. It involves surgical procedure and various complications. Few trials support insertion of a venous catheter as a safe alternative to chest tube placement as a method of draining air from neonates with pneumothorax. This is an easy and quick bedside procedure and is particularly useful for neonates that require immediate air drainage.<sup>9</sup> As compared with chest tube drainage, needle aspiration decreased hospital stay and decreases surgery related complication. Our case was also managed with insertion of 22-gauge cannula connected to an underwater seal. There was significant improvement in respiratory rate, chest retraction, Silverman score and FiO<sub>2</sub> requirement after needle insertion. It also avoided chest tube insertion and patient was discharged on 10<sup>th</sup> day of hospital admission.

Another alternative to chest tube placement in neonate is high-frequency oscillatory ventilation that provides a conservative management in a case of significant pneumothorax in a preterm neonate who is hemodynamically stable and requires mechanical ventilation.<sup>10</sup>

Pneumothorax in a neonate is a serious condition with high morbidity and mortality which requires

early identification and prompt management. Venous catheter with underwater water seal can be considered as an alternative to chest tube drainage to minimize surgical complication and hospital stay.

Conflict of Interest: None.

Consent: JNMA [Case Report Consent Form](#) was signed by the patient and the original article is attached with the patient's chart.

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