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Recurrent Pneumothorax Due To Klebsiella Sepsis In A Term Neonate- A Rare Case Report

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Abstract

Pneumothorax occurs more frequently in the neonatal period than in any other period of life and is associated with increased mortality and morbidity. Several risk factors for pneumothorax, including respiratory pathology, invasive and non-invasive respiratory support, have been described. Neonatal sepsis remains an important risk factor for neonatal pneumothorax. Here we are presenting a rare case of a term neonate with bacteriologically proven klebsiella pneumonia in the first week of life associated with recurrent pneumothorax. The clinical course was complicated by the recurrent pneumothorax, 3 times in a span of one month. Each time baby was treated with antibiotic therapy and chest tube drainage. Satisfactory clinical recovery was observed each time. Baby is doing well on follow up.

Keywords: Pneumothorax, sepsis, antibiotics, chest tube

Introduction

Neonatal pneumothorax is a life threatening condition that is associated with high mortality and morbidity [(1)]. Despite the high incidence, only 0.5% of cases of pneumothorax are symptomatic [(2,3)]. The early diagnosis and treatment of neonatal pneumothorax is critical, as it may help to avoid complications and reduce mortality rates resulting from hypoxaemia, hypercapnia or impaired venous return [(1,4,5)]. There are many risk factors associated with its development including meconium aspiration syndrome, respiratory distress syndrome, pulmonary hypoplasia, mechanical ventilation, and sepsis. The use of mechanical ventilation and coexisting diseases are also reported to be important risk factors that can affect the prognosis of neonatal pneumothorax [(6-9)]. Neonatal sepsis remains an important risk factor requiring a high index of suspicion. Immediate treatment with antibiotics is imperative. The most commonly implicated bacteria include Escherichia coli, Group B streptococcus, Staphylococcus, Klebsiella pneumoniae, and Pseudomonas aeruginosa [(10).] In developing countries, multiple drug resistant organisms causing neonatal sepsis are increasing, and Klebsiella pneumoniae is often reported in this context. Klebsiella has become a relatively common infecting pathogen in the newborn sepsis, but frequently under reported [(11).] Thaler, in a review of the literature in 1962, found only seven cases of klebsiella pneumonia during the first month of life. With the increasing use of assisted ventilation and the extensive administration of antibiotics in the neonatal period this organism may be the cause of more pulmonary infections in the future [(12)]. In the literature a case of premature infant with bacteriologically proven klebsiella pneumonia in the first week of life is reported. The clinical course was complicated by the early formation of pneumatoceles and subsequent recurrent pneumo thoraces. Satisfactory clinical recovery, growth and psychomotor development were noted at 1 year of

age, despite the persistence of a pneumatocele in the right lung [13]. Studies have shown that the most severe forms of neonatal sepsis with an unfavourable outcome were due to virulent strains of *K.* pneumoniae [14].

The index case was recurrent pneumothorax with culture positive klebsiella sepsis in a neonate. Treated with repeated ICDT placement and antibiotics according to sensitivity pattern.

Case Report

A newborn male baby born out of non consanguineous parentage, by LSCS, to a primi mother at term gestation, with uneventful antenatal history, with birth weight of 2.75kg,was brought with c/o breathing difficulty since birth. History of meconium stained amniotic fluid was present. On examination baby was tachypneic, tachycardiac, and distressed. There were retractions and saturation of 88% at room air. Preliminary investigations like blood counts, ABG, CXR, and blood sugar were sent. In view of severe respiratory distress with retractions and grunting, associated with respiratory acidosis in ABG, had to be intubated and put on ventilator with pressure control mode. CXR showed bilateral haziness and loss of lung volume, hence surfactant administration was done. Laboratory parameters were Hemoglobin= 18.5 gr%, Total Leukocyte count (TLC) =35,900 cells/cu mm, polymorphs =88%, lymphocytes=09%, eosinophils=03%, platelet count= 2,42,000cells/cu mm, sodium=141m mol/L, potassium= 3.4 m mol/L, chloride=105m mol/L, creatinine=1.1mg/dl. Inflammatory markers were procalcitonin (PCT) = 5.18ng/ml, IL6= 13.76pg/ml, and C- reactive protein (CRP) =33.5mg/L.

Even with ventilator, surfactant and other supportive management baby was not improving well. Baby developed fever on day 3 of admission. Hemogram, electrolytes, CRP, and Culture were repeated. Baby developed retractions on ventilator, and on examination decreased air entry on right side. CXR showed right pneumothorax, and Inter Costal Drainage Tube (ICDT) was placed. (Figures 1 and 2). Baby improved gradually and weaned to CPAP (Continues Positive Airway Pressure) on day 5, and to HFNC (High Flow Nasal Cannula) on day 6 of life. Repeat blood culture was positive for Klebsiella and sensitive to Colistin and Tigecycline (Figure3). Antibiotics were changed according to sensitivity pattern. Treated with tigecycline 2mg/kg for 7 days. Feeding initiated as trophic feeding on day2, and gradually increased day by day. Attached to mother for breast feeding from day 7 of life onwards. Weaned from HFNC to room air on day 10, ICDT was also removed and shifted to room on day 12 of life. Baby developed distress and retractions on day 14, along with cyanosis and desaturation in room, and had to be shifted to NICU. As air entry decreased on right side and CXR showed right pneumothorax, ICDT placed again (Figures 4 and 5). CT chest was also done to rule out any congenital adenomatoid malformation (Figure 6). Baby recovered and ICDT removed on day 17 of life. Shifted to room and discharged on day 19 of life.

Baby was on regular follow ups for vaccination and well baby clinic. Gradually baby developed distress again and CXR revealed pneumothorax recurrence. Baby had to be admitted again on day 29 of life. Baby was admitted again in NICU and connected to nasal Oxygen. ICDT was placed (Figures 7 and 8). Baby gradually recovered. ICDT removed on day 32 and shifted to room. Discharged home on day 34. Baby is on regular follow ups and doing well.

Discussion

Early onset sepsis remains a common problem in neonates causing significant morbidity and mortality. Positive blood culture is the hallmark of sepsis along with supportive clinical and laboratory parameters [15]. Current efforts toward maternal intrapartum antimicrobial prophylaxis have significantly reduced the rates of Group B streptococcous disease but have been associated with increased rates of Gram-negative infections. Klebsiella has become a relatively common infecting pathogenic organism in the newborn period [16]. However, pneumonia and pneumothorax due to klebsiella remains a rarely reported occurrence in this age group. Thaler et al in a review of the literature in 1962, found only seven cases of klebsiella pneumonia during the first month of life [17]. With the increasing use of assisted ventilation and the extensive administration of antibiotics in the neonatal period this organism may be the cause of more pulmonary infections in the future. Our index case was culture proven klebsiella sepsis with recurrent pneumothoraces.

According to Schmutz, Henry et al high leukocyte counts were diagnostic clue to neonatal sepsis [18]. In

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our index case the TLC was 35,900 cell/cumm. A study by Meem and Modak showed CRP and procalcitonin were the two most commonly elevated acute-phase reactants in neonatal sepsis [19]. In our index case CRP was 33.5 mg/L and PCT was 5.18ng/ml. Blood culture was the gold standard investigation in neonatal sepsis.

Pneumothorax in the newborn has a significant mortality and morbidity. Continued air leak and persistent pneumothorax could alter respiratory and cardiovascular hemodynamics, and also exacerbate the effects of oxygen toxicity and barotraumas by prolonging oxygen and ventilatory assistance. Differentiation between pneumatoceles, pneumothorax and congenital pulmonary cysts may be difficult [18]. Many of these can be detected or eliminated easily with chest radiographs [20]. We used CXR as the diagnostic test for pneumothorax.

Study by Papageorgiou A et al showed pneumatocele with klebsiella sepsis and treated with chest tube drainage [22]. According to Vinson ED et al chest tube drain for decompression of an acute tension pneumothorax was the treatment of choice [13]. Subhasree Roy et al studied the klebsiella susceptibility to tigecycline [23]. To best of our knowledge our index case was the first case of klebsiella sepsis with recurrent pneumothorax in a neonate. Treated successfully with tigecycline and chest tube.

Conclusion

Pneumothorax is a life threatening condition. It is relatively common in NICU. Its risk factors, especially sepsis should be well known in order to prevent and treat the underlying condition. Early onset sepsis with klebsiella is the cause for recurrent pneumothoraces in our case. If there is sudden deterioration of a neonate associated with respiratory distress suspect pneumothorax. Prompt diagnosis by urgent portable X-ray and immediate intervention is needed for life saving and better outcome.

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