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Neonatal Empyema Thoracis: a case report

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Abstract

A term newborn was admitted to the neonatal intensive care unit immediately after the birth, with respiratory distress due to congenital pneumonia. With progression of respiratory symptoms, empyema thoracis was diagnosed due to the right massive purulent pleural effusion in chest X ray. Treatment was fulfilled by ventilator support and pus drainage by means of two chest tubes and appropriate antibiotics. Although, empyema thoracis is seen commonly in children following pneumonia, it is a very rare condition in neonatal period and there are limited reported cases of neonatal empyema which have been treated completely without any complication.

Introduction

Empyema thoracis is defined as accumulation of pus in pleural space. It is relatively common in children, especially in malnutrition and immunocompromised states (1), but it is very rare in neonatal period, even following severe pneumonia. Underlying risk factors could rarely be detected (2, 3) and it has a progressive and rapid course with high mortality in spite of appropriate treatment (3-5).

Reported bacterial agents in limited neonatal empyema cases had been gram negative bacteria (*Escherichia coli* and *Klebsiella* species) and gram positives (*Staphylococcus aureus*, *hemolytic Group A Streptococcus*) (3, 6). Empyema formation in neonatal period is a very rare condition, probably due to immune deficiency in neonates for infection localizing (2). We report a case of neonatal empyema thoracis in a newborn infant, who was successfully treated without any complication.

Case Report

A male neonate with gestational age of 37 weeks and birth weight of 3400 grams was born in Afzalipour Medical Center/ Kerman via cesarean section delivery with good Apgar score without any perinatal risk factor. Twenty minutes after the birth, apnea and cyanosis occurred and the infant was intubated and mechanical ventilation begun. In the first chest X ray evidence of pneumonia was found. Required laboratory tests were done and empiric antibiotics were begun.

Echocardiography was accomplished because of heart murmur in physical examination and serious cardiac problems were ruled out. Eight days after the beginning of treatment, general condition was slightly improved. The first blood culture was negative. The infant was extubated and supported by nasal CPAP, but unexpectedly respiratory distress progressed at the 13th day of life, so the infant was reintubated and mechanical ventilation was started again. Massive right side pleural effusion was found in chest X ray (figure 1), and approximately 20cc pus was aspirated by pleural tap. Fluid analysis revealed exudate nature, and gram negative bacillus (*klebsiella spp.*) was reported in the aspirated pleural fluid. Chest tube was inserted via 5th intercostal space and 50cc pus was drained in the first 24 hours and purulent secretion continued during next days, so that the second chest tube was inserted from lower intercostal space for better drainage (figure 2, 3). Echocardiography was done because of heart murmur worsening and hepatomegaly and severe cardiac failure was reported; therefore, treatment was continued with inotrope drug and intravenous diuretic and empiric antibiotics were replaced by Vancomycin, Meropenem and Amikacin according to the antibiogram. At this period, the infant was seriously ill and repeated cardiopulmonary resuscitations including cardiac massage were required and extubation failed repeatedly. The second and third blood cultures were negative. Chest tube was maintained in place for 23 days, and after purulent drainage cessation and relative recovery, the chest tube was removed.

Figure 1

Figure 2

Figure 3

Finally, the neonate was extubated after 18 days and cardiac drugs were tapered off following cardiopulmonary status improvement. In the last radiography before discharge, there was evidence of background pneumonia, but neonatal pleural effusion had been eliminated completely. The infant was discharged without respiratory distress and with very good general condition. We did not find immunodeficiency and no hypoxic or cardiopulmonary complication in two years follow up in this infant.

Discussion

Empyema thoracis is a very rare condition in neonatal period and is accompanied with high mortality rate (2, 4, 5, 6). Clinical manifestation at this time is not clear and radiographic evaluation and high clinical suspicion is required for diagnosis. Staphylococcus aureus has been reported as the most common etiologic agent (3). There is not any accepted guideline for the treatment of neonatal empyema thoracis (6) and usually treatment consists of pleural fluid drainage, chest tube insertion and supportive drug treatment (7,8). In our patient, external drainage in addition to intravenous wide spectrum antibiotics and appropriate cardiopulmonary support caused general and respiratory recovery. Videoscopic procedures or fibrinolytic agents, which there are not any experiences in their use in neonatal period, were not required. The presented patient is one of the rare cases of neonatal empyema thoracis caused by gram negative bacteria and was recovered completely with usual treatment.

Conclusion

Although empyema thoracis in neonatal period is a rare condition, it must be considered and ruled out by chest Xray in every neonate affected by pneumonia that is not improved with usual treatment or has complicated clinical course. Our experience in this patient demonstrated that prompt diagnosis and appropriate supportive treatment in addition to adequate pus drainage could decrease morbidity and mortality in neonatal empyema thoracis cases.

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