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Pleural empyema in a new born: A case report

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Abstract

Pleural empyema is a parapneumonic effusion (a pleural collection in association with underlying pneumonia) that contains pus. We report 25 day old male infant who developed early onset neonatal pneumonia with pleural empyema. Staphylococcus aureus was isolated from pleural fluid. Patient was managed with intercostal tube drainage and antimicrobial therapy.

Key words: pleural empyema, intercostal drainage

INTRODUCTION

Worldwide the incidence of pneumonia is increasing. Whilst, there is limited high quality evidence to guide the management of neonates and children with empyema, the outcome is usually excellent irrespective of the initial approach, with normal chest X ray and lung function at long term follow up. Our literature search showed that around 20 case reports in the world literature have been reported.[1-4] In neonates gram positive organism are more commonly seen on culture like Staphylococcus aureus, Escherichia coli, hemolytic group B Streptococcus, hemolytic group A Streptococcus, Klebsiella spp. and Serratia.[3,5,6]

CASE REPORT

A 25 day old 2.3 kgs newborn was admitted to our tertiary centre with respiratory distress and feeding difficulty. On admission patient was lethargic, cyanotic and respiratory distress (68 breaths/min)was present. Patient was febrile with intercostals and sub costal retraction. On auscultation breath sounds were absent on right side. He was immediately intubated and kept on ventilator. Arterial blood gas revealed ; pH 7.16,PaO2: 55mm Hg,PacCo2:50mm Hg,HCO3:18.0 mmol/L with an SaO2: of 80%. Xray chest revealed right sided pleural effusion ,atelectasis with left sided mediastinal shift [Figure 1].Ultrasonography of the thorax revealed right sided pleural effusion with right collapse lung. A right sided intercostal drainage tube with closed chest drainage system was placed at the same time under local anesthesia by the Pediatric surgeon. Pleural fluid was purulent in character [Figure 2]. The biochemical analysis of pleural fluid showed pH was 6.7, lactate dehydrogenase (LDH) was high at 1600 UI/L protein was also high at 4.6 g/dl (Normal pleural fluid has the following characteristics: pH of 7.60-7.64,Protein content of less than 2% (1-2 g/dL),Fewer than 1000 white blood cells (WBCs) per cubic millimetre, Glucose content similar to that of plasma, Lactate dehydrogenase (LDH) less than 50% of plasma).Glucose was too low to be measured. Laboratory investigations revealed marked leukocytosis with leukocytes of 20000/mm3 and peripheral blood smear revealed 66% neutrophils, 20% lymphocytes, and 6% monocytes with 22% of toxic granulation. His C-reactive protein was found to be higher than 20 mg/dl (normal <0.5 mg/dl). The fluid analysis showed abundance of polymorphonuclear leukocytes and staphylococcus aureus was isolated in culture. Patient was treated with iv.Amoxicillin/clavulanate and aminoglycoside. Gradually the respiratory distress improved and patient was extubated and weaned from ventilator. Xray chest on 3rd post operative day revealed good resolution of empyema [Figure 3]. Chest tube was removed on 7th postoperative day as there was no drainage. Patient was discharged once adequate feeding and weight gain were achieved and antibiotics continued for four weeks.

DISCUSSION

Pleural empyema is very uncommon in neonates. Neonatal empyema is potentially fatal if not treated early.[7] Gram positive bacteria are more commonly employed in the etiology of neonatal empyema.[3,8] The empyema process is a continuum, but for descriptive purpose can be divided into 3 stages: 1. Exudative-clear fluid with a low white cell count 2. Fibrinopurulent-increasing white cell count with fibrin deposition leading to septation and loculation 3. Organising-thick,non elastic peel formation. Early onset pneumonia in neonates causes rapid deterioration, respiratory distress and high mortality. X ray chest and USG are very helpful to diagnose and monitor this condition. Chest X-ray cannot always differentiate severe consolidation/collapse from pleural collection, but the presence of mediastinal shift is highly supportive of pleural collection.[9] Chest ultrasound confirms the presence and can estimate the size of the pleural collection, as well as the echogenicity of fluid and the presence of loculation. Cell count, Gram stain and microbiological analysis (e.g. PCR studies) and bacterial culture are helpful. Blood culture in 13-31% cases is positive, but isolation of organism and its culture from the isolated fluid is quite useful.[10] Biochemical analysis LDH and protein should be performed as high values with white cells and bacteria on microscopy support the diagnosis of empyema. Recently, the virulence of staphylococcal strains is notably determined by different toxin expressing-genes, such as the Panton-Valentine leukocidin (PVL) gene found in S. aureus isolates obtained from neonatal and pediatric necrotizing pneumonia samples. Children with small pleural effusion and minimal respiratory distress may respond to antibiotics alone, whereas those with a moderate- large sized pleural effusion and moderate-severe respiratory distress

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Figure1: Xray chest showing, right sided pleural effusion with mediastinal shift to the left.

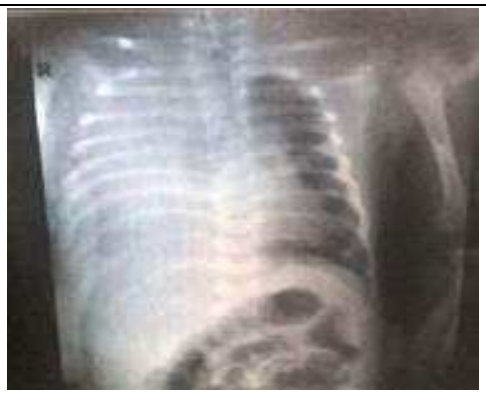

Figure 3: Post operative chest xray showing resolution of effusion (ICD in situ)

will require drainage. Urgent intervention with chest tube drainage is life saving and combination of appropriate antibiotics with penicillin and aminoglycoside is very beneficial. However, studies recommend longer duration and two drug treatment protocol to treat this condition in neonates.[11] Its recommended that we should continue with IV antibiotics in neonates and children at least until afebrile for 24 hours. The length of treatment depends on factors including severity of disease, causative organism, and complications. Chest tube placement is indicated in cases of enlarging effusion or respiratory compromise and if there is fibrin deposition and peel formation, fibrinolysis with urokinase can shorten the hospital stay.[12] Recent literature shows mortality in empyema in children has been reduced upto to 2.5%.[13] The rapidity of disease to a fatal termination, along with the difficulty to diagnose fluid inside chest of a newborn, pose challenge to manage such cases even in tertiary units.

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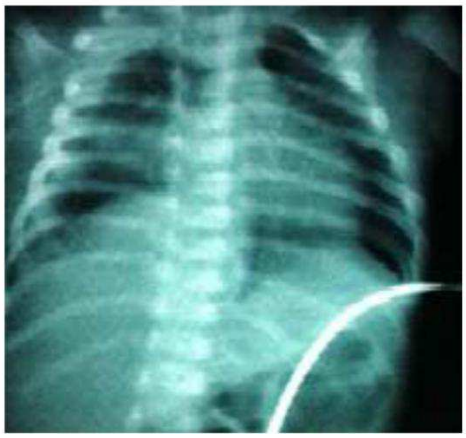

Figure 2:Clinical photograph of the patient with intercostal drainage

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