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Case Report

Tension pyopneumothorax in an immune-competent child in Uyo, Nigeria: a case report

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ABSTRACT

Tension pyopneumothorax is a relatively uncommon complication of pneumonia. The diagnosis of pyopnuemothorax should be considered based on clinical signs, such as decreased air entry, hyper-resonant percussion note and dullness to percussion over the affected area. Profound anaemia may also occur. The striking horizontal line [air-fluid level] on chest radiograph demarcating the pneumothorax from the empyema should alert the clinician to the diagnosis of a pyopneumothorax. Antibiotic therapy in combination with closed tube thoracostomy drainage helped ensure a good outcome in this instance. A case of tension pneumothorax is herein reported to illustrate the complications of pneumonia in children, and the implications of delayed presentation. It is hoped that advocacy will be consistently conducted at facility and community levels to improve the awareness and care-seeking behaviour of parents and caregivers.

Keywords: Pyopneumothorax, Anaemia, Dullness, Percussion, Air-fluid, Thoracostomy, Drainage

INTRODUCTION

Pyopneumothorax is the collection of air and pus in the pleural cavity.[1,2] It is a complication of pneumonia.[3] It has been described as being uncommon and even extremely rare.[2-4] Some of the predisposing factors to complications of pneumonia include malnutrition, measles and immuno-suppressive conditions such as HIV/AIDS and diabetes mellitus.[5]

We herein report a case of tension pneumothorax in an immune-competent child.

CASE REPORT

A 4-year old girl presented to the Children's Emergency Unit [CHEU] of the University of Uyo Teaching Hospital [UUTH], Uyo, Akwa Ibom State, Nigeria, on the 7th of March 2015, with a 4-week history of vomiting, fever and cough, as well as a 6-day history of lightening of her palms.

There was an associated history of fast breathing and difficulty in breathing for 2 weeks prior to presentation at CHEU.

No history of contact with an adult with chronic cough, nor night sweats, but there was a history of some weight loss and loss of appetite since the onset of the illness.

Two weeks into the onset of the illness, the parents took her to the village traditional healer who gave her some herbal medications with no relief of symptoms.

Other aspects of the history were not contributory.

She is the 2nd child of the parents. She was in Nursery 1. The elder sibling [a 12 year old boy] is alive and well. Her father is a 40 year old taxi driver with junior secondary level of education, and her mother is a 36 year old security officer.

They live in a well-ventilated 2-room house.

Physical findings: On physical examination she was found to be acutely ill-looking, in obvious respiratory distress [with flaring of the alar nasi, intercostal and subcostal recessions], severely pale, febrile to touch with body temperature of 38.8°C, not jaundiced, not dehydrated, no peripheral lymphadenopathy, no pedal edema. Weight of 13 kg [81.3% of expected].

Respiratory system: RR: 56/min;

Central trachea, reduced chest expansion on the right;

Dull percussion notes on the right lower lung zones, reduced air entry on the right mid zone, and absent breath sounds on the right lower hemi-thorax, anteriorly and posteriorly.

Widespread insiratory crepitations.

Cardio-vascular system: 140/minute, full volume and regular;

Hyperactive praecordium, S_1, S_2 and S_3 with gallop rhythm. No murmurs.

Digestive system: good oral hygiene, moist buccal mucosa, no thrush. Abdomen: full, soft and moves with respiration, moderately tender hepatomegaly of 5cm below the right costal margin; the spleen was not palpably enlarged and the kidneys were not ballotable. The bowel sounds were normal.

Central nervous system: No abnormalities were detected.

Urgent chest radiograph showed hyperlucent right upper half devoid of pulmonary vascular markings and radio-opaque right lower half demarcated by an air-fluid level (Figure 1).

Diagnosis: Bronchopneumonia with right-sided pyopneumothorax. R/o: Pulmonary Tuberculosis.

Laboratory findings

Urgent PCV: 21% [required blood transfusion]

Total WBC: 9.8 x 10^9/L [Neutrophils 61%; lymphocytes 26%; monocytes 10%; eosinophils 3%; basophils 0%].

HIV screening: negative; Mantoux test: Negative [no induration].

Gastric aspirates for AFB: Negative.

Serum electrolytes/urea/creatinine results: Creatinine 50 [NR: 53-115 µmol/L]; urea 3.1 [NR: 2.1-7.1 mmol/L]; sodium 127 [NR: 135- 145 mmol/L]; potassium 5.4 [NR: 3.2-5.0 mmol/L]; chloride 94 [NR: 96-108 mmol/L]; bicarbonate 16 [NR: 22.28 mmol/L].

During the period of hospitalization, the patient was treated with intravenous antibiotics [ceftriaxone and gentamicin] and analgesics.

Urgent closed tube thoracostomy drainage was done which yielded about 520mls of purulent fluid. A sample was sent for microscopy, culture and sensitivity, which revealed gram positive cocci with lots of WBCs. No growth after 48 hours of incubation at 37°C.

She remarkably improved after the chest intubation, as evidenced by the interval change on chest radiograph (Figure 2), and was discharged home in a satisfactory clinical condition after 14 days on chest tube drainage and a 19-day stay in hospital.

She is being followed-up at the out-patient clinic.

Figure 1: Chest radiograph with air-fluid level.

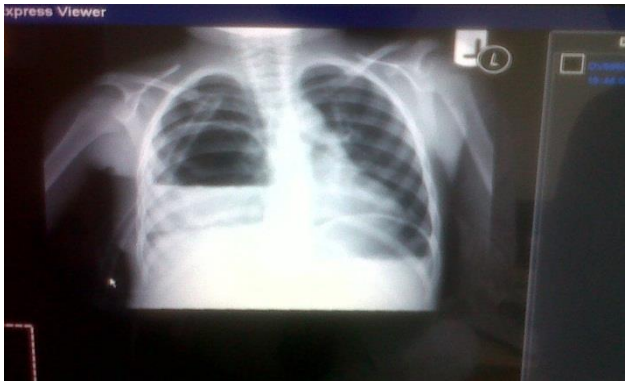

Figure 2: Interval change after chest intubation.

DISCUSSION

Pneumonia is one of the most common reasons for hospital admission in children,[6] with hospitalisation rates for community-acquired pneumonia in children ranging from 9.5% to 42%.[7]

Complicated pneumonia, usually develops in a small proportion of immune-competent children with no other underlying diagnosis, such as chronic suppurative lung disease.[7] Other predisposing factors to complicated pneumonia include malnutrition, measles or infection with organisms that are antibiotic resistant, as well as conditions such as diabetes mellitus and HIV/AIDS.[5] Other reasons for complications in paediatric community-acquired pneumonia include patronage of medical charlatans, parental ignorance and poverty.[8]

These complications of pneumonia may include persistent pneumonia, severe sepsis, acute respiratory distress syndrome, syndrome of inappropriate antidiuretic hormone secretion, haemolytic uraemic syndrome, disseminated intravascular coagulation, secondary thrombocytosis, parapneumonic effusion/empyema, pericardial effusion, lung abscess, necrotising pneumonia and atelectasis.[7] Other complications include pneumothorax and pyopneumothorax.[3]

Pyopneumothorax which is defined as a collection of pus and air in the pleural cavity is relatively uncommon in childhood.[1,2] It has been described as “extremely rare” by Whiteman et al.[4]

The most common presentations of pyopneumothorax include breathlessness, cough, chest pain, dyspnoea and decreased breath sounds, especially asymmetrical auscultation.[3,7,9,10] These were all present in the index case.

The diagnosis of pyopnuemothorax should be considered based on clinical signs, such as decreased air entry and dullness to percussion over the affected area.[7] The chest radiograph typically shows the presence of an air-fluid level.[2] This was observed in the index patient (Figure 1).

Anaemia is common complication of empyema occurring in up to 40% of cases.[11] This clinical feature was observed in the index patient.

S. pneumoniae, *S. aureus*, and *H. influenzae* are common causes of empyema in developing countries.[12] In the index patient, gram positive cocci were isolated, though with no growth yielded. This may be as a result of the antibiotics that the patient received both before and during hospitalisation.

Over 2000 years ago, drainage of the pleural cavity was carried out by Hippocrates in an attempt to treat empyema.[13] However, there does not appear to be a general consensus on the optimal management approach despite the different treatment options available.[14]

Surgical intervention was not necessary in this case because there was complete resolution with lung re-expansion on chest tube drainage and antibiotics. Surgical intervention is usually indicated in only about 15-40% of empyema thoracis.[15] In a related study in this centre [UUTH], empyema thoracis in children was fully treated with antibiotics and chest tube drainage without need for recourse to surgical intervention in the form of thoracotomy and decortications.[8] However in a study in Zaria, Nigeria, about 26% of patients with empyema thoracis were treated with either thoracotomy and decortications or open drainage while the remaining 74% of the patients were successfully treated with chest tube drainage and antibiotics.[16]

CONCLUSION

Tension pyopneumothorax is a relatively uncommon condition in childhood, and a high index of suspicion of complications of pneumonia is required, especially with patients who have “shopped around” (with the respiratory distress) at traditional healers’ and patent medicine vendors’.

Profound anemia often results from the empyema thoracis, and this should be examined for, and carefully managed.

The striking horizontal line on chest radiograph demarcating the pneumothorax from the empyema should alert the clinician to the diagnosis of a pyopneumothorax.

Advocacy should be consistently conducted at facility and community levels to improve the awareness and care-seeking behaviour of parents and caregivers.

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