Tension Empyema Thoracis

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Summary

Tension empyema is a rare and life threatening complication of pleural space infection requiring emergent drainage to restore cardio-respiratory function. The authors report a case of a 27-year-old male patient with pulmonary tuberculosis, who presented with severe dyspnea, right sided chest pain, and persistent cough. He subsequently developed cardiovascular collapse requiring an emergent right chest tube which drained over 2 liters of pus under pressure. The cardiovascular system stabilized and he subsequently underwent decortication for trapped lung and had an uneventful postoperative stay. Tension empyema should be considered as a differential in young patients without a history of trauma, thoraco-abdominal procedures or thoracic surgery, who present with cough, fever and chest pain, with clinical findings of cardiovascular collapse.

Keywords: Tension Empyema, Tuberculosis, Cardiac Arrest, Thoracostomy.

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Introduction

Empyema thoracis is the accumulation of pus in the pleural space. "Tension" is a term used when fluid or air accumulated in the pleural space is under sufficient positive pressure to cause severe respiratory distress, mediastinal shift and hemodynamic compromise (1). While tension pneumothorax is a relatively common event, scattered cases of tension hemothorax, urohemothorax, hydrothorax and chylothorax have been previously reported (2-6). Tension empyema is a rare complication of pleural space infection, with only a few case reports existing in the literature (7-9). Our objective was to describe the presentation and acute management of this rare condition.

Case

We report a case of a 27-year-old male patient, with a history of sputum-positive pulmonary tuberculosis (TB), who presented to our facility with a 2 week history of worsening dyspnea, right sided chest pain, fever and persistent cough. He reported that he completed his anti-TB medication 2 months prior to onset of symptoms.

On examination, he was noted to have severe tachypnea, diaphosesis, hypotension with unrecordable low blood pressure, and hypoxic with saturations of 60% on room air. Before adequate evaluation, he deteriorated and had cardio-respiratory arrest. Basic and advanced life support were initiated, and the airway secured with an endotracheal tube. Resumption of spontaneous cardiac activity was noted after three rounds of atropine and epinephrine. The patient's blood pressure was still unrecordable, but the pulse rate and saturation had improved to 120 beats/min and 90% respectively.

Assessment of the chest revealed a hypoinflated right hemithorax with absent breath sounds and significant left tracheal deviation. Suspecting a right sided tension hemothorax, a needle thoracocentesis at the 2nd intercostal space was performed, revealing thick yellow fluid. An emergent portable chest X-Ray (CXR) was obtained to corroborate with the aspirate findings, which showed a large right effusion with left mediastinal shift (Figure 1).

A diagnosis of tension empyema was made, and an emergent right tube thoracostomy was performed. Immediately upon entry in to the pleural cavity, drainage of purulent fluid under pressure was noted without a concomitant drainage of air (Figure 2). A total of 2900 ml of pus was drained over a period of 10 – 20 minutes (Figure 3). The blood pressure rapidly improved to 91/69mmHg and pulse rate reduced to 95beats/min. He was transferred to the intensive care unit, placed on a ventilator and immediately started on broad spectrum antibiotics. The patient continued to improve, and was extubated 4 hours

later with no resumption of respiratory distress, but required supplemental oxygen.

The blood work showed a hemoglobin of 14.9 gm/dl , white blood cell (WBC) count of 10 600 per µL, platelet count of 204, 000 per mm^3, sodium of 142 mmol/L, potassium of 5.5 mmol/L, and creatinine of 64 µmol/L. An HIV test was positive with a subsequent CD4 count of 369cells/µl. Microscopy of the aspirated fluid revealed no cells. Gram and Acid Fast Bacilli(AFB) stains of the pus were negative, and a bacteriologic culture showed no growth at two days. Sputum was negative for acid and alcohol fast bacteria (AAFB).

Retreatment TB regimen was initiated after baseline liver function tests, as the empyema was thought highly likely to be due to TB. The patient continued to demonstrate lung re-expansion, reduced oxygen requirements, and reduced chest tube drainage. He underwent decortication on hospital day 18 for fibrinous adhesions with a trapped lung. Unfortunately, a pleural biopsy was not sent for histology. The patient had a good post-operative course and was discharged two weeks later to complete his TB medication.

Written informed consent for the publication from the patient or immediate relatives could not be obtained despite all reasonable attempts. Every effort has been made to protect the privacy of our patient.

Discussion

Tension empyema leads to severe cardio-respiratory compromise due to acute accumulation of pus in the pleural space leading to severe respiratory distress, mediastinal shift, and cardiovascular collapse. One of the earliest reports of this rare condition is attributed to Holloway in 1986 (7). Since then there have been two other published reports on tension empyema in the English literature (8, 9).

Any patient who complains of chest pain, severe dyspnea and tachycardia, with findings of hypotension, absent breath sounds, a dull percussion note, and tracheal deviation to the opposite hemithorax without a history of trauma, thoraco-abdominal procedure or thoracic surgery may have a 'tension' caused by a hemothorax, empyema or hydrothorax. Presence of fever, productive cough or recent treatment for pneumonia or TB may be indicative of a tension empyema as noted in this case and in the case report by Ahern and Miller (8).

An urgent thoracostomy should be performed before cardio-respiratory arrest ensures. In this case and others, thoracostomy saved the patient, but could have prevented cardio-respiratory arrest had it been utilized earlier. Bramley and colleagues reported a case of a 48 year old man who presented with respiratory distress and developed cardiac arrest, which was later reversed by emergent tube thoracostomy (9). Evaluation of the chest during resuscitation revealed a hypoinflated left hemothorax with absent breath sounds and pus on thoracocentesis. Immediate return of spontaneous circulation and blood pressure ensued with removal of pus. Ahern and Miller also used tube thoracostomy after cardiac arrest with a similar result (8). Thoracocentesis, used in this case and reported in the studies above was important in differentiating a tension empyema from other differential diagnosis. A higher index of suspicion, as noted in the case by Ahern and Miller, should have prevented the unnecessary delay in obtaining an X-ray for our patient (8).

Conclusion

Tension empyema should be considered as a differential in young patients without a history of trauma or thoracic surgery, who present with cough, fever and chest pain, with clinical findings of hypotension, mediastinal shift and lung collapse due to significant amount of fluid on one side of the chest. Emergent drainage is important to prevent and/or reverse the cardiovascular consequences.

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