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A Case of Extensive Cellulitis Following a Tube Thoracostomy for a Gas-Forming Empyema

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Abstract

We herein present a case in which extensive cellulitis occurred following a tube thoracostomy for a gas-forming empyema. A 72-year old man was admitted with a fever and cough. A chest computed tomography revealed a large effusion with an air space in the left pleural cavity. A tube thoracostomy was then performed and purulent fluid was recognized. Administration of flomoxef was started after a tube insertion. On the third hospital day, an area of erythema and tenderness was observed around the chest tube insertion site, and on the following day, this area was seen to spread extensively to the left lateral abdomen and the left leg. Subsequent computed tomography revealed widespread subcutaneous swelling with small amounts of air. Laboratory data suggested that multiple organ failure was in progress due to a severe and extensive cellulitis, and the antibiotic was changed to doripenem. Ten days after, the cellulitis had resolved and the laboratory data showed normal result. He has been followed up in our outpatient clinic with no relapse after six months. Although rare, possible occurrences of cellulitis should be considered as a potential complication resulting from a tube thoracostomy for empyema.

Keywords: Cellulitis; Empyema; Tube thoracostomy

Introduction

The initial treatment for empyema is usually drainage by tube thoracostomy [1]. However, in rare instances widespread cellulitis occurs as a complication of this procedure. We herein present such an instance in which extensive cellulitis arose in a patient following a tube thoracostomy for a gas-forming empyema.

Case Report

A 72-year old man was admitted with a fever and cough. A chest X-ray and Computed Tomography (CT) revealed a large effusion with an air space in the left pleural cavity (Figure 1). A tube thoracostomy was then performed and purulent fluid was recognized. There was no air leakage and a bacterial culture of the pleural fluid was negative. Administration of flomoxef (1000 mg intravenously every 12 hours) was started after a tube insertion. On the third hospital day, an area of erythema and tenderness was observed around the chest tube insertion site. On the fourth hospital day, this area was seen to spread extensively to the left lateral abdomen and the left leg. Subsequent chest and abdominal CT revealed widespread subcutaneous swelling with small amounts of air, whilst the pleural effusion was almost eradicated by drainage (Figure 2). Laboratory data for this case indicated an increase in C-reactive protein (14.64 mg/dL), an elevated white blood cell count (17,070/μL), a mild decrease in the platelet count (103,000/μL),and an impairment of hepatic and renal function (aspartate aminotransferase 1011 IU/L, alanine aminotransferase 243 IU/L, lactate dehydrogenase 519 IU/L, alkaline phosphatase 1294 IU/L, gamma-glutamyltranspeptidase 205 IU/L, blood urea nitrogen 71.4 mg/dL, and creatinine 2.22 mg/dL). These data suggested that multiple organ failure was in progress due to a severe and extensive cellulitis, and the patient was transferred to our hospital. Upon arrival at our facility, the antibiotic was changed to doripenem (500 mg intravenously every 8 hours). Ten days after the patient's transfer to our clinic, the cellulitis had resolved and the laboratory data showed normal result. The intravenous administration of doripenem was then replaced with an oral administration of levofloxacin (500 mg orally every 24 hours). The chest drainage tube was removed 16 days after the hospital transfer, and the patient was discharged seven days later. Since that time, he has been followed up in our outpatient clinic with no relapse after six months.

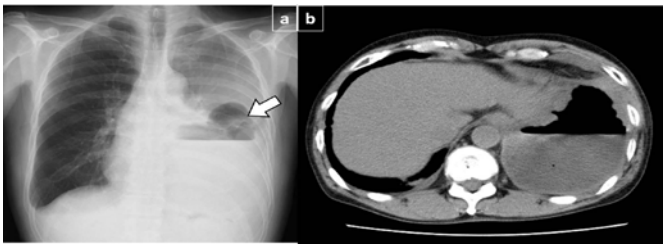

Figure 1: A: Chest X-ray of the patient prior to a tube thoracostomy showing a left pleural effusion with gas formation (arrow).

B: Chest computed tomography of the patient prior to a tube thoracostomy revealing a massive effusion and gas in the left pleural cavity. No inflammatory findings could be recognized in the surrounding chest wall.

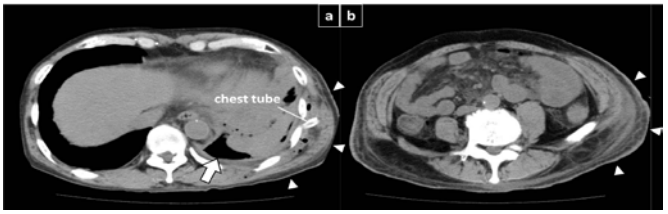

Figure 2: A: Chest computed tomography four days after a tube thoracostomy showing swelling of the left chest wall around the chest tube with small amounts of air (arrowheads). The pleural effusion was almost eradicated (arrow).

B: Abdominal computed tomography revealing swelling of the left abdominal wall (arrowheads).

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Discussion

In our present case report, we describe a patient who manifested extending cellulitis after undergoing a tube thoracostomy. This finding suggested that a pleural infection had spread from the chest tube insertion site. There is a previously reported case of necrotizing fasciitis that occurred after a tube thoracostomy for the drainage of a gas-forming empyema [2]. In this previous case report, erythema and tenderness were seen on the trunk extending from the chest tube insertion site on the fourth hospital day, and then widespread crepitation was evident on the ninth hospital day. The patient subsequently died. The authors speculated that subcutaneous dissemination of pathogenic organisms due to a traumatic chest tube placement was a possible cause of the fatal complication in this case.

Effective management of empyema requires pleural drainage to enable infection source control and proper antibacterial therapy to eradicate the infecting pathogens and reduce the likelihood of recurrence. In our current case, the infecting organism could not be detected, but anaerobic infection was a possibility because of the intrathoracic gas formation. The betalactam-betalactamase inhibitor, clindamycin, or carbapenems are recommended as antimicrobial therapies for anaerobe [3]. In our current case, however, flomoxef was selected as the first-line antibiotic after which the infection became progressively severe in spite of adequate pleural drainage. A prudent selection of antibiotics might prevent this aggravation of infection. Then, doripenem, a new carbapenem with a broad-spectrum activity against gram-positive and gram-negative aerobic organisms and anaerobes [4], was selected as the second-line antibioticin our present case, and had the desired effect.

In conclusion, although rare, possible occurrences of cellulitis should be considered as a potential complication resulting from a tube thoracostomy for empyema. Moreover, if empyema is accompanied by intrapleural gas formation, proper antibiotic selection to counter potential anaerobic infection is required in addition to pleural drainage.

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