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RESPIRATORY CASE REPORTS

Tuberculous Empyema and *Candida tropicalis*: A Rare Co-infection of Two Different Pathogens

Tüberküloz Ampiyemi ve Candida tropicalis: İki Farklı Patojenin Nadir Bir Koenfeksiyonu

Esra Birekul[1], Atilla Can[1], Halil Şen[2], Burcu Yormaz[3], Hüseyin Yıldıran[1]

Abstract

In most cases, empyema develops pathophysiologically as a result of untreated and uncontrolled parapneumonic pleural effusion. Such cases may be treated with various interventional procedures depending on the amount of fluid, such as thoracentesis or chest tube drainage, supported by pathogen-targeted antibiotic therapy. The underlying infectious cause of empyema is often viral or bacterial, while fungal-related empyema is much rarer. The presented case is of particular interest due to the simultaneous occurrence of fungal and tuberculosis empyema.

Keywords: *Empyema, Pleural Effusion, Candida Tropicalis, Tuberculosis.*

Öz

Ampiyem, patofizyolojik olarak çoğunlukla tedavi almamış ve kontrol edilememiş parapnömonik pleral efüzyon sonucu gelişir. Etkene yönelik antibiyoterapi ile birlikte sıvı miktarına bağlı olarak sıvının torasentez ile boşatılması, göğüs tüpü ile drenajı gibi farklı girişimsel işlemler gerekebilir. Altta yatan enfeksiyöz neden çoğunlukla viral ya da bakteriyal olmakla birlikte mantara bağlı ampiyem oldukça nadirdir. Sunulan olgu eş zamanlı mantar ve tüberküloz ampiyemi görülmesi nedeniyle ilginçtir.

Anahtar Kelimeler: *Ampiyem, Plevral Efüzyon, Candida Tropicalis, Tüberküloz.*

[1]Department of Thoracic Surgery, Selçuk University Faculty of Medicine, Konya, Türkiye
[2]Department of Thoracic Surgery, University of Health Sciences, Beyhekim Training and Research Hospital,Konya, Türkiye.
[3]Department of Pulmonary Diseases, Selçuk University Faculty of Medicine, Konya, Türkiye

[1]Selçuk Üniversitesi Tıp Fakültesi, Göğüs Cerrahisi Anabilim Dalı, Konya
[2]Sağlık Bilimleri Üniversitesi Beyhekim Eğitim ve Araştırma Hastanesi, Göğüs Cerrahisi Kliniği, Konya
[3]Selçuk Üniversitesi Tıp Fakültesi, Göğüs Hastalıkları Anabilim Dalı, Konya

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Correspondence (İletişim): Esra Birekul, Department of Thoracic Surgery, Selçuk University Faculty of Medicine, Konya, Türkiye

e-mail: meyrusa@gmail.com

Empyema is the term given to accumulations of infected fluid in the pleural space, occurring due to such pulmonary infections as pneumonia and lung abscesses, or conditions such as bronchiectasis, previous thoracic surgery, septic pulmonary embolism, trauma, mediastinitis, malignancy, esophageal perforation, spontaneous pneumothorax and sepsis (1). The most common causative agents of empyema are *Streptococcus pneumoniae*, anaerobes and *Staphylococcus aureus* (2), while tuberculosis is one of the most frequent causes of pleural effusion in developing countries (3). In rare cases, fungal pathogens, as opportunistic infections, can lead to empyema. The most common predisposing factors to candida-induced empyema are a history of thoracic or abdominal surgery and esophageal perforation (4), although it may also develop secondary to bronchopulmonary infections (5). Various treatments can be proposed following a diagnosis empyema depending on factors such as the patient's clinical condition and the amount of fluid involved, although medical therapy combined with fluid drainage is the standard approach (6).

CASE

A 58-year-old male patient presented to the emergency department with complaints of dyspnea and right-sided chest pain. A physical examination revealed the patient to be in good general condition, conscious, oriented and cooperative. Peripheral oxygen saturation was 87%, blood pressure was 120/75 mmHg and heart rate was 89 beats per minute. The patient had been diagnosed with laryngeal squamous cell carcinoma two years prior and had been treated with chemotherapy and radiotherapy, and a tracheostomy had been performed 1 year later. He was not on any regular medication. Rales were present in the right hemithorax on auscultation, and an arterial blood gas analysis revealed pH: 7.47, pCO_2: 24 mmHg and pO_2: 59 mmHg. Hematologic tests showed WBC: 20.21 K/uL and HGB: 9.7 g/dL. Posteroanterior (PA) chest X-ray showed increased consolidation and pleural effusion in the lower zone of the right hemithorax (Figure 1). A thoracic computed tomography (CT) scan revealed an area of consolidation with air bronchogram in the right lower lobe as well as pleural effusion (Figures 2, 3, and 4). Diagnostic thoracentesis was performed, and an analysis of the aspirated purulent fluid revealed LDH: 32,768 U/L, albumin: 0.8 g/dL and total protein: 2.7 g/dL. Simultaneous serum results were LDH: 196 U/L, albumin: 3.4 g/dL, and total protein: 6.9 g/dL. Tube thoracostomy was performed to address the right-sided empyema (Figure 5), and 1200 cc of purulent fluid was drained. The patient underwent fiberoptic bronchoscopy, and bronchoalveolar lavage (BAL) was obtained.

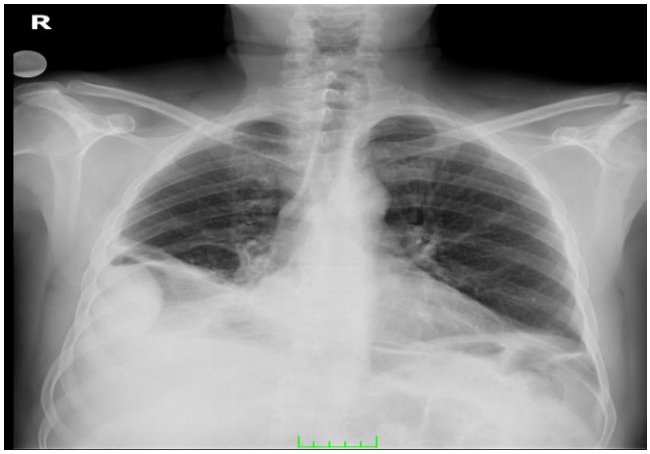

Figure 1: *Pleural effusion in the right hemithorax*

No bacterial growth was detected in the BAL culture; however, the galactomannan antigen was reported as positive. *Candida tropicalis* growth was detected in the culture of the thoracentesis sample. To rule out the possibility of contamination, a repeat sample from the pleural fluid was sent, again revealing *Candida tropicalis*, and so the appropriate antifungal therapy was initiated. Subsequent tuberculosis tests of the pleural fluid revealed the growth of *Mycobacterium spp*. on Löwenstein-Jensen medium. A sputum sample was collected for acid-fast bacilli (AFB) staining and was found to be AFB $^{++}$.

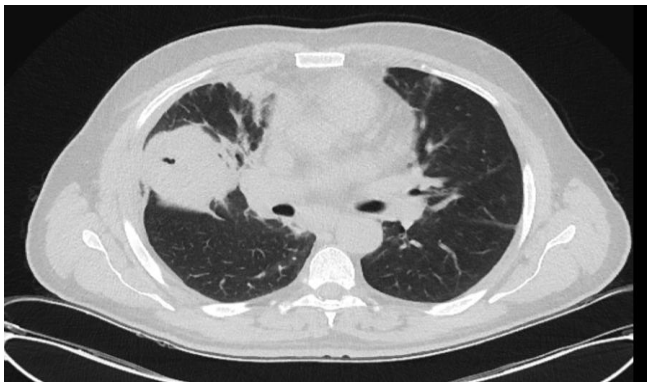

Figure 2: *Increased consolidation in the right lower lobe of the lung (Lung window)*

The samples were subsequently sent to the National Tuberculosis Reference Laboratory of the General Directorate of Public Health (HSGM). PCR analysis detected *M. tuberculosis* complex DNA. The patient's treatment regimen included Pyrazinamide 500 mg 4 times/day, Rifampicin 300 mg 2 times/day, Ethambutol 500 mg 3 times/day and Isoniazid 300 mg once/day. Following the completion of empyema treatment, the chest tube was removed (Figure 6) and the patient was discharged 16 days after admission. He is continuing with antituberculosis treatment and followed up by the Chest Diseases and Tuberculosis Dispensary.

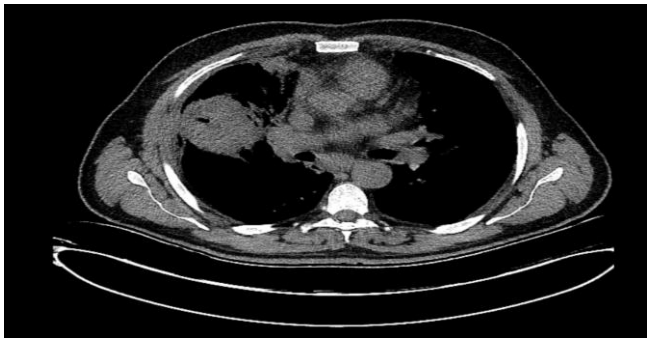

Figure 3: Increased consolidation in the right lower lobe of the lung (Mediastinal window)

DISCUSSION

Although the etiology of empyema is multifactorial, the majority of cases arise from bacterial pneumonia and the associated parapneumonic effusion. Of the approximately 1 million patients hospitalized annually for pneumonia, an estimated 20–40% develop parapneumonic effusion and 5–10% develop empyema, revealing the significance of empyema as a health issue (7). Although there are no specific symptoms of empyema, shortness of breath, pleuritic chest pain and cough are common symptoms. Physical examination can reveal a decrease in breath sounds in the hemithorax affected by empyema, and subsequent radiological investigations, including chest X-ray and thoracic CT, will be required. Chest X-ray will reveal bluntness in the sinuses and increased consolidations in the empyema-affected hemithorax (6). Thoracentesis plays a crucial role in the diagnosis of empyema, while fluid samples sent for analysis are important for pathogen identification. Studies have shown the most common cause of empyema to be parapneumonic effusion resulting from bacterial or viral pneumonia, while effusions caused by opportunistic microorganisms and leading to empyema are less common.

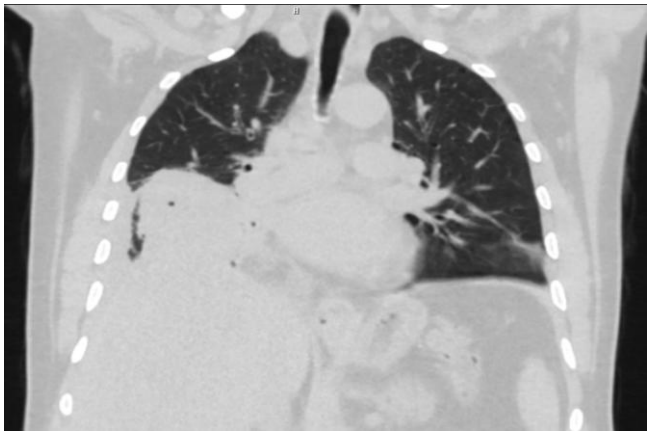

Figure 4: Increased consolidation and pleural effusion in the right lower lobe of the lung

Pleural tuberculosis can be acute or subacute, with symptoms including cough, chest pain, fever, loss of appetite, weight loss, night sweats and variable degrees of shortness of breath. Tuberculosis-related pleural effusions are usually unilateral (8). Candida species are common microorganisms in the environment and are part of the normal flora of the human body. However, under certain conditions, they can become opportunistic pathogens and cause infections (9). *Aspergillus fumigatus* is the most common pathogen responsible for fungal pleural empyema, although other emerging forms, such as *Histoplasmosis, Coccidioidomycosis, Blastomycosis, Paracoccidioidomycosis, Cryptococcosis, Mucormycosis and Monosporiosis, as well as Fusarium, Pseudoallescheria boydii, Paecilomyces, Scopulariopsis, Penicillium marneffei, Pneumocystis carinii, Actinomyces and Nocardia*, have also been identified as pulmonary pathogens (10). The increasing number of immunocompromised patients, the rise in intensive care unit admissions and the over-reliance on broad-spectrum antibiotics have led to an increase in fungal empyema cases (5). Candida infections are also common causes of fungal empyema, and while *Candida albicans* is the most frequent pathogen (11), *Candida tropicalis* has emerged as another fungal empyema pathogen, although cases are rare. Candida infections have been linked to the increased use of invasive devices and the changes in gastrointestinal flora resulting from the use of broad-spectrum antibiotics (5).

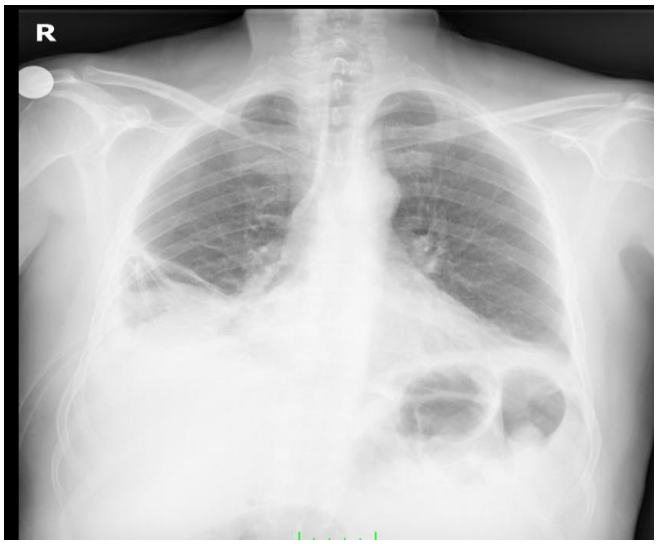

Figure 5: Post-procedure image of the patient's right tube thoracostomy

In a case reported by Sahu et al. (12) in 2020, pleural effusion samples obtained for the investigation of empyema showed growth of *Candida albicans, Candida tropicalis, Candida glabrata and Candida krusei*. In our case, *Candida tropicalis*, a rare pathogen, was isolated from the purulent fluid sample obtained via diagnostic thoracentesis, and *Mycobacterium spp*. on Löwenstein-Jensen medium was identified in the pleural fluid sent for tuberculosis culture. The clinical course of the patient was thought to have developed as a *Candida tropicalis* infection on a tuberculosis background. Pleural empyema caused by Candida species is extremely rare, particularly cases involving non-albicans Candida species such as *Candida tropi-*

calis, with only a limited number of reports in the literature to date. Such cases usually arise in patients with underlying immunodeficiency, prolonged antibiotic use, malignancy or long-term intensive care unit stays.

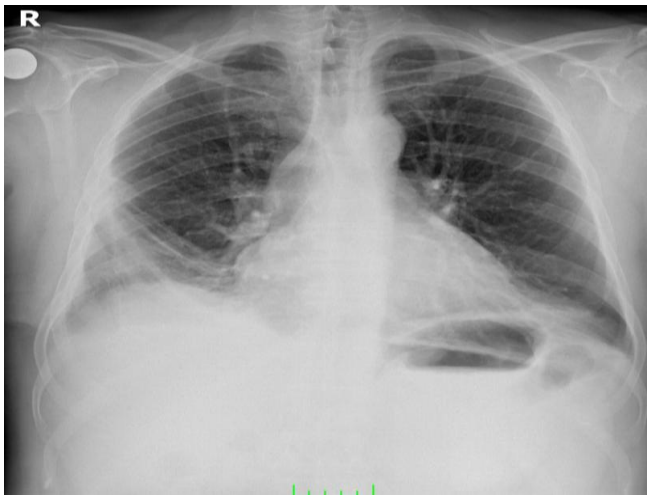

Figure 6: Control chest X-ray after chest tube removal

CONCLUSION

Although rare, the potential of *Candida tropicalis* in the etiology of pleural empyema in cases with tuberculosis-induced immunosuppression serves as an important reminder that fungal pathogens should not be overlooked, particularly when complicated pulmonary infections are encountered. Further case presentations of rare infections such as *Candida tropicalis*-induced pleural empyema are needed, given the limited number of cases reported in the literature to date, as this will help improve our understanding of the epidemiology and treatment of this rare condition and expand the knowledge base in this field.

CONFLICTS OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Concept - E.B., A.C., H.Ş., B.Y., H.Y.; Planning and Design - E.B., A.C., H.Ş., B.Y., H.Y.; Supervision - E.B., A.C., H.Ş., B.Y., H.Y.; Funding - ZE.B., A.C., H.Ş., B.Y., H.Y.; Materials - E.B., A.C., H.Ş., B.Y., H.Y.; Data Collection and/or Processing - E.B., A.C., H.Ş., B.Y., H.Y.; Analysis and/or Interpretation - E.B., A.C., H.Ş., B.Y., H.Y.; Literature Review - E.B., A.C., H.Ş., B.Y., H.Y.; Writing - E.B., A.C., H.Ş., B.Y., H.Y.; Critical Review - E.B., A.C., H.Ş., B.Y., H.Y.

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