Access this article online
Quick Response Code:

Website: https://eurasianjpulmonol.org
DOI: 10.14744/ejp.2025.47229

Ultrasonographic split pleura sign in a case of aspergillus-associated empyema

Beyza Yıldırımlı[1], Coşkun Doğan[1], Tahir Şevval Eren[2], Deniz Turan[3]

ORCID:
Beyza Yıldırımlı: 0009-0008-3517-4058
Coşkun Doğan: 0000-0002-6948-5187
Tahir Şevval Eren: 0000-0003-3331-5511
Deniz Turan: 0000-0001-7943-7536

[1]Department of Pulmonology, İstanbul Medeniyet University Faculty of Medicine, İstanbul, Türkiye,
[2]Department of Thoracic Surgery, İstanbul Medeniyet University Faculty of Medicine, İstanbul, Türkiye
[3]Department of Microbiology, İstanbul Medeniyet University Faculty of Medicine, İstanbul, Türkiye

Address for correspondence:
Dr. Coşkun Doğan, Department of Pulmonology, İstanbul Medeniyet University Faculty of Medicine, İstanbul, Türkiye.
E-mail: coskund24@hotmail.com

Received: 04-03-2025
Revised: 01-07-2025
Accepted: 14-07-2025
Published: 22-12-2025

It is extremely rare for *Aspergillus* species, saprophytic molds naturally present in the environment, to cause *Aspergillus* empyema (AE) in patients without underlying immune system pathology. The diagnosis is made by microscopic examination and culture of pleural pus.[1] The Pleural Split Sign (PSS) refers to the thickening of both the parietal and visceral pleura due to chronic inflammation, which encapsulates the collection. This thickening results in contrast enhancement on thoracic computed tomography (CT).[2]

A 66-year-old male presented to the chest diseases outpatient clinic with complaints of cough, yellow sputum, and fever. He had a history of smoking (30 pack-years) but no history of tuberculosis contact, alcohol or substance use, malignancy, or immunosuppressive drug use. His vital signs were stable, and the only significant laboratory finding was an elevated C-reactive protein (CRP: 35).

Posterior-anterior chest radiography (PA-CXR) showed a density suggestive of an aspergilloma within a sequela lesion in the left apex and bilateral costophrenic angle blunting. Thoracic CT revealed pleural calcifications, parenchymal sequelae, a cavitary lesion with a fungus ball (aspergilloma) in the left upper lobe, and a 22 mm thick loculated pleural fluid collection with air-fluid levels in the left pleural space [Fig. 1].

Thoracic ultrasonography (USG) showed a loculated pleural effusion in the posterior-inferior paravertebral region of the left hemithorax. Thoracentesis yielded 20 cc of purulent fluid [Fig. 2], and a drain was inserted into the left pleural space. The patient was started on teicoplanin and meropenem. Galactomannan antigen in the pleural fluid was reported as 2.764 (positive). Pleural fluid culture identified *Aspergillus fumigatus* complex, prompting the addition of amphotericin B. Mycobacterial acid-fast ba-

How to cite this article: Yıldırımlı B, Doğan C, Eren TŞ, Turan D. Ultrasonographic split pleura sign in a case of aspergillus-associated empyema. Eurasian J Pulmonol 2026;28:64-66.

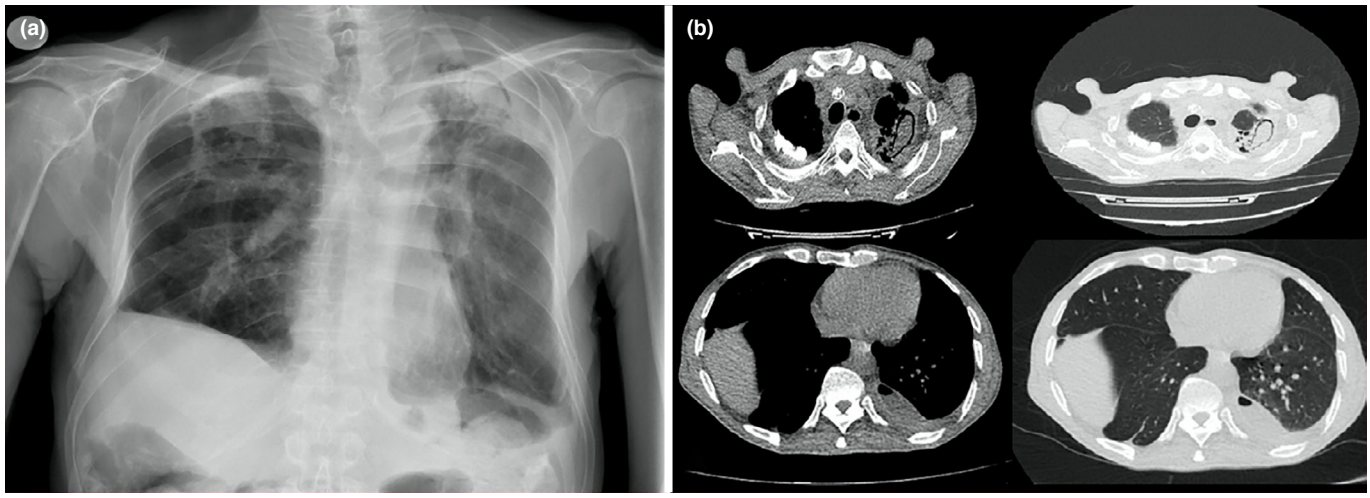

Figure 1: (a) Chest radiography shows bilateral apical sequela densities and a density in the left apex suggestive of an aspergilloma. (b) Thoracic computed tomography (CT) reveals traction bronchiectasis in the left upper lobe, a cavitary lesion with a suspected fungus ball (aspergilloma), bilateral parenchymal sequelae, right pleural calcification, and pleural effusion in the left pleural space

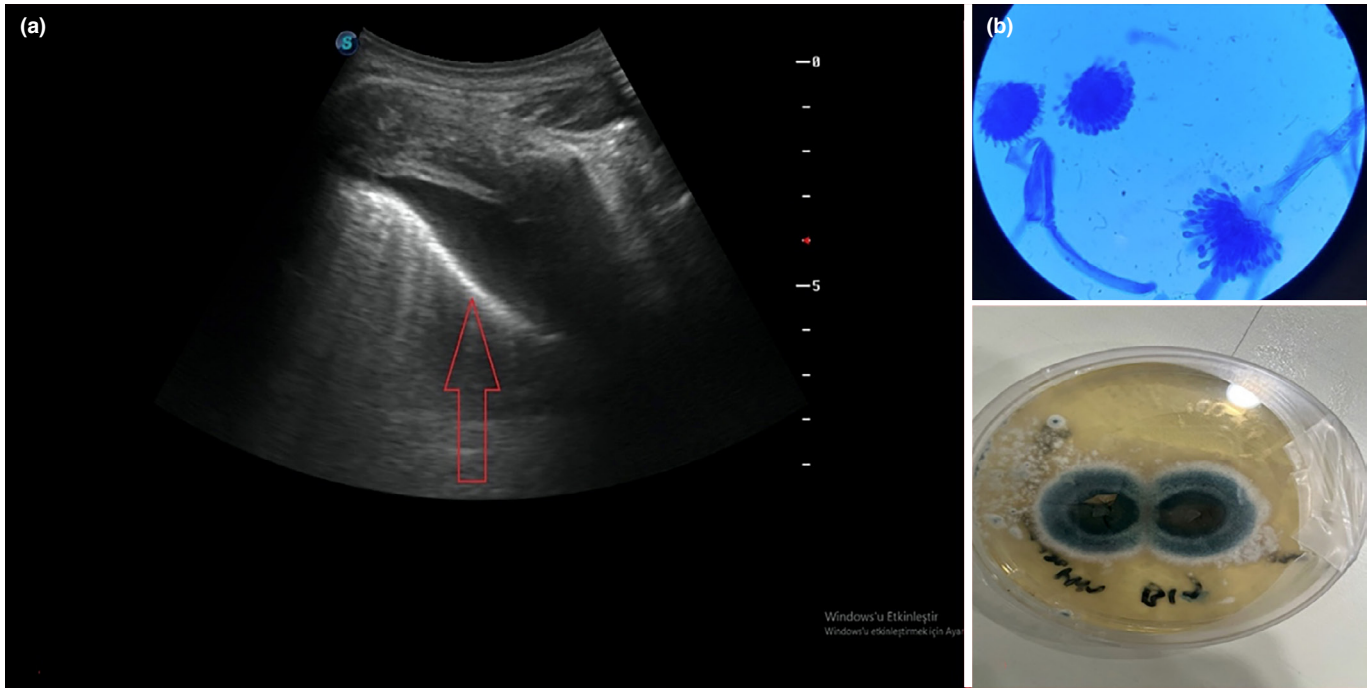

Figure 2: (a) Ultrasonography shows pleural effusion with a hyperechoic pattern between the thickened visceral and parietal pleura. (b) Macroscopic and microscopic images showing the morphology of *Aspergillus fumigatus*

cillus (AFB) testing was negative. The drain was removed after a total of 250 cc purulent drainage over nine days. After four weeks of inpatient amphotericin B treatment, the patient was discharged on oral voriconazole to complete a total antifungal course of 6 to 12 weeks.

It is a rare medical condition to identify *Aspergillus fumigatus*, a saprophytic mold, as the causative agent of empyema in immunocompetent individuals. A recent study by Zhang et al.[3] reported that the three most common causes of AE are secondary to invasive pulmonary aspergillosis (IPA), bronchopleural fistula, or post-surgical complications. Known risk factors for AE include tuberculosis, lung abscess, pulmonary cysts, bronchiectasis, thoracic intubation or drainage, pneumonectomy, and lung cancer. The most commonly used treatment method today includes chest tube drainage in addition to intravenous antifungal therapy.[4]

The PSS, which differentiates peripheral pulmonary abscess from empyema, refers to the visualization of thickened parietal and visceral pleura along the borders of the collection. It has traditionally been defined as a CT finding. In the English literature, only one case has been reported visualizing the PSS via ultrasonography. Jiménez Serrano et al.[5] used contrast-enhanced USG in a patient with right pleural effusion and found that the pleural layers showed marked contrast enhancement. The authors emphasized that the PSS, consisting of thickened, hyperenhancing parietal and visceral pleura separated by pleural fluid, can be visualized not only by contrast-enhanced CT but also via contrast-enhanced USG.

In conclusion, although rare, *Aspergillus fumigatus* can be the etiologic agent of empyema in immunocompetent individuals. In such cases, thoracic ultrasonography performed by pulmonologists is an important diagnostic tool.

Ethics Committee Approval

This is a case image, and therefore ethics committee approval was not required in accordance with institutional policies.

Informed Consent

Written informed consent was obtained.

Conflict of Interest

The authors have no conflicts of interest to declare.

Funding

The authors declared that this study received no financial support.

Use of AI for Writing Assistance

AI-assisted technologies were not used in this article.

Author Contributions

Concept – B.Y.; Design – B.Y.; Supervision – B.Y.; Resource – D.T.; Materials – B.Y.; Data Collection and/or Processing - T.Ş.E.; Analysis and/or Interpretation - C.D.; Literature Review – T.Ş.E.; Writing – B.Y.; Critical Review – C.D.

Peer-review

Externally peer-reviewed.

References

1. Krakówka P, Rowińska E, Halweg H. Infection of the pleura by Aspergillus fumigatus. Thorax 1970;25(2):245–53. [CrossRef]
2. Stark DD, Federle MP, Goodman PC, Podrasky AE, Webb WR. Differentiating lung abscess and empyema: radiography and computed tomography. AJR Am J Roentgenol 1983;141(1):163–7. [CrossRef]
3. Zhang J, Gao X-L, Wu J, Chen J-J. Clinical characteristics and outcomes of pleural aspergillosis: a review of 13 cases. Microbiol Spectr 2024;12(4):e0385223. [CrossRef]
4. Goel MK, Juneja D, Jain SK, Chaudhuri S, Kumar A. A rare presentation of aspergillus infection as empyema thoracis. Lung India 2010;27(1):27–9. [CrossRef]
5. Jiménez Serrano S, Radalov I, Vollmer I. Split pleura sign diagnosis with contrast-enhanced ultrasound. Arch Bronconeumol 2021;57(6):431. [CrossRef]