Pulmonary aspergillosis, mucormycosis, and actinomycosis co-infection presenting as a cavitary lesion in a patient with diabetes

Lan Lin[1], Dan Xue[1], Ting-Yan Lin[1], Ying-Xiao Wu[1], Yi-Ting Jiang[2], Li-Min Chen[1]

[1]Department of Respiratory Medicine, Fujian Medical University Union Hospital, Fuzhou, Fujian 350001, China;
[2]Department of Pathology, Fujian Medical University Union Hospital, Fuzhou, Fujian 350001, China.

To the Editor: Mucormycosis and aspergillosis are opportunistic fungal infections that can lead to life-threatening complications.[1,2] Pulmonary actinomycosis is a rare infection which is commonly confused with other lung diseases.[3] Co-infection with these three pathogens in the same host is rare. Here, we report a unique case of a cavitary lesion with aspergillosis, mucormycosis, and actinomycosis co-infection.

A 52-year-old male patient with type 2 diabetes presented at Fujian Medical University Union Hospital with a 2-month history of fever, cough, expectoration, and muscle soreness. Chest computed tomography (CT) scans revealed a large irregular cavitary lesion in his right upper lobe (RUL) [Figure 1A]. Following antibacterial therapy, CT showed that his lobar pneumonia had partially disappeared but lung abscesses had formed [Figure 1B]. The sound from his right lung was slightly quieter than from the left lung; moist rales were heard from both sides.

Investigations showed elevated leukocytes (15.31×10^9/L) and serum creatinine (178 μmol/L), plus hypoxemia (arterial partial pressure of oxygen [PaO_2] 66.6 mmHg). He had poor blood-glucose control (glycosylated hemoglobin 8.3%). Serum procalcitonin, fungal glucan, and *Cryptococcus* capsule antigen tests were negative. A serum galactomannan test (GM test) was positive (0.56). No pathogens were detected in sputum sample cultures, although *Candida albicans* was cultured (100 cfu/mL). Sputum smears for acid-fast bacilli and cancer cells were negative. Bronchoscopy revealed purulent sputum blocking the RUL bronchus [Figure 1E]. A bronchoalveolar lavage fluid (BALF) GM test was positive (4.51). Microbiology/pathology results confirmed aspergillosis infection.

The patient received meropenem and voriconazole for 2 weeks while aspergillosis was confirmed. CT revealed an irregular thick-walled cavity in the RUL [Figure 1C]. Oral voriconazole was continued. One month later, another bronchoscopy showed the RUL bronchus was completely obstructed by a granulomatous neoplasm [Figure 1F]; BALF GM test was positive (1.78). Pathologic results were different, with fungal mycelia observed, including *Mucor* [Figure 1H] and *Aspergillus* [Figure 1I]. Mucormycosis was confirmed; therefore, we recommended amphotericin B or posaconazole; the patient refused because he had renal dysfunction.

His intermittent fever remained; coughing, shortness of breath, and pneumonia worsened [Figure 1D]; blood creatinine increased to 260 μmol/L. Meropenem and posaconazole were given. Bronchoscopy showed the RUL bronchus completely obstructed by a yellowish granulomatous neoplasm which moved up and down as he respired [Figure 1G]. A further BALF GM test was positive (5.09). Pathology showed that fungal mycelia of *Aspergillus* were observed in the background of *Actinomycetes* [Figure 1J]. The patient refused amphotericin B again; piperacillin-tazobactam was substituted for meropenem and oral posaconazole was continued.

After 6 months, no improvement was seen, so pulmonary lobectomy was performed. Post-operative pathology showed a mycotic mass of *Aspergillus*. The patient went into remission.

Mucormycosis and aspergillosis are opportunistic, potentially fatal invasive fungal infections; co-infection usually occurs in the orofacial area or sinuses.[1,2] Pulmonary actinomycosis is rare and frequently confused with other pulmonary diseases; therefore, correct diagnosis is challenging, often leading to delayed or misdiagnosis.[3]

Access this article online

Quick Response Code:

Website: www.cmj.org

DOI: 10.1097/CM9.0000000000000468

Correspondence to: Prof. Li-Min Chen, Department of Respiratory Medicine, Fujian Medical University Union Hospital, No. 29 Xinquan Road, Fuzhou, Fujian 350001, China
E-Mail: 13599438522@163.com

Chinese Medical Journal 2019;132(20)
Received: 03-06-2019 **Edited by:** Li-Shao Guo

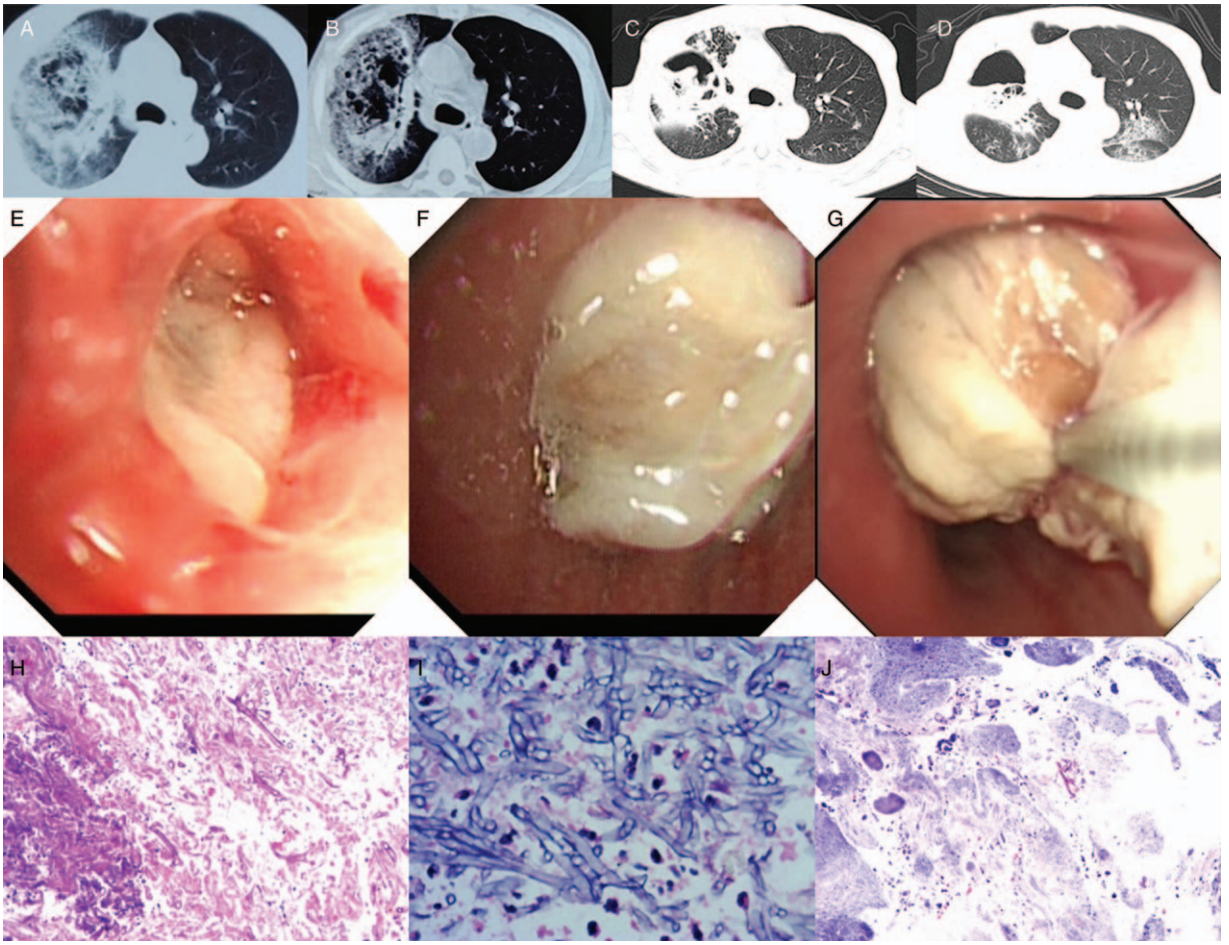

Figure 1: Chest computed tomography (A–D), bronchoscopic (E–G), and pathologic findings (H–J) of the patient. (A) An infectious lesion in the RUL with a small amount of pleural effusion on the right-hand side. (B) Following 1 week of treatment with antibiotics, the lobar pneumonia was partially absorbed but a lung abscess was visible. (C) An irregular cavity with a thick wall in the RUL. (D) Bilateral pneumonia, particularly in the right and left lower-lobes; a cavity was found in the RUL accompanied by right-lung consolidation and an air bronchogram. (E) Stenosis of the bronchial opening in the RUL with a coarse mucous membrane, which was blocked by a large amount of purulent yellow sputum. (F) The bronchus in the RUL was completely obstructed by a granulomatous neoplasm which was covered by a sputum scab; the surrounding mucous membrane was coarse, congestive, and swelling. (G) The bronchus in the RUL was completely obstructed by a yellowish granulomatous neoplasm with a coarse surface, which floated up and down with respiration. (H) Fungal mycelia were observed which appeared to be *Mucor* (hematoxylin-eosin staining, original magnification ×10). (I) *Aspergillus* with multiple septate filaments (hematoxylin-eosin staining, original magnification ×40). (J) Fungal mycelia were observed in the background and identified as *Actinomycetes* (hematoxylin-eosin staining, original magnification ×4). RUL: Right upper lung.

Treatment of such co-infections requires prompt diagnosis, appropriate treatment, and, if necessary, surgical resection.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the article. The patient understands that his name and initials will not be published and due efforts will be made to conceal the identity of the patient, although anonymity cannot be guaranteed.

Funding

This work was supported by grants from the Joint Funds for the Innovation of Science and Technology, Fujian Province, China (No. 2017Y9031), Startup Fund for Scientific Research, Fujian Medical University (No. 2016QH033), and the Key Specialty Discipline Construction Program of Fujian.

Conflicts of interest

None.

References

1. Chermetz M, Gobbo M, Rupel K, Ottaviani G, Tirelli G, Bussani R, *et al*. Combined orofacial aspergillosis and mucormycosis: fatal complication of a recurrent paediatric glioma-case report and review of literature. Mycopathologia 2016;181:723–733. doi: 10.1007/s11046-016-0021-8.
2. Torres-Damas W, Yumpo-Cárdenas D, Mota-Anaya E. Coinfection of rhinocerebral mucormycosis and sinus aspergillosis [in Spanish]. Rev Peru Med Exp Salud Publica 2015;32:813–817.
3. Boo YL, How KN, Pereira DS, Chin PW, Foonq KK, Lim SY. Pulmonary actinomycosis masquerading as lung cancer: a case report. Med J Malaysia 2017;72:246–247.

How to cite this article: Lin L, Xue D, Lin TY, Wu YX, Jiang YT, Chen LM. Pulmonary aspergillosis, mucormycosis, and actinomycosis co-infection presenting as a cavitary lesion in a patient with diabetes. Chin Med J 2019;132:2512–2513. doi: 10.1097/CM9.0000000000000468