

Disseminated invasive aspergillosis in an immunocompetent patient

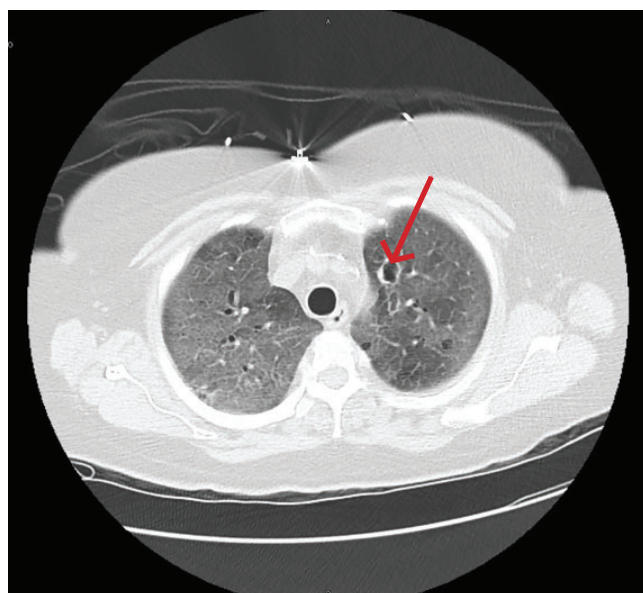


Figure 1. Computed tomography of the lungs showed a cystic lesion in the left upper lobe (arrow), with diffuse ground-glass opacities throughout.

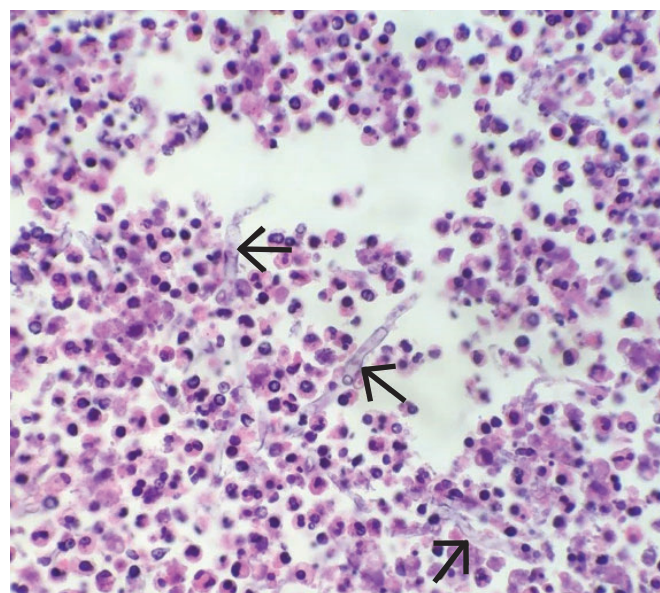


Figure 2. Study of a bowel specimen showed the typical "tree-branch" structures (arrows) of fungal hyphae (hematoxylin and eosin, $\times 600$).

A 57-YEAR-OLD WOMAN was admitted to our hospital for progressive hypoxic respiratory failure that developed after 10 days of empiric treatment at another hospital for an exacerbation of chronic obstructive pulmonary disease (COPD).

Computed tomography (CT) showed a lesion in the upper lobe of the left lung, with new ground-glass opacities with cystic and cavitary changes raising concern for an inflammatory or infectious cause (**Figure 1**). Respiratory culture of expectorated secretions grew *Aspergillus*. Assays for beta-D-glucan and serum *Aspergillus* immunoglobulin G (IgG) antibodies were positive, although given the improvement in her oxygenation requirements and

overall clinical status, these were thought to be trivial. Tests for immunoglobulin deficiencies and human immunodeficiency virus were negative, ruling out primary immunodeficiency. However, within the next 48 hours, her respiratory status declined, and voriconazole was started out of concern for invasive pulmonary aspergillosis based on results of serum IgG testing.

Despite 2 days of treatment with voriconazole, the patient developed respiratory failure. Repeat CT showed that the ground-glass opacities were more dense, especially in the lower lobes, and new patchy infiltrates were noted in the left lung. The patient developed a right tension pneumothorax requiring emergency intubation and chest tube insertion.¹

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She subsequently developed acute abdominal pain with worsening abdominal distention, diagnosed as pneumoperitoneum. Emergency exploratory laparotomy revealed perforations in the cecum with fecal spillage, requiring ileocecectomy and ileostomy.

Pathologic study of bowel specimens confirmed fungal hyphae with “tree-branch” structures consistent with fungal infection in the bowel (Figure 2).

Oral voriconazole was continued. The patient’s respiratory status improved, and she no longer required supplemental oxygen. She was discharged on a regimen of oral voriconazole 200 mg twice daily. However, over the next 12 months, she had additional hospitalizations for severe sepsis from abdominal wound infections, pneumonia, and *Clostridium difficile* infection. She will require lifelong antifungal treatment.

INVASIVE PULMONARY ASPERGILLOSIS

Invasive pulmonary aspergillosis is the most severe form of aspergillosis and is most often seen in immunocompromised patients. The death rate is as high as 50% in neutropenic patients regardless of the time to diagnosis or effective treatment.² It becomes life-threatening

as the infection enters the blood stream, leading to formation of thrombi and precipitating embolism and necrosis in the lungs.³

In immunocompetent patients, COPD, tuberculosis, bronchiectasis, liver disease, severe sepsis, and diabetes mellitus predispose to invasive pulmonary aspergillosis.² Other risk factors include long-term steroid therapy at doses equivalent to prednisone 20 mg/day for at least 13 weeks⁴ and viral infection such as influenza.⁵ Chronic use of inhaled corticosteroids has been hypothesized to increase risk.⁴

Histopathologic confirmation of fungal elements is the gold standard for diagnosis.³ New biomarkers such as beta-D-glucan have shown promise in enabling earlier diagnosis to allow effective treatment of disseminated aspergillosis, as in our patient.⁶

TAKE-HOME MESSAGE

Although not common, invasive aspergillosis can occur in immunocompetent and near-immunocompetent patients, particularly those with COPD or other underlying lung disease.

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REFERENCES

1. Vukicevic TA, Dudvarski-Ilic A, Zugic V, Stevanovic G, Rubino S, Barac A. Subacute invasive pulmonary aspergillosis as a rare cause of pneumothorax in immunocompetent patient: brief report. *Infection* 2017; 45(3):377–380. doi:10.1007/s15010-017-0994-3
2. Moreno-González G, Ricart de Mesones A, Tazi-Mezalek R, Marron-Moya MT, Rosell A, Mañez R. Invasive pulmonary aspergillosis with disseminated infection in immunocompetent patient. *Can Respir J* 2016; 2016:7984032. doi:10.1155/2016/7984032
3. Chen L, Liu Y, Wang W, Liu K. Adrenal and hepatic aspergillosis in an immunocompetent patient. *Infect Dis (Lond)* 2015; 47(6):428–432. doi:10.3109/00365548.2014.995697

4. Taccone FS, Van den Abeele AM, Bulpa P, et al; AspiCU Study Investigators. Epidemiology of invasive aspergillosis in critically ill patients: clinical presentation, underlying conditions, and outcomes. *Crit Care* 2015; 19:7. doi:10.1186/s13054-014-0722-7
5. Crum-Cianflone NF. Invasive aspergillosis associated with severe influenza infections. *Open Forum Infect Dis* 2016; 3(3):ofw171. doi:10.1093/ofid/ofw171
6. Ergene U, Akcali Z, Ozbalci D, Nese N, Senol S. Disseminated aspergillosis due to *Aspergillus niger* in immunocompetent patient: a case report. *Case Rep Infect Dis* 2013; 2013:385190. doi:10.1155/2013/385190

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Our patient survived but will require lifelong antifungal treatment