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Pulmonary nodules in a lung transplant recipient

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A 72-year-old man presented with a 1-month history of cough, shortness of breath, weight loss, and fatigue. Ten months earlier he underwent bilateral lung transplantation (cytomegalovirus [CMV] donor negative/recipient positive, Epstein-Barr virus [EBV] recipient positive) for idiopathic pulmonary fibrosis, with basiliximab and methylprednisolone induction followed by tacrolimus and prednisone maintenance. Early posttransplantation course was complicated by bilateral anastomosis stenosis with pseudomembrane formation and *Pseudomonas aeruginosa* pneumonia. Posttransplant, he did not require treatment for transplant rejection. The patient received antifungal prophylaxis with inhaled liposomal amphotericin-B and CMV prophylaxis with valganciclovir for the first 3 months after transplantation. At the time of hospitalization, he was receiving trimethoprim-sulfamethoxazole for prophylaxis and azithromycin for prevention of bronchiolitis obliterans syndrome.

On examination, he was afebrile. Breath sounds were diminished in the right base. He had a normal white blood cell count of $8.3 \times 10^3/\mu\text{l}$ and an elevated C-reactive protein of 2.8 mg/dl. Contrast tomography (CT) of the chest revealed right pleural effusion and nodular opacities in the right and left lower lobes (Figure 1). He was initiated on

ceftriaxone and azithromycin for suspected pneumonia. Thoracentesis demonstrated exudative pleural effusion and *Staphylococcus haemolyticus* was isolated on fluid culture. The serum *Aspergillus* galactomannan was elevated at 2.56 index. The fatigue, weight loss, and positive EBV serology was concerning for concomitant lung malignancy or posttransplant lymphoproliferative disorder (PTLD), and a bronchoscopy and transbronchial biopsy was performed. No evidence of malignancy was found on pathology. The macroscopic and microscopic appearance of the pathogen isolated from bronchoalveolar lavage is shown in Figures 2 and 3. The patient underwent additional treatment.

1 | Questions

1. The clinical presentation and lung nodules seen in Figure 1 is most consistent with:
 - a. A community-acquired bacterial pneumonia
 - b. A respiratory viral infection
 - c. An opportunistic mold infection
 - d. Pulmonary toxicity due to medication

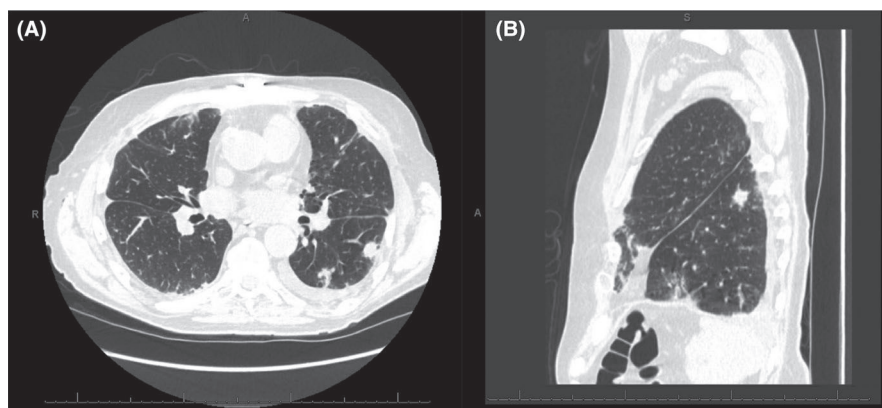


FIGURE 1 Axial (A) and sagittal (B) contrast tomography of the chest demonstrating scattered bilateral nodular and consolidative opacities

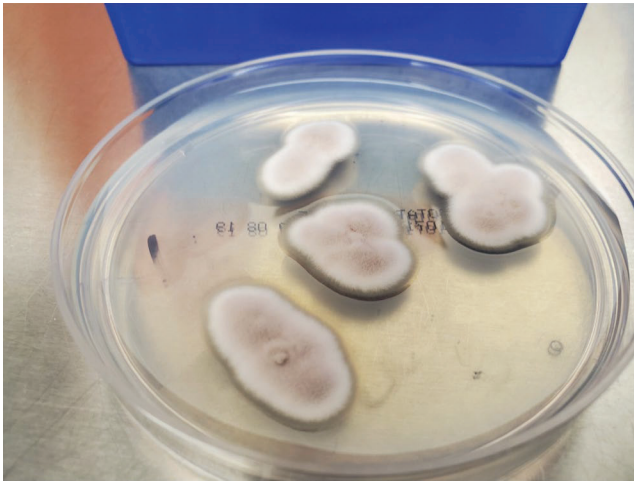


FIGURE 2 Macroscopic features of colonies on culture plate

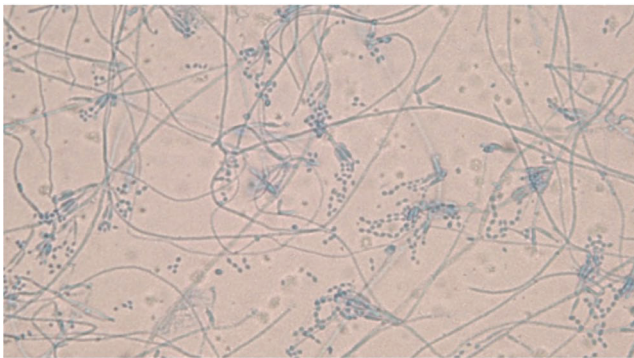


FIGURE 3 Lactophenol cotton blue stain demonstrating microscopic features of the pathogen (400× magnification)

2. Which of the following is an independent risk factor for invasive mold infections after lung transplantation?
 - a. Double lung transplant
 - b. Epstein–Barr virus infection
 - c. Augmented immunosuppression for rejection
 - d. Bronchiolitis obliterans

3. The patient's serum *Aspergillus* galactomannan antigen was positive. Which of the following may cause a false-positive galactomannan test?
 - a. Use of antifungal prophylaxis
 - b. Infection with a non-*Aspergillus* mold
 - c. Crossreactivity with cephalosporin antibiotics
 - d. Respiratory colonization with *Candida* sp.

4. Based on the microbiology shown in Figures 2 and 3, what is the appropriate initial treatment?
 - a. Voriconazole
 - b. Flucytosine
 - c. Amphotericin B
 - d. Trimethoprim-sulfamethoxazole

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