

Exophiala pneumonia presenting as an eosinophilic pneumonia in an immunocompetent patient

Jonathan K. Callaway, Adriane I. Budavari, Kashif Yaqub, Roberto L. Patron, Karen L. Swanson

ABSTRACT

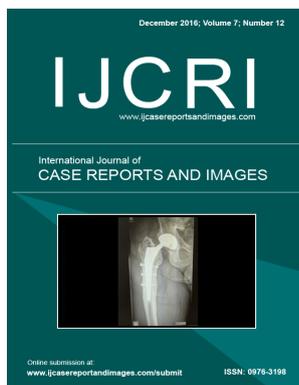
Introduction: *Exophiala* is a common melanized environmental mold with a worldwide distribution. It is usually found in organic waste-enriched soil and decaying plants. *Exophiala* species are increasingly identified as the cause of human infection, typically causing cutaneous infections in immunocompromised hosts. It only rarely presents as isolated pneumonia and has never been reported as an eosinophilic pneumonia. We present a case of an immunocompetent patient with an eosinophilic pneumonia caused by an *Exophiala* species.

Case Report: A 72-year-old Caucasian male Arizona resident with moderate-severe chronic obstructive pulmonary disease, type 2 diabetes mellitus and a 20-pack-year history of smoking presented with a three-week history of cough and fatigue after placing ground sterilizer in his yard. A computed tomography scan of chest showed diffuse consolidation filling most of the right middle lobe, with associated lymphadenopathy. A bronchoalveolar lavage revealed a differential of 33% eosinophils, consistent with an *eosinophilic pneumonia* and bronchoalveolar fluid culture grew 1+ *Exophiala* species. He was treated with corticosteroids and fluconazole, with clinical improvement over several months.

Conclusion: In conclusion, *Exophiala pneumonia* remains rare and is usually associated with underlying bronchiectasis or with an immunocompromised state. *Eosinophilic pneumonia* is also a rare disorder that has been associated with non-helminthic infections such as coccidioidomycosis in addition to certain medications and chemical exposure. Our patient likely developed the *Exophiala pneumonia* with an *eosinophilic pneumonia* syndrome due to the inhalation of dust and ground sterilizer. Our case emphasizes the importance of clinical history especially in an unusual pneumonia in an immunocompetent patient.



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Keywords: *Exophiala*, Eosinophilic pneumonia, Phaeohyphomycoses

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INTRODUCTION

Exophiala is a common melanized environmental mold with a worldwide distribution. It is usually found in organic waste-enriched soil and decaying plants [1], but

has also been isolated from saunas and dishwashers [2, 3]. *Exophiala* species are increasingly identified as the cause of human infection, typically causing cutaneous infections in immunocompromised hosts [4, 5]. It only rarely presents as isolated pneumonia, with the first published case in 1989 by Barenfanger et al. [6]. Since that time, only 10 cases of isolated *Exophiala* pulmonary infections have been identified [6–15]. Of these cases, none manifested as an eosinophilic pneumonia. We presented a case of an immunocompetent patient with an eosinophilic pneumonia caused by an *Exophiala* species.

CASE REPORT

A 72-year-old male Arizona resident with moderate-severe chronic obstructive pulmonary disease, type 2 diabetes mellitus, and a 20-pack-year history of smoking presented with a three-week history of cough and fatigue. He was initially treated as an outpatient with a five-day course of steroids, with some temporary symptomatic improvement, followed by profound fatigue. On examination, heart rate was 107bpm, and oxygen saturation 97% on room air. He had no palpable adenopathy, no rash, but had crackles posteriorly in the right mid-lung field. Blood workup was notable for a white blood cell count of $9.7 \times 10^9/L$ (4.2 – $10.2 \times 10^9/L$) with the differential showing neutrophils 8.14×10^9 , lymphocytes 0.40×10^9 , monocytes 0.76×10^9 , eosinophils 0.40×10^9 and basophils 0.01×10^9 . Serum sodium was 119 mmol/L (135–145 mmol/L). A posteroanterior and lateral chest radiograph (Figure 1) demonstrated a new dense consolidation within the right middle lobe. A subsequent computed tomography scan of the chest (Figure 2) showed diffuse consolidation filling most of the right middle lobe, with associated lymphadenopathy. Initially, he was treated with empiric piperacillin/tazobactam and levofloxacin and a bronchoscopy was performed. The bronchoalveolar lavage revealed a differential of 33% eosinophils, 33% lymphocytes, 11% alveolar macrophages and 18% polymorphonuclear leukocytes, consistent with an eosinophilic pneumonia. All other testing for microorganisms, including coccidioidomycosis was negative. Given no definitive etiology of his progressing pulmonary process, he was treated with corticosteroids and fluconazole 400 mg daily for presumed coccidioidomycosis. Following hospital discharge, the bronchoalveolar lavage fluid culture grew 1+ *Exophiala* species. Fluconazole was continued and three weeks later, the patient was clinically improving. A follow-up CT scan (Figure 3) showed marked improvement of the consolidation and a new thick-walled cavity in the medial right middle lobe. Coccidioidomycosis complement fixation and immunodiffusion serologies were repeated twice and remained negative. The prednisone was tapered off and he continued fluconazole for a total of 10 weeks. The patient was seen again two months later and

after being off treatment for three weeks, was relatively asymptomatic. A repeat computed tomography scan of chest (Figure 4) showed continued improvement of the mass-like consolidation within the medial segment of the right middle lobe. The lesion had lost its cavitory component and had decreased in size.



Figure 1: A posteroanterior and lateral chest radiograph demonstrating a new dense consolidation within the right middle lobe.



Figure 2: A subsequent computed tomography scan of the chest showed diffuse consolidation filling most of the right middle lobe, with associated lymphadenopathy.



Figure 3: The follow-up computed tomography scan showed marked improvement of the consolidation and a new thick-walled cavity in the medial right middle lobe.



Figure 4: A repeat computed tomography of his chest showing continued improvement of the mass-like consolidation within the medial segment of the right middle lobe. The lesion had lost its cavitary component and had decreased in size.

DISCUSSION

Exophiala species are uncommon pathogens, but have been noted to have an increasing incidence in immunocompromised patients [16]. The most common site of infection is the skin, but *Exophiala* species have also been reported to cause sinus, pulmonary, and

disseminated disease [17]. Cases of *Exophiala pneumonia* remain rare, and are usually associated with underlying cystic fibrosis or immunocompromised state. It is well established that up to 19% of patients with cystic fibrosis are colonized with *Exophiala* species, yet only a few cases of *Exophiala* species pneumonia have been reported in this group [11, 18]. Our patient did not have either of these two major risk factors; however, he did have moderate obstructive lung disease, yet he developed invasive disease. Given the rarity of pneumonia caused by *Exophiala* species, a standardized treatment regimen has not been established. Although multiple antifungals have been used to treat pulmonary *Exophiala* infections, including amphotericin B, ketoconazole, itraconazole, flucytosine and voriconazole, no agent has been shown to be superior to the others [7, 12, 13]. There is no consensus regarding optimal duration of therapy, but most studies suggest between 3–7 months [7, 12, 13].

Acute eosinophilic pneumonia is a rare disorder characterized by abnormal pulmonary imaging, and bronchoalveolar lavage with greater than 25% eosinophils [19]. Typically patients present with nonproductive cough, dyspnea, and fever, but may also have malaise, myalgias, night sweats, and pleuritic chest pain [20]. On physical examination, high fever, tachypnea, and bibasilar inspiratory crackles are common [20]. Treatment is typically systemic glucocorticoid therapy in conjunction with supportive care. Optimal dosing or length is not established, but intravenous methylprednisolone is used for severe hypoxemia or respiratory failure until respiratory failure resolves. Oral prednisone is preferred for patients without respiratory failure or once it has resolved. It is recommended to continue glucocorticoids for two weeks after resolution [20]. There is an extensive list of causes of eosinophilic pneumonia, including helminth infections, non-helminthic infections, medications, toxins, idiopathic acute eosinophilic pneumonia and eosinophilic granulomatosis with polyangiitis. Of the non-helminthic infections, coccidioidomycosis has been established as a cause in several cases [21] and rarely with tuberculosis [22]. Although there was only light growth of *Exophiala*, no other organism was identified as a source to explain the cavitary lesion. Repeat coccidioidomycosis serologies were negative twice supporting our diagnosis of *Exophiala pneumonia* presenting as an eosinophilic pneumonia. In follow-up with the patient, he remembered that six weeks prior to his hospitalization, he had been digging and laying a ground sterilizer in his yard. He remembered the wind blowing quite briskly and that dirt and the sterilizer frequently blew in his face. He was not wearing a mask at the time.

CONCLUSION

Exophiala pneumonia remains rare and is usually associated with underlying bronchiectasis, such as

cystic fibrosis or with an immunocompromised state. Eosinophilic pneumonia is also a rare disorder that has been associated with non-helminthic infections such as coccidioidomycosis and tuberculosis in addition to certain medications and chemical exposure. Our patient likely developed the *Exophiala pneumonia* with an eosinophilic pneumonia syndrome due to the inhalation of dust and ground sterilizer. Our case emphasizes the importance of clinical history especially in an unusual pneumonia in an immunocompetent patient.

Author Contributions

Jonathan K. Callaway – Substantial contributions to conception and design, Drafting the article, Final approval of the version to be published

Adriane I. Budavari – Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published

Kashif Yaqub – Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published

Roberto L. Patron – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Karen L. Swanson – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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