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An unusual combination of aspergillus- scopulariopsis brumptii coinfection in an immunosuppressed adult male

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Summary

Aspergillus coinfection with Scopulariopsis brumptii in an immunosuppressed adult male is rare. Patients with Aspergillosis have been described to be coinfected with other organisms, including fungi but the combination with fungi from the Scopulariopsis group has not been so far reported to the best of our knowledge. We report the case of an adult male with monoclonal gammopathy of unknown significance and concurrent COPD, Rheumatoid arthritis on monoclonal antibody therapy and Methotrexate, presenting with recurrent chest infections. Initially, the patient was diagnosed with allergic bronchopulmonary Aspergillosis and treated with antifungal and corticosteroid therapy. During follow up, repeated chest infection was noted despite a range of broad-spectrum antibiotics. Scopulariopsis brumptii was detected on the sputum sample, and specific antifungal treatment was commenced until the full recovery. The patient was on follow up for several years. He is now asymptomatic with no further growth of Aspergillus or Scopulariopsis in his sputum.

Keywords: aspergillus; scopulariopsis brumptii; immunosuppressed.

Background

Over 180 species of Aspergillus have been described that cause fungal infection aspergillosis [1]. ABPA is an allergic pulmonary condition resulting from immune responses after exposure to the inhaled Aspergillus fumigatus antigens. Patients with ABPA present with asthma-like features and sputum and recurrent pulmonary infection. The prevalence rate of ABPA is high in asthmatic patients, which is about 2.5% adult asthma patients or 4.8 million people worldwide. Patients with an immunosuppressed background are more likely to develop infections like Aspergillosis as well as aspergillus coinfection with other organisms [2]. Scopulariopsis and Microascus species belong to the ascomycete family, Microascaceae, generally found in soil and air, plant litter, paper, and wood. There are about 30 species under the Scopulariopsis genus, and they cause non-invasive infections and, in the immunosuppressed cause invasive infections like endocarditis [3], sinusitis [4], brain abscess [19], localized pulmonary [6,7]. The prevalence of Scopulariopsis brumptii is 7.2%, and lungs are the most common site of infection [8]. The combination of Aspergillosis with Scopulariopsis brumptii is unusual. This case is unique and highlights the importance of looking for multiple fungal species causing infection in an immunosuppressed individual.

Case presentation

A 75-year-old adult male presented with recurrent chest infection symptoms, including cough, greyish sputum wheezing and exertional dyspnoea. His past medical history includes COPD, monoclonal gammopathy of unknown significance, polymyalgia rheumatica, rheumatoid arthritis, cervical spondylosis, hypertension, and depression. He was on immunosuppressive therapy methotrexate, Certolizumab pegol (Cimzia) for rheumatoid arthritis. He had a history of winter bronchitis for the past seven years and was exposed to asbestos as a builder. He smoked tobacco, 20 cigarettes per day for 35 years. Patient had raised IgE and RAST IgE to aspergillus and aspergillus specific IgG. Aspergillus was detected on one sputum sample previously. Eight months later, the patient presented with fever, rigor, cough associated with white sputum and weight loss; chest x-ray and the blood test revealed empyema of the left lung and iron deficiency anaemia, respectively. A chest drain was inserted during his stay in the hospital, and on discharge after three weeks, his condition was stable. After that, however, there was a small effusion on the left lung; hence, Amoxycillin clavulanic acid for one month and inhalers including salbutamol, tiotropium bromide fluticasone propionate was prescribed. In addition, aspirated pleural fluid was sent for microbiology which did not show any aspergillus on that sample.

After one year, the patient was diagnosed with multiple myeloma and six cycles of CDTA chemotherapy and had remission from multiple myeloma. The patient was reasonably stable, and advice was given to continue his previous treatment along with the chemotherapy. His condition was improved and was stable on subsequent visits. By that time, he had completed his six cycles of CDTA chemotherapy and got remission from multiple myeloma.Four months later, he complained of cough with greenish-yellow sputum though the chest tightness or wheezing were improved; he also reported that he was given a combined flu and pneumonia vaccination at Wythenshawe hospital during his appointment, which helped to set off his chest symptoms. Examination revealed basal crepitation with good airflow on both lungs, and the repeat chest x-ray showed improvement of the left basal changes with no fluid accumulation. Hence, Augmentin was advised to continue for one 1week with no steroid or antifungal.

Further, four months later, the patient presented with a repeated chest infection associated with productive cough with greenish-yellow coloured sputum and occasional dyspnoea. Serratia was detected on his last few sputum samples, which were found resistant to Augmentin, and he was treated with ciprofloxacin and corticosteroids.

Despite antibiotic courses, the patient struggled with chronic cough and sputum. Therefore, the sputum sample was sent for microbiology testing, and the sample demonstrated Scopulariopsis brumptii and colonization of Aspergillus after two years of the initial diagnosis of ABPA. Patient was successfully treated with Posaconazole.

Discussion

Aspergillosis infection mainly affects the respiratory system though the sign symptoms may vary from person to person and depends on host response, structural lung damage and immune status. For example, allergic Broncho Pulmonary Aspergillosis (ABPA) fungal infection mainly affects asthmatic and cystic fibrosis patients [9]. Aspergillus fumigatus is the main causative organism ubiquitous in the environment and causes an allergic reaction to certain people who become sensitized to inhaling the fungus [10]. Similarly, lungs are the most common site of infection for Scopulariopsis species and affect immune suppression.

As the combination of Aspergillosis with Scopulariopsis coinfection is rare and has not been reported yet, we have selected similar cases of Aspergillosis with coinfection with other organisms, but they are different in some respects (Table1).

Awari et al. (2020) reported a similar case where the patient was hospitalized with worsening dyspnoea before her stem cell transplantation and cryptococcus neoformans was detected and was commenced on intravenous liposomal amphotericin B along with fluconazole, as the symptoms were not improved with the treatment, she was readmitted in the hospital. Bronchoalveolar lavage confirmed Aspergillus, and oral voriconazole was prescribed for one year, which helped with the symptoms. Repeat chest CT was performed three months showed improvement. The case is similar to ours because of an uncommon combination of dual fungi in an adult immunosuppressive patient, but the treatment strategy was slightly different. They used recommended antifungal drug voriconazole and liposomal amphotericin B for invasive Aspergillosis in their case.

Another case report published by Sheki et al. (2014) [15] described a case of a combination of dual fungi in a patient who had eosinophilic pneumonia and bronchial asthma; despite having treatment for that, her symptoms were not resolved. Chest CT scan revealed central bronchiectasis; ed to explore for ABPA. A new generation shotgun sequencer for random sequencing of fungal DNA was used to detect any fungal involvement, and Aspergillus with Schizophyllum was detected, followed by antifungal therapy with amphotericin B flucytosine, itraconazole, voriconazole, and micafungin. The patient response to the treatment, particularly itraconazole and prednisolone, improved the symptoms. In this case, though the patient was initially misdiagnosed with pneumonia and bronchial asthma, later the pathogens were identified by genetic sequencing, diagnosis of the fungus was made morphologically, and this technique helped them to diagnose dual fungi in the same setting which is reported as a good technique for screening and rapid, accurate identification of fungi in a clinical specimen.

Kumar et al. (2016) [16] describe a patient with a history of pulmonary tuberculosis along with bronchial asthma and ABPA; the patient presented with five days history of fever, breathlessness associated with cough, a chest x-ray revealed bilateral pleural infiltration with a possible cavitary lesion, HRCT showed bilateral bronchiectasis with multiple cavities in the right upper lobe, and sputum microscopy and culture showed Nocardia and pseudomonas respectively, she was treated by imipenem, amikacin, itraconazole, cotrimoxazole and steroid, the patient, unfortunately, did not survive. Amirrajab (2015) [14] presented a pyoderma gangrenosum on immunosuppressive therapy who developed infection with Aspergillus and Fusarium proliferatum.

Table 1: Showing similar cases of aspergillosis-Co infection

Author	Year	Patient (Age/Sex)	Comorbidity	Coinfection (type)	Treatment	Outcome
Awari et al., [11]	2020	69 years, female	Multiple Myeloma	Cryptococcus neoformans	Corticosteroid, Amphotericin, Fluconazole, Finally, Voriconazole given	Recovered
Aliyali et al., [12]	2016	34 years, male	Minor Thalassemia	Echinococcus granulosus	Surgery Antibiotics Anti- helminthic	Recovered
Gupta et al., [13]	2014	53 years, Female	Type- 2 diabetes mellitus, hypothyroidism, ischemic heart disease, adrenal insufficiency	Mucoromycetes	Piperacillin-tazobactam, Amphotericin, Voriconazole	Died
Amirrajab et al [14]	2015	32 years old	Pyoderma gangrenosum on steroids and methotrexate	Fusarium prolfieratum	voriconazole linezolid meropenem and ciprofloxacin	Died

All four studies show Aspergillosis coinfected with different fungi, and in one study, they used random sequencing of the fungal DNA for the diagnosis of fungi in the samples can be a good option for prompt diagnosis to reduce the mortality and morbidity rate. However, accurate, prompt diagnosis of fungal pathogen depends on some features of microbiological laboratory tests of PCR-based assays, antigen, and serological tests [17]. For the diagnosis of Aspergillosis, there are specific recommendations for using galactomannan testing for BAL and serum and the role of PCR test [17]. One study showed the sensitivity of GM 60%-93%, and for PCR sensitivity ranging from 85%-100%, which is greater than the sensitivity of direct microscopy and fungal culture, the sensitivity of fungal culture and direct microscopy has a sensitivity of less than 50%. Besides the conventional diagnosis method, including direct microscopy and fungal culture, sequencing of fungal DNA, PCR test and GM test can be used to detect fungus in immunosuppressed patients.

All described studies, including our case, used antifungal drugs, and two of the cases were immunosuppressed, although the third case had diabetes, a known risk factor for fungal infections. The main aim of treating Aspergillosis with other coinfection includes controlling symptoms, preventing further exacerbation, and restoring the pulmonary functions of the patients. Drugs used for Aspergillosis include antifungal drugs-itraconazole, amphotericin- B, voriconazole, anti-inflammatory drugs, antibiotics for secondary infections, and anti-IgE therapy.

Scopulariopsis brumptii can cause infection in patients with previously diagnosed Aspergillosis in the immune-suppressed. This group of patients require special attention when presenting with repeated chest symptoms in the previously diagnosed ABPA. The differential diagnosis should include coinfections, which are more common for developing coinfection with bacteria and viruses. More importantly, the combination of dual fungi is rare. In the case of dual fungal combination infection, there is a risk of missing the diagnosis of the second organism because of the similarity of symptoms and signs, and the use of newer diagnostic techniques would help. This case report will alert the clinicians to keep in mind Scopulariopsis brumptii as a causative organism in the case of Aspergillosis.

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