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Short commentary

Aspergillosis: Causes, Forms, and Medication; A Fungal Infection

Neelam Sharma-Walia*

Department of Foundational Sciences and Humanities, Microbiology and Immunology, Chicago Medical School, School of Graduate and Postdoctoral Studies, Innovation and Research Park, North Chicago, Illinois, United States 233,USA

Correspondence to: Neelam Sharma-Walia, Foundational Sciences and Humanities, Microbiology and Immunology, Chicago Medical School, School of Graduate and Postdoctoral Studies, Innovation and Research Park, 233, USA; E-mail: neelam.sharma-walia@rosalindfranklin.edu

Abstract

Aspergillus is a ubiquitous mould genus typically found in soil and rotting vegetation. Sources, modes and treatment. In defining the diseases caused by Aspergillus, the term' aspergillosis 'is used but most generally refers to those caused by Aspergillus fumigatus. Aspergillus flavus, Aspergillus terreus and Aspergillus niger are other animals that can cause human illness [1].

Aspergillus releases massive numbers of conidia (asexual spores) into the air as part of its life cycle and can thus be present in both outdoor and indoor environments. Aspergillus conidia inhalation is normally a daily phenomenon, but only a limited number of individuals experience chronic illness and are at an elevated risk of aspergillosis (e.g. people with compromised immune systems and/or impaired lungs).

It is difficult to quantify the burden of aspergillosis in the UK because of the insensitivity of fungal culture, the lack of regular, sensitive, non-culture diagnostic testing and the lack of a national surveillance network. A 2017 study estimated that 3,288-4,257 cases of invasive aspergillosis, up to 3,600 cases of recurrent pulmonary aspergillosis and 110,667-235,070 cases of allergic bronchopulmonary aspergillosis (ABPA) complicating asthma or cystic fibrosis are registered every year in the UK [2].

Keywords: Aspergillus conidia; Aspergillosis; Hypersensitivity

Types of Aspergillosis

A number of clinical syndromes may be caused by Aspergillus; variable host-pathogen associations contribute to a range of Aspergillus-related diseases, from hypersensitivity responses to ABPA to invasive diseases associated with highly immunocompromised states [3].

Invasive pulmonary aspergillosis

In regular host lungs, epithelial cells and alveolar macrophages extract inhaled conidia. Conidia can germinate into branching filaments called hyphae that escape these host defences, which is when Aspergillus becomes invasive. Alveolar macrophage-released inflammatory mediators contribute to the mobilisation of neutrophils that can remove the hyphae [3].

Invasive pulmonary aspergillosis (IPA) most often occurs in patients that are seriously immunocompromised and is histopathologically characterised by invasion of hyphaeeic lung tissue [5].

Symptoms: Classic IPA signs occur late and include fever, pain in the pleuritic chest, haemoptysis (coughing up blood), cough, and shortness of breath, usually developing reasonably steadily over a span of days to a few weeks. In 5-10 percent of cases, diffusion to other organs is seen; this involves the brain in

Neelam Sharma-Walia*

Department of Foundational Sciences and Humanities, Microbiology and Immunology, Chicago Medical School, School of Graduate and Postdoctoral Studies, Innovation and Research Park, North Chicago, Illinois, United States 233,USA

Correspondence to: Neelam Sharma-Walia, Foundational Sciences and Humanities, Microbiology and Immunology, Chicago Medical School, School of Graduate and Postdoctoral Studies, Innovation and Research Park, 233, USA; E-mail: neelam.sharma-walia@rosalindfranklin.edu

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particular, especially if patients are treated with ibrutinib cancer therapy [6].

Diagnosis: Early diagnosis is crucial for survival; a biopsy of the lung tissue is also not available, though. IPA is nearly invariably lethal if left undiagnosed and untreated. A combination of clinical, radiological and microbiological characteristics, including galactomannan antigen detection, is important for diagnosis. However, IPA is associated with high mortality rates even when diagnosed, particularly in HSCT recipients, where 12-week mortality rates above 50 percent have been recorded [7].

As a first-line treatment for IPA, voriconazole is recommended because it is associated with a lower mortality rate relative to amphotericin B [8]. Isavuconazole is similarly effective, though less toxic, than voricanazole [9]. IPA should be treated with at least 12 weeks of antifungal therapy, but, based on the therapeutic response and underlying immunosuppression, longer treatment courses may be needed. During therapy with triazole antifungal agents, clinical drug management is advised [8].

Conclusion

Aspergillus causes a wide variety of diseases for which there are few therapeutic choices for antifungal drugs, an issue that is compounded by the emerging challenge of susceptibility to antifungal drugs. As a result new diagnostic and clinical techniques are required to optimise patient outcomes. The various adverse effects and medication reactions involved with the use of antifungal medications in the treatment of Aspergillus disease should be known to pharmacists.

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