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Cystic Fibrosis Research News

Title:

PREVALENCE AND DIVERSITY OF FILAMENTOUS FUNGI IN THE AIRWAYS OF CYSTIC FIBROSIS PATIENTS – A DUTCH, MULTICENTRE STUDY

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What was your research question?

We aimed to investigate which fungi can be cultured from the sputum of Dutch cystic fibrosis (CF) patients and with which frequency.

Why is this important?

The airways in the lung are protected by mucus. However, in CF patients the mucus gets so thick that it facilitates infections, damaging the lungs. Fungi can grow in damaged lungs. However, in many patients fungi are present without causing symptoms. Therefore, it is not clear whether it is better to treat patients with anti-fungal drugs or not. It is important to treat infections that damage the lungs, but it is also important not to treat patients with unnecessary antifungal drugs, which can have serious side effects. At this point, we do not know which types of fungal growth are harmful. In order to begin to understand the role of fungal infections in lung damage in patients with CF, we need to assess which fungi can be found and how often.

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What did you do?

Between March 2010 and March 2013 sputum samples were collected from CF patients in five CF centers. They represented 82% of all Dutch CF patients. Growth media optimized for fungal growth were provided to the participating laboratories. Each laboratory followed the same culture protocol. Every week batches of fungi were transported to a reference laboratory, where molecular diagnostics were used to identify the types of fungi. Because all the identifications were performed in the same laboratory the data collection was very consistent.

What did you find?

Over 3 years, we collected 3,787 fungi from 699 patients. In total we found 107 different species of fungi. The most common cultured fungus was Aspergillus fumigatus (52% of all cultured fungi). Seven percent of the Aspergillus fumigatus were resistant to azoles. Azoles are the most frequently used antifungal drugs. Other frequently cultured fungi were Penicillium species (20.7%) and Scedosporium species (7.5%). Forty-one percent of patients had at least one fungus in their sputum sample each year.

What does this mean and reasons for caution?

Our study demonstrates that sputum samples of CF patients harbour a high diversity of fungal species. However, a positive culture does not necessarily mean that the fungus is actually growing in the lung. Sometimes, fungal spores in the air can be inhaled and get stuck in the patient's mucus without beginning to grow. So, a positive sputum sample might just mean that the patient recently inhaled a spore, not that the fungus was already growing in the lungs. Furthermore, fungal growth inside the lung does not automatically mean that the lung is being damaged. So even though fungi can be cultured often in sputum samples of CF patients, it remains unknown how much fungi contribute to the symptoms of CF.

What's next?

This study helps us to know exactly which fungi can be found in CF patients. The next step is to investigate when fungal growth is harmful to the patient and when antifungal therapy should be started.

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