



Case report

Tympanic membrane perforation secondary to *Aspergillus niger* otomycosis

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ARTICLE INFO

Article history:

Received 5 August 2020

Received in revised form 30 August 2020

Accepted 31 August 2020

Keywords:

Otomycosis

Aspergillus niger

Tympanic membrane perforation

Tympanoplasty

ABSTRACT

Aspergillus niger is one of more than 340 different species belonging to the filamentous fungal genus *Aspergillus*. Aspergillosis can present with a wide range of clinical syndromes, and it results in significant morbidity and mortality worldwide. Here we described a rare case of the left central tympanic membrane perforation secondary to *Aspergillus niger* otomycosis. The patient underwent tympanoplasty with good improvement.

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Introduction

Aspergillus is a fungus, which is ubiquitously distributed in air, soil, water, and organic matter. There are more than 340 different species belonging to the genus *Aspergillus* [1]. The most frequently identified pathogens are *Aspergillus fumigatus* and *Aspergillus flavus*. They are not transmitted from person to person. Aspergillosis, which is an infection caused by *Aspergillus* spp., often affects the respiratory system [2]. Most cases of aspergillosis occur in immunocompromised patients, but its signs and severity vary greatly [3]. Extrapulmonary aspergillosis include keratitis, sinusitis, otomycosis, and onychomycosis [4–7]. Unusual cutaneous mycosis caused by *Aspergillus protuberus* and *Aspergillus tubingensis* have been reported [8,9]. However, these infections are less severe, and often curable with antifungal treatments. Here we reported a rare case of the left central tympanic membrane perforation secondary to *Aspergillus niger* otomycosis.

Case presentation

A 76-year-old female patient presented to the clinic with the chief complaint of a sudden onset pain on the left ear. Her personal medical history was significant for hypertension, psoriasis, type 2 diabetes mellitus, and osteoarthritis status post right total knee replacement. The patient also had a continuous positive airway

pressure (CPAP) therapy at home for obstructive sleep apnea. At the time of admission, the patient was afebrile (36.5 °C), and had blood pressure of 157/71 mmHg, heart rate 67 bpm, respiratory rate 18/min, and blood oxygen saturation level 94 %. The patient admitted to hearing loss in both ears, which was asymmetrical (the left ear worse than the other), requiring her to wear hearing aids. The patient had experienced chronic ear drainage with persistent recurrent infection despite aggressive outpatient topical treatment. A diagnosis of central tympanic membrane perforation was made, and the patient was taken to surgery for the left tympanoplasty. There was significant edema of the surrounding tissues of the eardrum. The middle ear mucosa was extremely edematous (at least 3–4 mm thick), polypoid with mucopurulent pockets of discharge. Probable fungal elements in the ear canal were noticed. The malleus was intact, but the incus and stapes were never definitively identified because of the swollen tissue. After the left tympanoplasty, patient was advised to follow-up outpatient for further care.

The ear canal debris and exudates collected from this patient during the surgery were submitted to the clinical microbiology laboratory for bacterial and fungal cultures. No bacterial growth was noted on sheep blood (tryptic soy agar containing 5% defibrinated sheep blood), MacConkey and Columbia CNA agars. On the Sabouraud dextrose agar, *Aspergillus niger* grew salt and pepper colonies. For microscopic examination, a slide was prepared under a biosafety cabinet by touching the colonies with a piece of clear tape, and a drop of lactophenol cotton blue was added on the slide. When viewed under the microscope, *Aspergillus niger* appeared as septate hyphae with long smooth unbranched

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conidiophores, which were terminated by a swollen vesicle bearing flask-shaped phialides. The biserial phialides covered the entire vesicle and formed a radiate head with dark conidia.

Discussion

Exposure to *Aspergillus* is almost universal, but aspergillosis is uncommon, suggesting that other factors play a key role in its pathogenesis. Healthy people often do not get sick when they breathe in *Aspergillus* spores every day. However, immune-compromised patients or patients with existing lung diseases are at a higher risk of developing health problems due to *Aspergillus*. Lin et al., 2017 reported a case of *Aspergillus niger* bloodstream infection associated within 3–4 months after gastric cancer surgery [10]. *Aspergillus niger* also caused tracheobronchitis in lung transplant patients [11]. In patients with hematological malignancies, *Aspergillus niger* infection in lung and paranasal sinus was an infrequent complication, which was characterized by a high mortality rate [12]. Some studies reported that diabetes mellitus and immunosuppressant drug therapy are also important risk factors associated with aspergillosis [13,14]. The similar situation was observed in this patient, who is diabetic and is taking methotrexate to treat psoriasis.

Trauma is the most common cause of tympanic membrane perforation, which often occurs in young people associated with domestic violence and street fighting [15]. In this study, we report a rare case of central tympanic membrane perforation due to *Aspergillus niger* otomycosis in an elderly woman, and the identification of *Aspergillus niger* was made based on macroscopic colony morphology and microscopic structures (Fig. 1). This fungus produced dark conidia from biserial phialides, which is a characteristic for *Aspergillus niger*. Mycotic thrombosis in blood vessels of the tympanic membrane results in avascular necrosis of the tympanic membrane [16]. Egami et al., 2003 reported that *Aspergillus terreus* was the most common pathogen of otomycosis in Japan [17]. In addition, bacteria can be primary pathogens. *Staphylococcus aureus* and *Pseudomonas aeruginosa* accounted for 52 % of otomycosis cases in Iran [18]. Another study revealed that 11 % of the cases were found to have mixed fungal and bacterial infections [19].

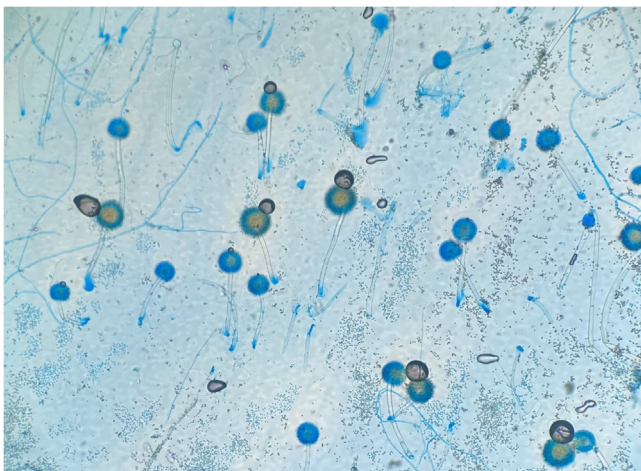


Fig. 1. Microscopic examination of *Aspergillus niger* stained with lactophenol cotton blue. Hyphae with unbranched conidiophore connected to a swollen vesicle covered with phialides. The phialides contain chains of conidia (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.).

Conclusion

Here we presented a rare case of central tympanic membrane perforation associated with *Aspergillus niger* otomycosis in an elderly patient. Our study emphasized the importance of diagnosing fungal otomycosis in patients who are diabetic and/or on immunosuppressant drug therapy in order to start immediate proper treatment and avoid complications.

Author statement

The work has not been published previously. The manuscript is not under consideration for publication elsewhere and that the submission is approved by all authors.

Author contributions

TP and AA: designed the study and wrote the manuscript.

Ethical approval

Approval from the ethical committee was not required due to the nature of this case report. Abiding by the Declaration of Helsinki, patient anonymity was guaranteed.

Declaration of Competing Interest

The authors report no declarations of interest.

Acknowledgement

We thank the staff of the clinical microbiology laboratory at UPMC Mercy for help with initial isolation and characterization of the isolate.

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