

OTOMYCOSIS IN PATIENTS WITH DIABETES MELLITUS: CLINICAL COURSE AND CHARACTERISTICS OF OTOMYCOSIS IN PATIENTS WITH DIABETES MELLITUS

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Abstract: Otomycosis is a superficial fungal infection of the external auditory canal that is frequently encountered in otolaryngological practice, especially in tropical and subtropical regions. Patients with diabetes mellitus represent a particularly vulnerable group due to immune dysfunction, altered local microenvironment, and metabolic changes associated with chronic hyperglycemia. The presence of diabetes not only increases susceptibility to otomycosis but also influences its clinical course, severity, recurrence rate, and response to treatment. This article provides a comprehensive review of the clinical features, pathophysiology, diagnostic challenges, and management of otomycosis in patients with diabetes mellitus. Emphasis is placed on the role of impaired immunity, common fungal pathogens, and the importance of glycemic control in achieving favorable outcomes. Understanding the unique aspects of otomycosis in diabetic patients is essential for early diagnosis, effective treatment, and prevention of complications.

Keywords: Otomycosis; Diabetes mellitus; Fungal ear infection; External auditory canal; Immunocompromised patients

Introduction

Otomycosis is a mycotic infection of the external auditory canal, occasionally extending to the tympanic membrane and middle ear. It accounts for a significant proportion of cases of otitis externa and is characterized by pruritus, ear pain, otorrhea, a sense of fullness in the ear, and hearing impairment. The condition is most commonly caused by saprophytic fungi, particularly species of *Aspergillus* and *Candida*.

The prevalence of otomycosis is higher in warm and humid climates, where environmental conditions favor fungal growth. Predisposing factors include excessive ear cleaning, prolonged use of topical antibiotics or steroids, use of hearing aids, swimming in contaminated water, and underlying systemic diseases. Among systemic conditions, diabetes mellitus is one of the most important risk factors.

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Chronic hyperglycemia leads to microvascular and macrovascular complications and impairs both innate and adaptive immune responses. As a result, patients with diabetes are more susceptible to infections, including fungal infections of the skin and mucous membranes.

In patients with diabetes, otomycosis often presents with more severe symptoms, a prolonged course, frequent recurrences, and an increased risk of complications. The infection may be resistant to standard therapy if glycemic control is poor. Therefore, understanding the interaction between diabetes mellitus and otomycosis is crucial for effective management. This article aims to review the clinical course of otomycosis in diabetic patients, focusing on pathogenesis, clinical manifestations, diagnosis, treatment, and prevention.

Discussion

Pathophysiology of Otomycosis in Diabetes Mellitus

The increased susceptibility of diabetic patients to otomycosis can be explained by several pathophysiological mechanisms. Chronic hyperglycemia impairs neutrophil function, including chemotaxis, phagocytosis, and intracellular killing of pathogens. Additionally, cell-mediated immunity is compromised, reducing the body's ability to control fungal colonization.

High glucose levels in tissues and secretions create a favorable environment for fungal growth. The external auditory canal of diabetic patients may have altered pH and increased

moisture, further promoting fungal proliferation. Microangiopathy associated with diabetes leads to reduced blood supply, impairing local immune responses and tissue healing.

Furthermore, diabetic patients often suffer from xerosis and skin barrier dysfunction, which facilitates fungal invasion. Repeated trauma to the ear canal from scratching due to pruritus may also contribute to the development and persistence of infection.

Etiological Agents

The most common causative organisms of otomycosis are filamentous fungi and yeasts. *Aspergillus* species, particularly *Aspergillus niger*, *Aspergillus flavus*, and *Aspergillus fumigatus*, are responsible for the majority of cases. *Candida albicans* and non-albicans *Candida* species are also frequently isolated, especially in patients with diabetes.

In diabetic individuals, mixed infections involving bacteria and fungi are more common, complicating the clinical picture and treatment. The presence of resistant or opportunistic fungal species may be associated with recurrent or chronic otomycosis.

Clinical Features

The clinical presentation of otomycosis in diabetic patients is similar to that in non-diabetic individuals but is often more severe. Common symptoms include intense itching, otalgia, ear discharge, tinnitus, and hearing loss. The discharge may be thick, white, black, yellow, or green, depending on the fungal species involved.

On otoscopic examination, fungal debris, hyphae, spores, and epithelial desquamation can be observed in the external auditory canal. In diabetic patients, inflammation and edema of the ear canal may be more pronounced. In severe cases, the infection may extend to the tympanic membrane, causing perforation, or progress to invasive otitis externa, a life-threatening condition predominantly seen in elderly diabetic patients.

Diagnostic Considerations

The diagnosis of otomycosis is primarily clinical, based on history and otoscopic findings. However, in diabetic patients, laboratory confirmation is often recommended due to the possibility of atypical presentations and mixed infections.

Microscopic examination of ear canal debris using potassium hydroxide (KOH) preparation can reveal fungal elements. Fungal culture helps identify the specific pathogen and may guide antifungal therapy in refractory cases. In patients with severe pain, cranial nerve involvement, or poor response to treatment, imaging studies such as computed tomography (CT) or magnetic resonance imaging (MRI) may be necessary to exclude invasive disease.

Assessment of glycemic control is an essential component of the diagnostic workup. Poorly controlled diabetes is associated with persistent and recurrent otomycosis, and failure to address hyperglycemia may result in treatment failure.

Treatment and Management

The management of otomycosis in diabetic patients requires a comprehensive and multidisciplinary approach. The primary goals of treatment are eradication of the fungal infection, relief of symptoms, prevention of recurrence, and optimization of glycemic control.

Aural toilet is the cornerstone of treatment and involves careful cleaning of the external auditory canal to remove fungal debris and discharge. This procedure improves the effectiveness of topical antifungal agents and should be performed under microscopic guidance when possible.

Topical antifungal medications are the mainstay of therapy. Commonly used agents include clotrimazole, miconazole, ketoconazole, nystatin, and ciclopirox olamine. Acidifying agents such as acetic acid may also be used to create an unfavorable environment for fungal growth. In diabetic patients, treatment duration is often longer, and close follow-up is required.

Systemic antifungal therapy is generally not required for uncomplicated otomycosis but may be indicated in cases of refractory infection, extensive disease, or immunocompromised patients. Oral antifungal agents such as fluconazole or itraconazole may be used with caution, considering potential drug interactions and hepatic side effects.

Equally important is strict control of blood glucose levels. Collaboration with endocrinologists or primary care physicians is essential to optimize diabetes management. Patient education regarding ear hygiene, avoidance of self-cleaning with objects, and keeping the ear dry is crucial in preventing recurrence.

Complications

Diabetic patients with otomycosis are at increased risk of complications. Persistent infection can lead to chronic otitis externa, tympanic membrane damage, and secondary bacterial infection. The most serious complication is necrotizing (malignant) otitis externa, a severe infection that can spread to the skull base and cranial nerves, leading to significant morbidity and mortality.

Early recognition and aggressive management of otomycosis in diabetic patients are essential to prevent such complications.

Conclusion

Otomycosis is a common fungal infection of the external auditory canal that poses unique challenges in patients with diabetes mellitus. Impaired immune function, altered local environment, and poor glycemic control contribute to increased susceptibility, severity, and recurrence of the disease in this population. While the clinical presentation is similar to that in non-diabetic patients, otomycosis in diabetic individuals often follows a more protracted and complicated course.

Effective management requires accurate diagnosis, meticulous aural toilet, appropriate antifungal therapy, and strict control of blood glucose levels. Awareness of the potential for complications, including invasive otitis externa, is crucial. A multidisciplinary approach and patient education play key roles in achieving successful outcomes and reducing recurrence rates. Further research is needed to establish standardized treatment protocols specifically tailored to diabetic patients with otomycosis.

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