



Otomycosis: Etiopathogenesis, clinical presentation, modern diagnostic and treatment methods

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Abstract: This article covers the etiological factors, developmental mechanism, detailed clinical signs, as well as modern medical diagnostic and treatment principles of otomycosis, which is a fungal inflammation of the external auditory canal and the tympanic membrane.

1. Introduction

Otomycosis (Lat. *Otomycosis*) is an inflammatory disease characterized by fungal infection of the skin of the external auditory canal, and sometimes the tympanic membrane and the middle ear cavity. According to the World Health Organization, 15-20% of external otitis cases have a fungal etiology. This indicator is even higher in hot and humid climates, as well as in patients with chronic diseases.

2. Etiology and risk factors

The causative agents of the disease are mainly saprophytic fungi that are widely distributed in nature. Mold fungi account for 80-90% of otomycosis cases:

- **Mold fungi (*Aspergillus* spp.):** *A. niger*, *A. flavus*, *A. fumigatus*. This is the most common group.
- **Rare types:** *Penicillium*, *Mucor*, *Rhizopus* (more often in patients with severe immunodeficiency).

Main predisposing factors:

- **Decreased local immunity and trauma:** Regular cleaning of the ear with hygienic cotton swabs leads to microtraumas of the skin and the loss of earwax (cerumen), which serves a protective function.
- **Concomitant systemic diseases:** Especially type-2 diabetes mellitus. High blood sugar levels (hyperglycemia) lead to tissue ischemia, microcirculation disorders (angiopathy), and changes in the pH of the skin, which creates an ideal basis for the active multiplication of fungi.
- **Iatrogenic factors:** Long-term, unjustified use of broad-spectrum antibiotics and local corticosteroid ear drops destroys the normal bacterial flora, opening the way for fungi.
- **Exogenous factors:** High humidity, frequent water entry into the ear, improper use of hearing aids or earphones.



3. Pathogenesis

The cerumen (earwax) secreted by glands in the skin of a healthy ear canal contains lysozyme, fatty acids, and immunoglobulins, which provide an acidic environment (pH 4.0-5.0). For a fungal infection to develop, this barrier must be broken. The pathogenesis involves 3 stages:

- **Adhesion:** Attachment of fungal spores to damaged epithelial cells.
- **Colonization:** Growth of fungal mycelia and their penetration into the stratum corneum of the skin.
- **Toxic-allergic reaction:** The development of severe local inflammation, tissue swelling, and allergic reactions due to enzymes (protease, lipase) and toxins secreted by the fungus.

4. Clinical presentation (Symptomatology)

The clinical signs of otomycosis may vary slightly depending on the type of pathogenic fungus, but the general triad of symptoms includes:

- **Itching (Pruritus):** The earliest and most common sign. The itching becomes unbearable, forcing the patient to scratch the ear with various objects, which further deepens the infection.
- **Hearing loss and tinnitus:** Conductive hearing loss occurs due to the ear canal filling with fungal masses (mycelial plugs) and swollen skin. Ear noise (tinnitus) and a feeling of ear blockage are constant companions of the disease.
- **Ear discharge (Otorrhea):**
 - When infected with *Aspergillus niger*: Black, coal dust-like, gray-dotted, drier discharge.
 - When infected with *Aspergillus flavus/fumigatus*: Yellowish-green, crust-like masses.
 - When infected with *Candida*: Whitish, moist, cottage cheese-like discharge occurs.
- **Pain (Otalgia):** Usually observed in the acute phase of the disease, when the tympanic membrane is involved in the process (fungal myringitis), or when a secondary bacterial infection occurs.

5. Modern diagnostic methods

To make an accurate diagnosis, visual and laboratory examinations are combined:

- **Otomicroscopy / Endoscopy:** Magnified viewing of the external auditory canal clearly shows fungal mycelia, redness and swelling of the skin, as well as changes in the tympanic membrane.
- **Laboratory diagnostics (Mycological examination):**
 - **Microscopy:** Treating the discharge with 10-20% KOH (potassium hydroxide) solution and identifying fungal spores and mycelia under a microscope.
 - **Culture plating:** Determining the type of pathogen and its sensitivity to antimycotic drugs by plating it on a nutrient medium (e.g., Sabouraud agar).

6. Treatment and Prevention

Modern treatment tactics include the following stages:

Stage	Modern treatment approach
Sanation (Cleaning)	Complete cleaning of the ear from fungal masses by a doctor under microscopic control using an aspirator (vacuum) or special probes.
Local antimycotics	Solutions and ointments affecting the fungus are used (Clotrimazole 1%, Otomix). The drug is applied to the cleaned ear via a turunda.
Systemic therapy	In chronic or disseminated forms, as well as in otomycosis occurring against the background of diabetes, oral antimycotics (Fluconazole, Itraconazole) are prescribed. HBO therapy for 5 – 10 sessions.
Restoration of microflora and immunity	Compensating the underlying disease (diabetes mellitus), eliminating dysbiosis, and using slightly acidic drops (Burov's solution, 2% acetic acid) to acidify the ear environment.

7. Conclusion

Otomycosis is a pathology with multifactorial etiology and complex treatment. The success of treatment depends not only on the correctly chosen antimycotic drug but also on regular and professional endoscopic cleaning of the ear, timely elimination of complications such as tinnitus, and strict control of the patient's concomitant diseases (especially endocrine pathologies).

References

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