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Fungi that Cause Swimmers Ear Infections

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Annotation: Swimer's ear are Common problems in swimmers and people engaged in agua activites. Commonly are brought on by Aspergillus and Candida species; yeasts are also contributing factors. This comperhensive review has the aim to How do you get a fungal ear infection, The effect of fungi on swimmer's e ear, symptoms and Complications of swimmers ear.

Keywords: Swimer's ear, Aspergillus spp, Candida spp, fungal ear, Otomycosis.

Introduction

Since many people swim and dive, swimming and other water sports are vital. Sometimes people can get direct water exposure without any protection for their ears. The tympanic membrane and external ear canal may readily become infected and send pressure into the middle and inner ears as shown in figure(1)(Khan and Jain 2019;Chander 2009)

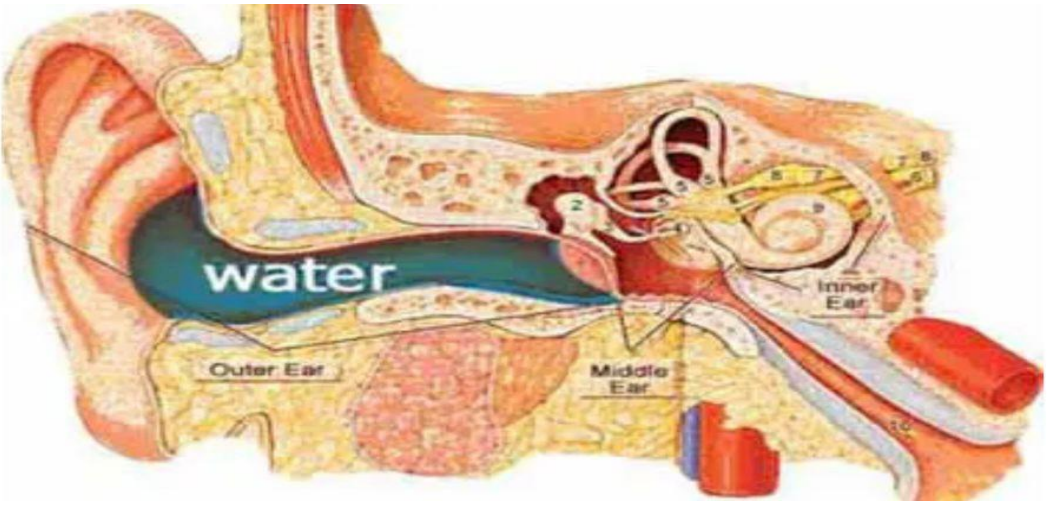
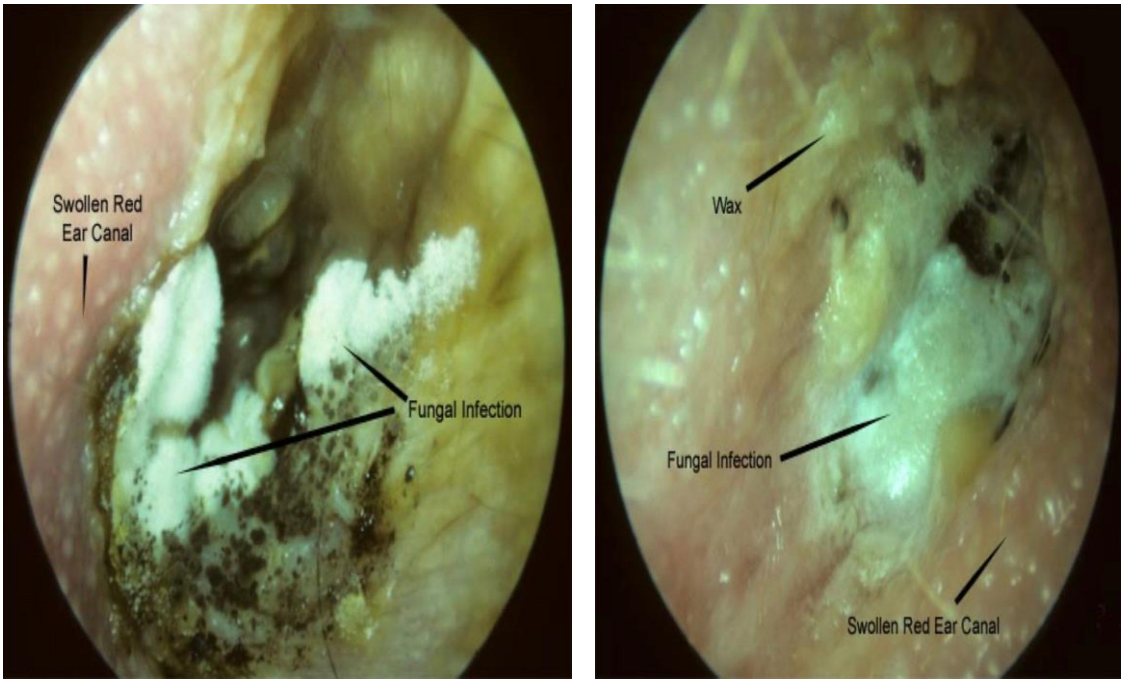


Figure (1) water entering the ear

a superficial, subacute, or chronic fungal infection of the external auditory canal, with consequences affecting the middle ear and inner ear, is called otomycosis (Khan and Jain 2019) Aspergillus niger Complex and Candida albicans are two examples of Aspergillus molds and yeasts from the Candida genus., are the most frequent causes of otomycosis (Tasic - Otasevic et al 2020) Apart from Candida albicans, it has been determined that Candida parapsilosis is also a common cause of otomycosis, especially in Europe (Degerli et al 2012) Within the Aspergillus niger complex, 28 distinct species of black mold have been identified by recent molecular technologies and studies as shown in figure(2). A. niger is the second most common cause of otomycosis, behind A. tubingensis. It has also been suggested that the uncommon species A. awamori, A. welwitschiae, and A. foetiduse are the source of this infection (Kamali et al 2022) In contrast to A. terreus, Additionally, species belonging to the A. Flavus group are often isolated. Less frequently, A. fumigatus, A. luchuensis and A. versicolor are the offenders. (Bojanovic et al 2023) There have also occasionally been reports of otomycosis brought on by yeasts belonging to the genera Geotrichum Candidum and Cryptococcus Rhodotorulla spp (Ali et al 2018) .



Figure(2) shows the presence of Candida and Asparagus in the ear canal(Cummings et al,.2020)

How do you get a fungal ear infection

External ear canals are warm, dark, and moisture-prone, making them ideal for fungi growth. They can be easily traumatized due to the thin skin layer. Cerumen or ear wax protects the canals by creating an acidic coating, but too little can predispose the canal to infection, while too much can block the canal (Makhdoumi et al 2021) Swimmer's ear is a common issue in summertime when swimming is prevalent, as it is caused by excessive moisture exposure, causing the ear's pH to rise and removing earwax. This leads to irritated canals, skin breakdown, and keratin debris absorption, creating an ideal environment for fungi growth (Rezaei et al 2022) If not properly treated, the water in leisure facilities and public swimming pools may cause biological contamination, disease transmission, and outbreaks. (Murphy et al 2017) Chorinated pool water can cause an infection by breaking down the ear's natural defenses, such as chlorine, sand, and salt, leaving the skin inside the ear without a protective barrier, allowing fungi to grow inside (Couto et al 2021).

Of fungi on The effect swimmer's ears

Fungi entering the ear are typically Early on, benign and superficial infections are frequently asymptomatic. However, because the right conditions can foster the growth of fungi, the infection

can occasionally become recurring. In approximately 10% of cases, the infection can spread (Roohi et al 2023) Otitis media patients may develop Fungal Colonization of the external anditory Canal due to prolonged discharge and maceration of the epithelium. Fungi employ discharged mucus excretion as a feeding supply, leading to chronic inflammation in the middle ear similar to upper respiratory tract flutter. increased mucus production, restriction of mucociliary clearance, goblet cell metaplasia, and chronic mucosal inflammation , and fibrosis are characteristics of this infection. This results in tympanic membrane perforation and disrupted fluid flow from the auditory tube to the middle ear cavity (Hag and Deshmukh 2022) Severe infections may cause damage to the parotid gland and other soft tissues nearby. They also sporadically impact the mastoid bone, temporomandibular joint, and base of the skull, perhaps affecting the facial, glossopharyngeal, vagus, accessory, or hypoglossal cranial nerves. (Vennewald and Klemm, 2010;Bojanovi et al 2023) The most severe cases of otomycosis, which include the entire temporal bone or the middle ear's tympanic membrane, are mainly associated with immunodeficiency disorders. (Viswanatha and Naseeruddin, 2011) Aspergillus infection typically doesn't cause bone invasion or tissue damage, Although the early stages of a Candida infection are characterized by exudation, later on, granulomatous inflammation takes center stage. (Wu et al 2021) Furthermore, it was discovered that the Aspergillus genus produced aflatoxins. These fungi can serve as mutagenic and carcinogenic agents in infected tissues and employ the aflatoxins as virulent factors, particularly in immunocompromised individuals (Sarhan 2020)

What are the symptoms of afungal ear infection

You might have a fungal infection in one or both ears. Individual differences exist in the symptoms of fungal ear infections, however they might include severe itching, Earach Burning or pain The skin around your ear canal is flaky. Discoloration of your ear canal or outer ear (red, yellow, purple, or gray). inflammatory response Headaches with Tinnitus (ear ringing) Discharge that is gray, white, black, green, or yellow an impression of ear fullness. loss of hearing Some patients have severe ear ache, dizziness, and fever. Your ear canal may have fuzzy white patches and yellow or black spots when a fungal ear infection is brought on by Aspergillus. If Candida is the cause, you can see a thick, creamy white discharge coming out of your ear (Anwar and Gohar 2014;Debta et al 2020) .

Will swimmer's ear clear up on its own?

No, it won't. An infection in your ear canal known as swimmer's ear is incurable and requires medical attention. If left untreated, an infection in the swimmer's ear can progress to the brain, cranial nerves, or base of the skull.

Aar Fungal ear infections contagious?

No, a fungal ear infection cannot be transferred to another individual. But while swimming in contaminated water, These illnesses are caused by a fungus that can spread from person to person. (Sarmadian et al 2020)

What are the complications of swimmer's ear?

Untreated swimmer's ear can lead to other issues like: Hearing loss due to an irritated and enlarged ear canal. Typically, hearing improves as the illness goes away .Recurrent infections in the ears damage to the bones and cartilage infection that spreads to surrounding tissue, the brain, the skull, or the cranial nerves, which originate in the brain itself (Medina-Blasini and Sharman,2023)

To avoid Fungi in swimmers you must do the following

1. Put on some earplugs. You have a far lower chance of experiencing an issue if you can keep water out of your ear canal. Select earplugs made specifically for swimming. Also helpful is a breathing cap that covers your ears.
2. After being in water, make sure your ears are completely dry. - Use a gentle cloth or towel to clean your outer ear. To aid in the drainage of water from your ear canal, tilt your head to the side. If you use a hair dryer on the lowest setting and hold it at least a foot (about 30 cm) away from the ear, you may use it to dry your ears.

3. Refrain from swimming in contaminated or unclean water.
4. If you are certain that you do not have an injured eardrum, you can use the Vosol Eardrops that are offered. after bathing to dry the Canal, from the drugstore
5. Keep irritants away from your ears. Put squeezable objects in your ears. During the application of hair dyes and sprays
6. Refrain from inserting foreign things in your ears as they may cause skin injuries.
7. Using earplugs or a swimming cap to keep your ears dry is crucial if you've had an ear infection. The water-proof coating in your ear canal is damaged after an infection, and it may take a month for it to heal. This increases the likelihood that you may become infected again quickly (Cheraghsahar et al 2017;Kamali et al 2019)

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