

Diffuse acute otitis externa

Ostre rozlane zapalenie ucha zewnętrznego

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ABSTRACT: Otitis externa acuta diffusa (OEAD) is one of the most frequent cases recorded in the otorhinolaryngological emergency room. The main symptoms include: acute otalgia, feeling of ear fullness, itching, hearing impairment, sometimes fever. Otoscopy is the basic part of diagnosis. First-line treatment involves topical antibiotic eardrops with or without a steroid. Clinicians should prescribe a non-ototoxic preparation when the patient has a known or suspected perforation of the tympanic membrane. Systemic antibiotics should not be prescribed in the first stage of therapy unless the patient is at risk of a severe course of disease.

KEYWORDS: acute otitis externa, diagnostic recommendations, therapeutic recommendations

STRESZCZENIE: Ostre rozlane zapalenie ucha zewnętrznego (OEAD; *otitis externa acuta diffusa*) to jedna z częstszych przyczyn zgłaszania się pacjentów na ostry dyżur otorynologiczny. Głównymi dolegliwościami, o których informują chorzy, są: nagły ostry ból, uczucie pełności w uchu, często świąd, upośledzenie słuchu, czasami gorączka. Podstawą rozpoznania jest badanie otoskopowe. Leczenie pierwszego rzutu polega na podawaniu miejscowo kropli zawierających antybiotyk ze steroidem (np. cyprofloksacyna z fluocynolonem) lub bez (np. cyprofloksacyna). Jeżeli nie ma możliwości oceny ciągłości błony bębenkowej, należy unikać stosowania preparatów o potencjale ototoksycznym. Antybiotyki o działaniu systemowym nie powinny być przepisywane w pierwszej fazie leczenia zapalenia ucha zewnętrznego – chyba, że pacjent jest w grupie ryzyka wystąpienia zapalenia ucha zewnętrznego o ciężkim przebiegu.

SŁOWA KLUCZOWE: ostre zapalenie ucha zewnętrznego, zalecenia diagnostyczne, zalecenia terapeutyczne

ABBREVIATIONS

CT – computed tomography

HRCT – High Resolution Computed Tomography

OEAT – otitis externa acuta diffusa

VZV – varicella zoster viru

INTRODUCTION

Otitis externa is an inflammatory process which involves the skin and subcutaneous tissue of the external auditory meatus, sometimes the ear auricle and the eardrum [1, 2]. It is one of the most frequent causes of patients reporting to the ENT Emergency Department [1, 3]. The condition occurs mainly in summer, humid months, when there is increased frequency of using bodies of water [1, 3].

The most common form that the paper will discuss in greater detail is acute diffuse external otitis (OEAD, or otitis externa acuta diffusa). Other rarer forms are: furunculosis of the external auditory canal, chronic inflammation, malignant external otitis, cholesteatoma of the auditory canal and keratosis obturans. OEAD is most often manifested on the basis of bacterial infection, and the main responsible etiological factors are *P. aeruginosa* and

S. aureus which account for 90% of all inflammation cases [2, 4, 5]. Inflammation is frequently invoked by several microorganisms simultaneously [1].

Fungal otitis externa is not common in our latitude but we can observe an increasing percentage of such cases due to civilization diseases. It is more widespread in patients with diabetes and immunodeficiency (patients with HIV, after chemo- and radiation therapy). Prolonged use of topical antibiotics may contribute to the onset of fungal otitis. It is most often caused by fungi of the genus *Aspergillus* (60–90% cases) and *Candida* (10–40% cases) [1, 2, 4].

Infections of viral background include, among others chickenpox and shingles (VZV) [1].

SYMPTOMS

The main symptoms reported by patients are: sudden severe pain, feeling of fullness in the ear, frequent itching, hearing impairment, sometimes fever [3]. Usually acute otitis externa progresses in an isolated manner, i.e. it is limited to one side, while bilateral cases are rarer [2]. At times it coexists with inflammation of the middle ear. In such case, the patient may also report other symptoms, such as

Tab. I. Differentiation of acute diffuse otitis externa.

	BACTERIAL INFLAMMATION	VIRAL INFLAMMATION (OTIC ZOSTER)	FUNGAL INFLAMMATION	FURUNCULOSIS	CHOLESTEATOMATOUS INFLAMMATION	ACUTE EXTERNAL OTITIS	KERATOSIS OBTURANS
Risk factors	<ul style="list-style-type: none"> – microtrauma. – water entering the ear (water baths without drying the external auditory canal). – narrow twisted ear canal. 	<ul style="list-style-type: none"> – reactivation of the VZV virus. – immunodeficiencies: leukemia, chemotherapy, AIDS, bone marrow transplantation. 	<ul style="list-style-type: none"> – humid environment. – trauma. – atopic dermatitis. – seborrheic dermatitis. – ear canal exostoses. – conditions after ear surgery. – chronic purulent otitis media. 	<ul style="list-style-type: none"> – mechanical microtrauma. – immune disorders: immunosuppression, AIDS, food deficiencies. – diabetes. 	<ul style="list-style-type: none"> – multifactorial etiopathogenesis. 	<ul style="list-style-type: none"> – immune disorders: AIDS, immunosuppression, leukemia. – diabetes. – old age. – radiation-induced tissue trauma. 	<ul style="list-style-type: none"> – accumulation of exfoliated keratinized squamous epithelium in the bony part of the external auditory canal.
Symptoms	<ul style="list-style-type: none"> – intense pain, achiness upon pressure on tragus. – sometimes swollen neck lymph nodes on the infection side. – fever. – rarely trismus. 	<ul style="list-style-type: none"> – burning pain. – vesicular rash involving the external auditory canal and posterior surface of the auricle. – sometimes peripheral nerve palsy (nerve VII), imbalance and impaired hearing / after Ramsey Hunt. 	<ul style="list-style-type: none"> – moderately intensified pain, severe pruritus. – thick discharge, which may have different colors: black, bluish green, yellow or white. 	<ul style="list-style-type: none"> – severe increasing pain. 	<ul style="list-style-type: none"> – usually painless progress. – periodically pain. – ear discharge. – conductive hearing loss. 	<ul style="list-style-type: none"> – ear pain radiating to the temple and temporomandibular joint. – purulent discharge. – feeling of fullness in the ear. – hearing impediments. – sometimes paralysis of nerve VII, and even IX, X, XI, XII. 	<ul style="list-style-type: none"> – distending ear pain. – hearing loss.
Diagnostics	<ul style="list-style-type: none"> – otoscopic examination: edema, redness and narrowing of the external auditory canal. 	<ul style="list-style-type: none"> – otoscopic examination: vesicular rash in the external auditory canal. – hearing test: sensorineural unilateral hearing disability. – balance organ assessment. 	<ul style="list-style-type: none"> – otoscopic examination: mycelium with white hyphae is characteristic for the genus <i>Candida</i>; for the genus <i>Aspergillus</i> Niger, the typical picture are hyphae and spores on the surface of a white thick discharge; "wet newspaper appearance". – mycological examination. 	<ul style="list-style-type: none"> – most common localization in one-third of the anterior external auditory canal. 	<ul style="list-style-type: none"> – otoscopic examination: most often altered image of the tympanic membrane with granulation tissue, perforation, adhesion. – pure-tone audiometry. – CT scan of the temporal bones (HRCT). 	<ul style="list-style-type: none"> – otoscopic examination: gray or brown difficult to remove hard epidermal plug causing narrowing of the ear canal can be found in the bony part of the ear canal. – laboratory tests: increase of inflammatory markers. 	<ul style="list-style-type: none"> – otoscopic examination: gray or brown difficult to remove hard epidermal plug causing narrowing of the ear canal can be found in the bony part of the ear canal.
Treatment	<ul style="list-style-type: none"> – cleaning of the external auditory canal. – an antibiotic with or without a steroid, e.g. drops containing ciprofloxacin (highly effective in the treatment of otitis of <i>P. aeruginosa</i> etiology). – low pH antiseptic preparations. 	<ul style="list-style-type: none"> – systemic steroids. – antiviral drugs (acyclovir, valaciclovir, famciclovir, ganciclovir). – analgesics (without salicylates). 	<ul style="list-style-type: none"> – topical preparations with antifungal agents, e.g. clotrimazole, miconazole, often in combination with acetic acid, boric acid, aluminum acetate, hydrochloric acid, sodium hydroxide, silver nitrate, endogenous antiseptic N-chlorotaurine and steroids. 	<ul style="list-style-type: none"> – warming preparations. – incision and drainage in the cover of oral antibiotic therapy. 	<ul style="list-style-type: none"> – surgery. 	<ul style="list-style-type: none"> – mechanical cleaning of the external auditory canal. – setons with 5% boric acid solution. – i.v. 3rd and 4th generation cephalosporins in combination with gentamicin. – carbencillin, ticarcillin, ureidopenicillin (high resistance among bacteria). – carbapenems. 	<ul style="list-style-type: none"> – local removal of keratin deposits. – topical antibiotics, steroids, salicylic alcohol. – some cases require plastic surgery of the ear canal with skin grafting.



Fig. 1. Acute allergic otitis externa.

runny nose, and the gathered medical history of the patient most often points to a recent infection of the upper respiratory tract.

Diagnostics of otitis externa is mainly based on: short characteristic medical checkup, otoscopic examination, tuning fork tests and tympanometry as an auxiliary means [3, 4]. Tuning fork tests suggest conductive hearing loss. Otoscopic examination reveals significant swelling and redness of the ear canal, auricle and eardrum, which is often invisible in the first days of infection. Furthermore, we can point to: nodal reaction on the inflammation side, aching upon pressure on tragus, sometimes discharge from the ear and fever [2, 3, 4]. Otorrhea may be caused by acute otitis media progressing with the perforation of eardrum and can be the cause of secondary invasion of the skin of the external auditory canal [1].

The following factors are conducive to the occurrence of otitis externa:

- residual earwax;
- localized trauma;
- disruption of the epidermal barrier, e.g. through the use of cotton buds, incompetent self ear rinsing, microtrauma to the skin of the ear canal among patients using hearing aids;
- contact allergy to hearing aid foam ear pads;
- anatomic conditions, i.e. narrow, twisted auditory canal;
- some dermatological conditions: seborrheic dermatitis, contact eczema, psoriasis, atopic dermatitis [6, 5].

The risk group for frequent prevalence of otitis externa includes patients with chronic otitis media with a ruptured eardrum as well as patients with drainage of the tympanic cavity.

Particular attention should be paid to patients at risk of more severe ear infections, such as those affected by diabetes, HIV, non-immunocompetent, after radiotherapy, chemotherapy, since they may develop a special form of inflammation known as malignant otitis externa [1, 7, 8].

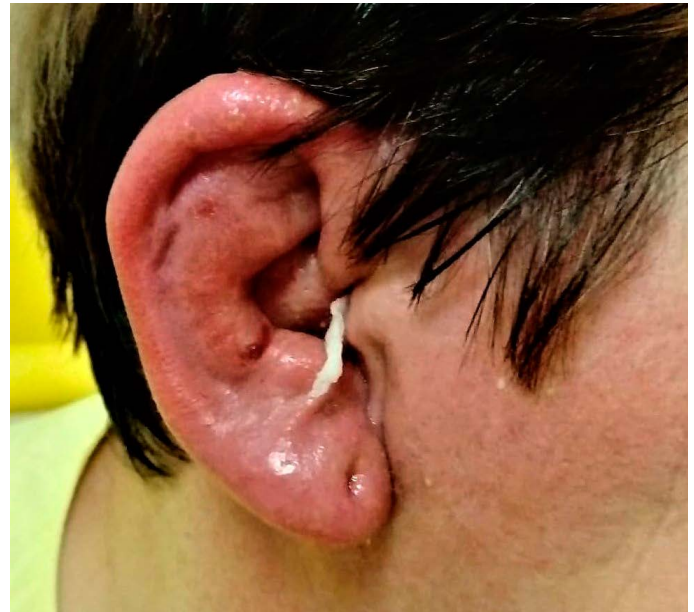


Fig. 2. Diffuse acute otitis externa (a seton soaked with antibiotic and steroid has been placed to the external auditory meatus).

DIFFERENTIAL DIAGNOSIS

When entering treatment, symptoms characteristic for such inflammation should be considered. Differential diagnosis of otitis externa acuta diffusa includes: viral and fungal inflammation, furunculosis, cholecystitis, malignant external otitis, keratosis obturans, and even osteoarthritis of the temporomandibular joint and other rare causes of earache.

THERAPEUTIC RECOMMENDATIONS

Before starting treatment, it is advisable to collect a swab from the ear canal and determine the susceptibility of the cultured microorganisms.

First-line treatment of uncomplicated diffuse otitis externa consists of: administration of topical antibiotic drops with or without a steroid, application of low-pH antiseptic preparations (e.g. acetic acid), and the use of oral anti-inflammatory and analgesic drugs [4, 9]. The great advantage of using topical antibacterial drugs is that they achieve a higher therapeutic concentration at the site of infection than when administered orally, but also to a lesser extent lead to drug resistance. Antibiotics used in local therapy comprise preparations from the groups of aminoglycosides (gentamicin, neomycin), polypeptides (gramicidin, polymyxin B) or fluoroquinolones (ciprofloxacin). Drops which contain ciprofloxacin are not ototoxic. They have been registered for use among patients with a ruptured eardrum; they are also highly effective in the treatment of *P. aeruginosa* [4, 10] ear infections. Aminoglycosides and alcohol-based drops should not be administered in patients with tympanic membrane perforation due to their ototoxic potential. Furthermore, some people have been found to develop allergic reactions invoked by drops with neomycin. Steroid drugs (hydrocortisone, dexamethasone) applied topically reduce swelling and have anti-inflammatory properties, thus relieving pain. The use of combined preparations, i.e. containing an antibiotic and steroid, appears to be the optimal solution due to their properties [2, 10].

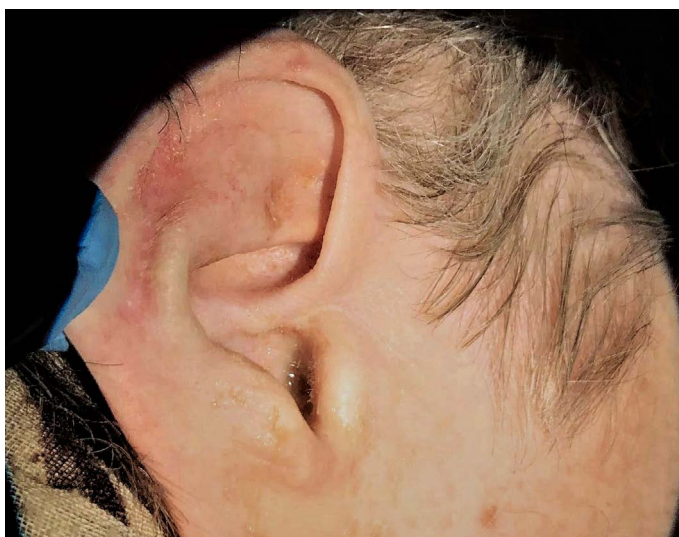


Fig. 3. Seropurulent outflow from the ear in chronic inflammation of the middle ear with the ear drum perforation.

The recommended treatment time is at least 7 days to 2 weeks. Clinical improvement should occur as early as 48–72 hours after the onset of therapy. The physician should inform the patient about the correct method of application – after each instillation, the patient should remain in the supine position for 3–5 minutes with the treated ear pointing upward. It is necessary to protect the ear against water [4] during the entire treatment period.

Complications of topical treatment are rare. Ear drops are safe and well-tolerated by patients. The most commonly reported adverse reactions are an itch inside the ear, less often rash or contact allergic reactions, rarely dizziness, hearing impairment, and superinfection of the ear canal.

Systemic antibiotics should not be prescribed in the first phase of treatment of otitis externa unless the patient is at risk of severe otitis externa, manifests intensified general symptoms or it is suspected that the inflammatory process is not limited to only the outer ear [1, 4, 11]. Diagnosis of medial otitis coexisting with external otitis more often requires treatment with oral antibiotics. Limited indications for the use of oral antibiotics result from

the increasing phenomenon of antibiotic resistance and the risk of side effects (such as: vomiting, diarrhea, allergic reactions). Moreover, the most commonly used groups of oral antibiotics are not effective against *P. aeruginosa* – a pathogen responsible for most cases of external otitis. When the swab result confirms infection with *P. aeruginosa* and it is recommended to administer a systemic antibiotic, ciprofloxacin is the drug of choice. Upon confirmation of infection with *S. aureus*, it is recommended to use trimethoprim/sulfamethoxazole.

Fungal otitis externa is treated by cleansing the ear canal of secretions and using topical antifungals (such as with clotrimazole, miconazole) and/or with: acetic acid, boric acid, aluminum acetate, hydrochloric acid and sodium hydroxide, silver nitrate, endogenous antiseptic N-chlorotaurine and steroids [1]. Topical antibiotics are contraindicated as they can lead to progression of disease and mycelium overgrowth.

It is recommended to undertake prophylactic measures in patients predisposed to inflammation of the outer ear, such as avoiding injuries to the auditory canal, the use of emollients, antipruritic preparations and topical steroids. Particular attention should be paid to ear hygiene, i.e. drying the ears and avoiding wet secretions, clearing from earwax and using acidifying drops before swimming [1].

CONCLUSION

Acute diffuse otitis externa is a disease entity that often inclines patients to report to the ENT due to severe pain. Proper diagnosis is possible after otoscopic examination. As a rule, local treatment with ear drops and the use of anti-inflammatory and analgesic drugs is sufficient. Patients notice health improvement quite quickly after starting treatment. It is vital that special attention be paid to patients with concomitant diseases that increase the risk of acute otitis externa. Attempts should be made each time to exclude the presence of ruptured eardrum and when this is not possible due to significant swelling of the external auditory canal, preparations with potential ototoxicity should be avoided.

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