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ПРИЧИНЫ И ТЕЧЕНИЕ ЗАБОЛЕВАНИЯ ОСТРОГО СРЕДНЕГО ОТИТА У БОЛЬНЫХ

Абстракт: *Данная статья представляет собой обзорные данные о характеристиках, клинических проявлениях и осложнениях острого среднего отита. Описывается последовательность изменений в отделяемом из уха, включая его серозно-кровянистый, слизисто-гнойный и гнойный характер. Освещается длительность и характер гнойного выделения, процесс заживления перфорации барабанной перепонки, а также возможные осложнения, включая внутричерепные процессы. Этот обзор предоставляет важную информацию для понимания клинических аспектов острого среднего отита и его осложнений, что может быть полезно для практикующих врачей и специалистов в области оториноларингологии.*

Ключевые слова: *острый отит, средний отит, среднее ухо, барабанная перепонка, заболевания.*

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CAUSES AND COURSE OF ACUTE OTITIS MEDIA IN PATIENTS

Abstract: *This article provides a review of the characteristics, clinical manifestations and complications of acute otitis media. The sequence of changes in the discharge from the ear is described, including its serous-bloody, mucopurulent and purulent character. The duration and nature of purulent discharge, the healing process of perforation of the eardrum, as well as possible complications, including intracranial processes, are covered. This review provides important information for understanding the clinical aspects of acute otitis media and its complications, which may be useful for practicing physicians and specialists in the field of otorhinolaryngology.*

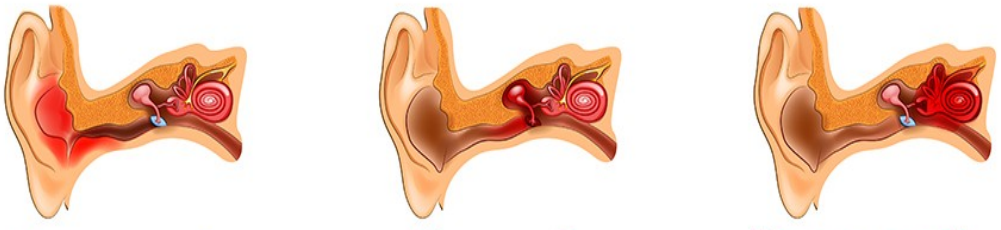
Key words: *Acute otitis media, otitis media, middle ear, eardrum, diseases.*

Acute otitis media (otitis media acuta) occurs quite often among the population; in some cases, its course is relatively mild, in others it is severe and protracted, with a transition to a chronic form. Acute otitis media can go through all stages of development from the onset of inflammation of the mucous membrane to perforation of the eardrum, suppuration and recovery, but in many cases, recovery is possible at any stage of the disease. It can proceed relatively easily,

without a noticeable general reaction of the body, which is facilitated by timely treatment, or it can take a severe course with sharp reactive phenomena from the whole organism (Fig. 1).

The occurrence of acute inflammation of the middle ear in children is facilitated by the anatomical and physiological features of the structure of the middle ear (the presence of myxoid tissue in young children; the auditory tube is short and wide, located horizontally; pneumatization of the temporal bone is not complete) and the state of immune defense in children (low levels of secretory IgA reaching adult levels by the age of 12; frequent respiratory infections, etc.). In addition, most of the time the infant is in a horizontal position; children in the first years of life do not have the skills to independently toilet the nasal cavity.

The direct cause of acute otitis media is an infection that has penetrated into the tympanic cavity (streptococcus, staphylococcus, pneumococcus, less often other microbes, often mixed flora) against the background of reduced local and general reactivity of the body, most often after local or general cooling, the so-called cold. Often this disease develops secondarily as a complication or manifestation of a general infection, in particular infectious lesions of the upper respiratory tract, influenza, and in children, scarlet fever, measles, diphtheria, etc. Acute inflammation of the middle ear can be a consequence of acute and chronic inflammation of the pharynx and nose. Hypertrophic processes in the nasal cavity and nasopharynx can play a significant role in the etiology of the disease; the main pathological mechanisms in this case are mechanical compression of the pharyngeal mouth of the auditory tube and disruption of its ventilation and drainage functions.



A B C

Fig. 1: Localization of otitis media.[1]

A - Otitis externa
B - Otitis media
C - Internal otitis

Usually, the auditory tube is also involved in the inflammatory process to one degree or another. Less commonly, the infection enters the middle ear through

[1] https://verficlinic.ru/blog/lechenie-otita-u-vzroslykh-i-detej/

a damaged eardrum due to injury or through a wound to the mastoid process. The third route of infection into the middle ear, hematogenous, is relatively rare; it is possible with infectious diseases such as scarlet fever, measles, typhoid, tuberculosis, etc.

The incidence rate of acute otitis media is determined by the age of the patients. It reaches the highest values (up to 61%) in the group of children aged 1 to 4 years. By age 7, 95% of children have experienced at least one episode of acute otitis media.

Pathogens identified in acute otitis media

Pathogen	Frequency, %
Streptococcus pneumoniae	40–50
Haemophilus influenzae	30–40
Moraxella catarrhalis	10–15
Viruses	less than 10

Pathogenesis. Acute otitis media exists in three main types: catarrhal, exudative and purulent otitis media.

Catarrhal and exudative forms occur without perforation of the eardrum; inflammatory exudate accumulates in the tympanic cavity and is evacuated through the auditory tube into the nasopharynx.

Purulent form. Partial melting of the membrane (perforation) occurs, and leakage from the ear is a characteristic sign of purulent otitis media.

Regardless of the form, during the disease process, hyperemia of the mucous membrane of the middle ear occurs, cellular infiltration of the membrane, exudate is released, initially serous, hemorrhagic and then purulent. With an increase in the amount of exudate, the pressure in the tympanic cavity increases, which greatly irritates the nervous apparatus of the middle ear and leads, in addition to severe pain, to the appearance of disorders of the gastrointestinal tract and urinary system (constipation, diarrhea, enuresis), and severe dyspeptic symptoms may occur in children. With the formation of perforation and suppuration, the pressure in the tympanic cavity drops, and general somatic manifestations subside.

The stages of acute inflammatory process of the middle ear are reflected in the classification of V.T. Palchuna et al., who identified five stages of the disease: acute eustachitis, catarrhal inflammation, pre- and post-perforation stages of purulent inflammation and the reparative stage. The course of acute otitis media can be mild, moderate or severe.

According to the duration of the disease there are:

- prolonged acute otitis media (presence of symptoms of inflammation of the middle ear for 3-12 months after one or two courses of antibiotic therapy);

- recurrent acute otitis media (the presence of three or more separate

episodes of acute otitis media within 6 months or 4 or more episodes over a period of 12 months);

- chronic purulent otitis media (chronic infection of the middle ear and perforated eardrum, accompanied by otorrhea for more than 2 weeks/long-term purulent inflammation of the middle ear, characterized by persistent perforation for more than 3 months, periodic or constant discharge from the ear and gradual progressive hearing loss).

Clinical picture. Symptoms and clinical course of acute otitis media can be expressed to varying degrees depending on the severity of the disease. There are local and general symptoms. Along with mild forms of otitis, there are also severe ones, which become complicated already in the first days of the disease. With the usual favorable course of acute otitis media, recovery most often occurs with complete restoration of auditory function. Under unfavorable conditions, the process in the ear can take on a protracted, sluggish character and become chronic.

In the typical course of acute purulent otitis media, three periods are distinguished.

The first period is characterized by the emergence and development of the inflammatory process in the middle ear. In this case, infiltration of the mucous membrane occurs, exudate is formed, local symptoms develop: pain in the ear, hyperemia of the eardrum, protrusion of its exudate, decreased hearing and general symptoms in the form of increased body temperature, poor appetite and sleep, weakness, poor health, moderate leukocytosis, mild increase in ESR.

The second period is perforation of the eardrum and suppuration. At the same time, rapid subsidence of pain and improvement in the course of the disease are observed.

The third period is the gradual cessation of the inflammatory process, the disappearance of suppuration, healing (or formation) of the perforation of the eardrum, normalization of the anatomical and functional state of the middle ear. The duration of each period ranges from several days to 2 weeks.

In the first period (or stage), during otoscopy, the injection of blood vessels is first visible along the handle of the malleus and along the radii from it, then the eardrum looks hyperemic, the identifying marks are quite distinguishable. Due to inflammation and compression (exudation, swelling) of the painful endings of the mucous membrane (tympanic branch of the glossopharyngeal nerve, III branch of the trigeminal nerve) of the tympanic cavity, a pain symptom is formed at this stage of inflammation. Ear pain is usually severe, gradually increasing; sometimes it becomes painful, unbearable, which deprives the patient of peace. Usually, the pain is felt in the depths of the ear; in nature it can be pulsating, aching, tearing, stabbing, shooting. Often the pain radiates to the teeth, temple, back of the head or

throughout the head. The pain intensifies when sneezing, blowing your nose, coughing, or swallowing, since this further increases the pressure in the tympanic cavity. In the first period of the disease, ear pain is usually the leading symptom. Body temperature rises to 38-38.5°C. The pulse quickens. Both excessive tachycardia and a particularly significant slowdown in the pulse should alert the doctor to possible complications (increase in sepsis, meningitis, slowdown in brain abscess). After the appearance of pus from the ear, the temperature decreases. If, with sufficient outflow, the temperature still remains high or remains low-grade for a long time, you need to look for the cause in some complication both in the ear area (mastoiditis, sinus thrombosis, etc.) and in other organs.

Hearing loss is one of the leading signs of acute otitis media and is usually so pronounced that the patient pays attention to it. Hearing loss depends mainly on the stiffness of the eardrum and the chain of auditory ossicles and has the character of a violation of sound conduction. In most cases, hearing loss reaches a significant degree: whispered speech is not perceived at all, spoken speech is heard only at the auricle. At the same time, due to the pressure of purulent exudate on the windows of the labyrinth and the penetration of toxins through the inflamed membranes of the window of the cochlea and the annular ligament of the window of the vestibule, hearing loss occurs due to damage to the sound-receiving apparatus. After the cessation of intoxication of the inner ear, as a rule, sound perception in the speech frequency range is completely restored. Perforation of the eardrum and purulence from the ear (otorrhea) characterize the second period (stage) of acute otitis media (Fig. 2).

The formation of perforation is due to the fact that as the amount of exudate in the tympanic cavity increases, its pressure increases. This leads to softening, thinning of the eardrum and perforation. Perforation is most often localized in the posterior quadrants. Perforation of the eardrum dramatically changes the course of acute otitis media; from this moment the second period of the disease begins. The pain in the ear decreases and completely disappears, the body temperature quickly normalizes, the pain when pressing on the mastoid process decreases, and the general condition improves. The third period (stage) of the disease, recovery, begins.

Perforation of the eardrum after a breakthrough of pus can be slit-like, but it is often round in shape with a tissue defect. The contours of the perforation may not be visible, but the so-called pulsating light reflex can often be seen at the location of the perforation. Its presence indicates that pus comes from the tympanic cavity through a hole in the eardrum. Fluctuations of a drop of liquid in the area of perforation of the eardrum are explained by the thickening and blood-filling of the mucous membrane of the tympanic cavity, the volume of which fluctuates

synchronously with the pulse. A pulsating light reflex appears due to the reflection of reflector rays falling on drops of discharge.

Immediately after the eardrum is perforated, the discharge from the ear in most cases is serous-bloody in nature, and then becomes mucopurulent and purulent. The proliferation of granulations in the middle ear and bloody extravasates in the form of bubbles during influenza otitis media can become a source of blood, which is sometimes mixed with pus. In acute otitis media, the pus is usually odorless unless there is external otitis media. Suppuration from the ear usually lasts 4-7 days. At first it is abundant, then noticeably decreases, the pus acquires a thicker consistency. Along with the gradual cessation of discharge, hyperemia and infiltration of the eardrum disappear, its usual shine appears, identification contours become distinguishable, and hearing gradually improves.

A small and especially slit-like perforation closes quite quickly through regeneration, leaving a thin, inconspicuous scar, sometimes with the deposition of calcareous petrification salts in it. Round-shaped perforations with a defect in the membrane tissue tend not to close, their edges become calloused, after which they become persistent. Sometimes, although rarely, even before perforation, the infection can quickly spread from the middle ear into the cranial cavity and lead to severe intracranial complications and even death.

In some cases, despite the perforation of the eardrum, the temperature rises and the patient's general condition does not improve. This course of the process is usually associated with the development of inflammation in the mastoid process. Suppuration that does not stop for a long time (3-4 weeks), especially when, after cleaning the ear, pus fills the ear canal again, indicates empyema of the mastoid process, which usually causes melting of its bony partitions (mastoiditis). The inflammatory process in the middle ear should be considered chronic if it lasts more than 6 weeks. In some cases, acute purulent otitis media from the very beginning acquires features of a chronic course, for example, tuberculous otitis media.

A B

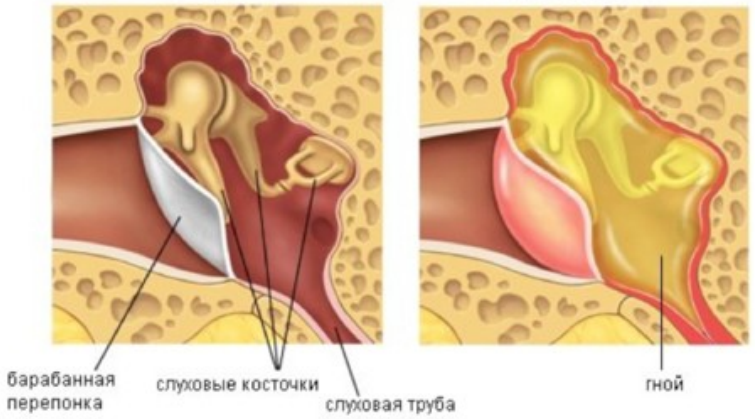


Fig. 2: Perforation of the eardrum and formation of pus.[2]

A – normal

B - abnormal

Otoscopic signs of the stages of acute otitis media

Stage	Otoscopy data
Stage of acute eustachitis	Retraction of the tympanic membrane, shortening of the cones of light
Stage of acute catarrhal inflammation	The eardrum is hyperemic and thickened, identification marks are difficult to determine or cannot be determined
Stage of acute purulent inflammation	Severe hyperemia of the tympanic membrane, identifying marks are not visible, there is a bulging of the tympanic membrane, perforation is possible
Post-perforation stage	Perforation of the eardrum, purulent discharge from it
Reparative stage	Restoration of the color and thickness of the eardrum, perforation is often closed with a scar

When treating acute inflammation of the middle ear, the patient should follow a home regime, and in case of a pronounced increase in temperature or general malaise, bed rest. In cases where there is a suspicion of the possibility of incipient complications of mastoiditis, especially intracranial ones, the patient should be immediately hospitalized. The food is easily digestible and rich in vitamins. It is necessary to monitor the activity of the gastrointestinal tract.

As a result of this study, it can be assumed that acute otitis media is a common inflammatory disease characterized by various clinical manifestations. Depending on the severity of the disease, symptoms may be expressed to varying degrees. The typical course of acute suppurative otitis media includes three periods: the initial period of inflammation, perforation of the eardrum and suppuration, as well as gradual recovery. Thus, it is important to promptly consult a doctor if you suspect acute otitis media to prescribe appropriate treatment and prevent possible complications.

[2] https://entcentre.ru/simptomy-i-zabolevaniya-lor/ostryy-sredniy-otit.html

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