Modern Approach to The Treatment of Complicated Forms of Chronic Purulent Inflammation of The Middle Ear

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ABSTRACT

Chronic purulent otitis media with complications is a serious disease that requires an integrated approach to diagnosis and treatment. The problem of timely identification and adequate treatment of people with chronic inflammation of the middle ear with complications remains relevant in the field of otolaryngology. This pathology includes various local and intracranial complications that can seriously affect the prognosis and quality of life of patients. Mortality from complications inside the cranial cavity is estimated at 20 to 50% and is practically not related to the time of surgical treatment of the inflammatory focus. The purpose of our study was to select tactics for complex diagnosis and treatment of chronic purulent otitis media with complications. We observed 114 patients with chronic suppurative otitis media (CSOM) for the period 2013-2023. Of these, 85 patients with local, 29 patients with intracranial complications. All patients underwent a general clinical examination, radiography of the mastoid process using the Schüller and Mayer methods, computed tomography of the mastoid process, magnetic resonance imaging of the brain, consultation with a neurosurgeon, neurologist, ophthalmologist and other specialists. To clarify the diagnosis and differential diagnosis, all patients with purulent meningitis underwent a spinal puncture. The patients' condition gradually improved, and clinical and biochemical parameters normalized. This was usually observed after surgical debridement of a purulent focus of the mastoid process, drainage of brain abscesses, removal of a blood clot from the sinus, and intensive drug therapy. Thanks to modern diagnostic methods and a system of comprehensive emergency surgical and intensive treatment, it was possible to improve treatment outcomes and reduce mortality in chronic purulent otitis media with complications.

Keywords: Chronic purulent otitis media, epitympanitis, mesotympanitis, mastoiditis, labyrinthitis, sinus thrombosis.

The problem of timely identification and adequate treatment of people with chronic inflammation of the middle ear with complications remains relevant in the field of otolaryngology. [1,3,5,6,10,12, 15].

According to the frequency of distribution in chronic suppurative otitis media (CSOM), mesotympanitis is about 50%, epitympanitis is about 20% and epimesotympanitis is about 30% of cases, respectively. In the case of mesotympanitis, the inflammatory process affects the mucous membrane of the middle ear. With epitympanitis, the upper parts of the attic and mastoid process are affected, which can lead to the destruction of the bone structures of the tympanic cavity, antrum, mastoid process, auditory ossicles, and cause the development of cholesteatoma and complications. [2,3,4,7,8,9,13].

Complications are divided into local (mastoiditis, atypical forms of mastoiditis, paresis and paralysis of the facial nerve,

labyrinthitis) and intracranial (purulent meningitis, abscesses of the brain and cerebellum, sinus thrombosis of the sigmoid sinus, sepsis). Mortality from complications inside the cranial cavity is estimated at 20 to 50% and is practically not related to the time of surgical treatment of the inflammatory focus, as shown by various clinical studies. [5,6,10,11,12].

In the development of chronic purulent otitis media with complications, bacteria such as streptococci, staphylococci, pneumococci, anaerobes, fungi and other opportunistic microorganisms play an important role. In most cases, analysis of the contents of the middle ear, cerebrospinal fluid and purulent focus in the cranial cavity shows the presence of mixed flora. The severity of the infection plays a significant role in the occurrence of various complications associated with the ear, but the overall reaction of the body also plays an important role in their development. [1.4, 6.11].

For a more accurate diagnosis of chronic otitis media with complications, immunological, biochemical, audiological methods and high-resolution methods, such as computed and magnetic resonance imaging of the temporal bones and skull, are used.

From the moment treatment begins, it is necessary to prescribe two or three modern antibiotics with the highest compatibility. In addition, in parallel with etiotropic therapy, pathogenetic treatment is carried out, including dehydration, detoxification and reducing the permeability of the blood-brain barrier.

The sooner surgical removal of inflammation in the middle ear is carried out in complicated forms of chronic urinary tract infection, the more successful the treatment result will be. Surgery is performed immediately after the patient is hospitalized. After the operation, intensive drug therapy is carried out. [1,5,7,10,13,15].

Despite the use of these technologies, the issues of diagnosis and treatment of various forms of complications of chronic hemorrhagic obstruction remain relevant. The presented data contributed to a more thorough study of the incidence, characteristics of clinical symptoms and approaches to the treatment of chronic inflammation of the middle ear.

PurposeOur study was the choice of tactics for complex diagnosis and treatment of chronic purulent otitis media with complications.

Materials and research methods. We observed 114 patients with chronic suppurative otitis media (CSOM) for the period 2013-2023, in the ENT department of the COMMC. Of these, 85 patients with local, 29 patients with intracranial complications.

Among the examined patients, chronic suppurative otitis media (CSOM), mesotympanitis was detected in 11 patients, epitympanitis in 84, epimesotympanitis in 19 patients. Table No. 1 shows the incidence of CHSO with complications among patients by age.

Table No. 1

	Kinds	Age			
		18 – 40 years old	40-60 years	Older 60 years	Total patients
1	Chronic purulent otitis media, mesotympanitis	3	5	3	eleven
2	Chronic purulent otitis media, epitympanitis	54	24	6	84
3	Chronic purulent otitis media, epimesotympanitis	10	6	3	19
	Total	67	35	12	114

Age characteristics of CGSO with complications (N = 114)

When analyzing the data in the table, age-related features of the occurrence of chronic hepatitis O with complications were identified. In the group of observations with otogenic complications, middle-aged patients prevailed.

Among local complications, there were 52 patients under 40 years of age, 24 patients under 60 years of age, and 9 patients aged 60 years and above. Of the local complications, mastoiditis was detected in 46 patients, atypical forms of mastoiditis in 12, facial nerve paresis in 14, labyrinthitis in 13.

Among otogenic intracranial complications, there were 15 patients under 40 years of age, 11 patients under 60 years of age, and 3 patients aged 60 years and above. Among them, otogenic purulent meningitis was detected in 8, extradural abscess in 7, brain abscess in 5, otogenic cerebellar abscess in 3, sinus thrombosis and perisinous abscess in 6 patients

Table No. 2

Types of complications	Age of patients						Total patients 114(100%)
	18 – 40 years old (N=67)		40-60 years (N=35)		Over 60 years old (N=12)		
	Husband	Women	Husband	Women	Husband	Women	
	Local complications (n=85)						
Mastoiditis	17	12	8	6	2	1	46
Atypical mastoiditis	4	3	2	1	1	1	12
Facial nerve paresis	4	3	2	2	1	2	14
Labyrinthitis	2	2	3	2	2	2	13
	Intracranial complications (n=29)						
Extradural abscess	3	2	1	1	-	-	7
perisinous abscess, sinus thrombosis	3	2	1	-	-	-	6
Meningitis	3	2	2	1	-	-	8
Brain abscess	2	1	1	1	-	-	5
Cerebellar abscess	1	1	-	1	-	-	3
Total	39	28	20	15	6	6	114

Nature of otogenic complications (N = 114)

The frequent occurrence of complicated forms of chronic suppurative otitis media in young patients indicates that there is a possibility of developing inflammation of the middle ear in early childhood.

Patients were admitted to the hospital in serious and extremely serious condition, with a high body temperature of 39-40 0C, complaints of severe pain in the affected ear, headache, dizziness, nausea, vomiting, decreased hearing and tinnitus. All patients had pronounced general and meningeal symptoms, as well as clouded consciousness.

All patients underwent a general clinical examination, radiography of the mastoid process using the Schüller and Mayer methods, computed tomography of the mastoid process, magnetic resonance imaging of the brain, consultation with a neurosurgeon, neurologist, ophthalmologist and other specialists. To clarify the diagnosis and differential diagnosis, all patients with purulent meningitis underwent a spinal puncture. Spinal cord fluid pressure in patients with otogenic meningitis ranged from 200 to 240 mmH2O, and total protein varied from 0.66 to 6 g/L with a clear Pandey and Nonne-Apelt reaction. Pleocytosis in the spinal cord fluid reached 3 thousand cells in 1 cubic millimeter.

When early signs of local and intracranial complications appear, urgent surgical intervention is necessary to eliminate the purulent focus in the middle ear and cranial cavity.

Research results All patients who underwent examination were operated on the middle ear in the early stages, in the first hours or up to one day: those who had local complications underwent radical surgery, and in patients with intracranial complications, an extended general cavity radical operation was performed with a wide opening of the middle ear. and posterior cranial fossae. Within the first two hours after admission to the hospital, 12 patients were operated on, from 2 to 6 hours - 22, from 6 to 12 hours - 28, from 12 to 24 hours - 52 patients.

In patients with an abscess of the brain and cerebellum, together with neurosurgeons, a craniotomy was simultaneously performed in the temporal region and the detected abscess was drained through a perforated rubber tube; sometimes a strip of rubber was inserted into the abscess cavity for open drainage. In case of intracranial complications, the trepanation wound behind the ear was left open. For patients with local complications, surgery was performed using a closed method. In the postoperative period, the surgical area was treated daily with antiseptic solutions (1% dioxidine, decasane solution) and turundas with hyoxyzone ointment were introduced into the trepanation cavity. At the same time, the second stage of treatment was carried out, including anti-inflammatory, detoxification, dehydration, desensitizing and restorative therapy. A competent selection of medications played an important role during this period.

After elimination of the intracranial purulent focus, antibiotics were prescribed taking into account the sensitivity of microorganisms to them. Antibiotics from the beta group were usually used.lactams, cephalosporins, and sometimes macrolides. Sometimes combination therapy with antibiotics was used, they were administered intramuscularly, intravenously, intraspinal, taking into account the general condition of the patient and the results of clinical and laboratory studies.

In case of serious condition of the patient, antibiotics from the beta group were used.lactams in high doses intramuscularly and cephalosporins intravenously. Antibiotic therapy was supplemented by the use of antifungal agents, such as fluconazole 50 mg once a day for 7 days for adults and at a dose of 1-3 mg/kg body weight for children. Lumbar puncture was performed according to indications, determining the volume of the studied cerebrospinal fluid depending on the patient's condition.

In cases of developmentperifocal secondary meningoencephalitis, intracranial hypertension and cerebral edema, as well as diffuse purulent meningitis, there was often nausea and vomiting. In order to provide nutrition and detoxification, restorative and stimulating therapy was carried out, native plasma 300-500 ml was prescribed intravenously, and a 5-10% glucose solution up to 500 ml was prescribed. with the addition of ascorbic acid 5% -4.0, cocarboxylase 2.0., 15% albumin solution up to 200 ml. With the development of perifocal secondary meningoencephalitis, intracranial hypertension, cerebral edema and purulent meningitis, patients often experienced symptoms of nausea and vomiting. To ensure nutrition and detoxification, restorative and stimulating therapy was carried out, including intravenous administration of native plasma in a volume of 300-500 ml, 5-10% glucose solution up to 500 ml with the addition of ascorbic acid (5% - 4.0), cocarboxylase (2.0) and 15% albumin solution up to 200 ml.

Dehydration was carried out and glucose 40% - 20.0, methenamine 40% - 10.0, mannitol 20% - 30.0 were administered as diuretics. Magnesium sulfate 25% - 10.0, Lasix 2.0 was used intramuscularly. Prescribed internal use of medical glycerin 50% - 1 teaspoon 3 times a day, Diacarb 0.25, 1 tablet 1 time a day. For thrombosis of the sigmoid sinus, anticoagulants were added, fibrinolysin was administered intravenously (20,000 units per 250 ml of 0.9% sodium chloride solution) with 10 thousand units of heparin. Patients were provided with gentle care, high-calorie nutrition (in critically ill patients - through a tube), and symptomatic therapy.

Results and discussion. When analyzing the clinical material, it was found that complicated forms of the disease are more common with epitympanitis 73.7% compared to

mesotympanitis 9.6% and epimesotympanitis 16.7%.

The cause of otogenic complications in 11 (9.7%) patients was chronic purulent otitis media, mesotympanitis, in 84 (73.7%) chronic purulent otitis media, epitympanitis, in 19 (16.6%) chronic purulent otitis media, epimesotympanitis .

The examined patients with otogenic complications were admitted to the hospital with an ambulance - 15% and 85% of the patients were admitted to the hospital by gravity

Upon admission to the hospital, the condition was assessed as extremely severe in 15.4% of patients, severe in 26.9%, and moderate in 57.7% of patients.

The cause of otogenic local complications was chronic purulent mesotympanitis in 8 patients, chronic purulent epitympanitis in 63 patients, chronic purulent epimesotympanitis in 14 patients,

The cause of otogenic intracranial complications was chronic purulent mesotympanitis in 3 patients, chronic purulent epitympanitis in 21 patients, and chronic purulent epimesotympanitis in 5 patients.

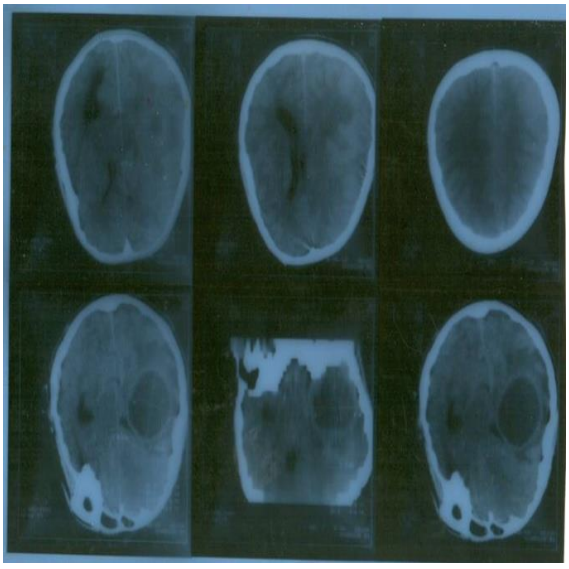
Among patients with local complications, mastoiditis was diagnosed in 54.1% of patients, atypical forms of mastoiditis in 14.1%, facial nerve paresis in 16.5%, labyrinthitis in 15.3%.

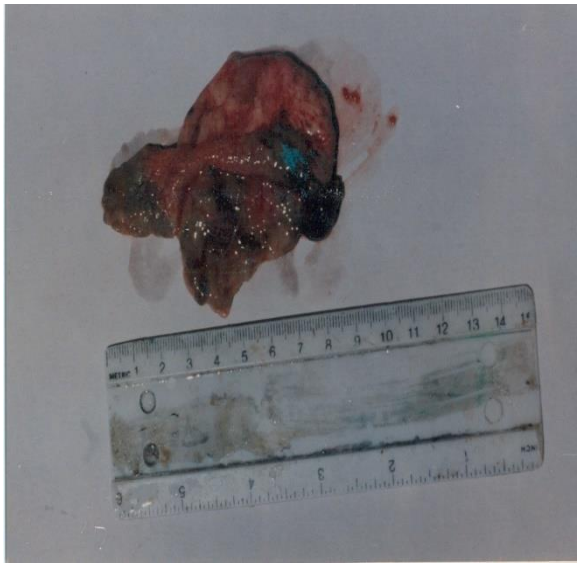
In the examined patients, isolated intracranial complications (meningitis, sinus thrombosis of the sigmoid sinus, sepsis, brain abscess) were diagnosed in 47.2%, and combined complications (meningitis + brain abscess, meningoencephalitis + otogenic sinus thrombosis + sepsis) in 52.8% of patients. Of all forms of intracranial complications, meningoencephalitis and brain abscesses were the most common.

During bacteriological examination of smears, discharge from the ear, abscess cavities and cerebrospinal fluid were culturedStreptococcus Pneumoniae – in 32%, Haemophilus influenzae – in 22%, Moraxella catarrhalis – in 16%, Streptococcus heamoliticus – in 5%, non-pathogenic microorganisms – in 25% of patients.

The use of CT of the high bones provided high accuracy in assessing the volume of destructive changes in the temporal bone and assessing the involvement of adjacent areas in the pathological process. Thanks to the CT method, it was possible to visualize the anatomical structures of the temporal bone in their natural location.

During the CT examination, we paid special attention to studying changes in the bone walls of the middle ear cavities. Using a CT scan, we were able to see in detail obvious bone defects in the area of the middle and posterior cranial fossae, as well as significant changes in bone tissue. When analyzing surgical findings and comparing them with CT data, the presence of destructive changes in the temporal bone was confirmed.





CT scan of a patient with an abscess of the left high lobe of the brain and the abscess capsule.

The patients' condition gradually improved, and clinical and biochemical parameters normalized. This was usually observed after surgical debridement of a purulent focus of the mastoid process, drainage of brain abscesses, removal of a blood clot from the sinus, and intensive drug therapy. Thus, it was possible to objectively assess the effectiveness of treatment.

5-7 days after the full course of treatment, patients noted a decrease in body temperature to 37-36.8 °C and a decrease in headaches. By the 14th day of intensive complex therapy, cerebral and meningeal symptoms gradually began to disappear in patients. CSF pressure in patients with otogenic meningitis also gradually decreased to normal values.

Despite the treatment, 2 patients with a brain abscess and 1 patient with a cerebellar abscess died, and the remaining patients recovered and were discharged from the hospital in satisfactory condition.

Conclusions:

-Difficulties in timely diagnosis of the disease and late examination of patients by an otorhinolaryngologist are due to late treatment of patients, insufficient manifestation of symptoms of the disease, which is associated with long-term use of antibiotics.

-Thanks to modern diagnostic methods and a system of comprehensive emergency surgical and intensive treatment, it was possible to improve treatment outcomes and reduce mortality in chronic purulent otitis media with complications.

-Intracerebral abscesses may present with unusual symptoms, therefore, joint action of an otolaryngologist and a neurosurgeon is recommended to provide surgical care.

-We believe that discussing the problem from various points of view will help make an informed decision regarding the treatment of patients with chronic suppurative otitis media with complications.

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