



# Microbial Landscape Of Pyoinflammatory Diseases Of Ent Organs In Pediatric Patients

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The etiologic factors associated with purulent-inflammatory diseases (PIDs)\* of the ENT organs in children were studied . Differences in microbiological parameters were established between acute and chronic otitis. A high frequency of isolation of microbial associations from various taxonomic groups was noted, which is of particular importance for adequate empirical treatment of otitis in children.

**Key words:** ENT organs, otitis, acute purulent otitis media (APOM)\*, chronic suppurative otitis media ( CSOM )\*

ENT diseases are a very broad group of inflammatory conditions, which every person experiences several times in their lifetime [2,7]. Among the total number of individuals with ENT pathology, acute suppurative otitis media is diagnosed in approximately 30% of cases. A key role in the etiology and pathogenesis of acute suppurative otitis media is played by the transition of the inflammatory process from the nasopharynx to the mucous membrane of the middle ear, indirectly through the pharyngeal orifice of the auditory tube.

These microorganisms are constantly present in the nasopharyngeal flora, but in the vast majority of cases, they exhibit their pathogenic properties against the background of a severe respiratory viral infection [3,10].

This group includes purulent-inflammatory diseases of the paranasal sinuses (rhinosinusitis), pharynx and tonsils (tonsilopharyngitis, tonsillitis), and middle



ear (otitis). The importance of these diseases is determined by their extreme prevalence, especially in childhood [1, 2].

Acute suppurative otitis media is one of the most common childhood illnesses . Recurrences of acute suppurative otitis media are facilitated by anatomical and physiological factors, such as the presence of adenoid tissue in the nasopharynx. Otitis can be caused by bacterial and viral pathogens, the relative frequency of detection of which varies depending on the age of the patients and the epidemiological situation [8].

Bacterial flora in ENT pathology has been studied by many domestic and foreign authors [3,4,8,9]. The etiology of otitis media has changed over the past 20 years; its causative agents are *Streptococcus pneumoniae* , *Haemophilus influenzae* , *Moraxella catarrhalis* , and *Streptococcus pyogenes* , with the first two pathogens being the most common [4,7].

**Target research .** Study of etiological factors of purulent-inflammatory diseases of ENT organs in children .

**Materials and methods.** 214 children aged 1 to 15 years with otitis media were examined using clinical, laboratory and bacteriological methods, including 155 with acute otitis media (AOM ) and 59 with chronic otitis media (COM ) . Among the examined children, 125 were boys (91 with acute otitis media and 64 with chronic otitis media) and 89 were girls (64 with acute otitis media and 25 with chronic otitis media). The age division of patients was carried out taking into account generally accepted standards. Accordingly, the age groups were represented as follows: 1-4 years old – toddlers; 5-6 years old – kindergarten age; 7-10 years old – children of primary school age; 8-14 years old – children of middle school age (adolescence) and 15 years and older – young adulthood. By place of residence, children with otitis were distributed as follows: living in the city - 135 (63.1%), in the countryside - 79 (36.9%).

Frequency and types of concomitant diseases of ENT organs in OGO and CGSO : 82 cases of concomitant diseases of ENT organs of extra-aural localization were noted, including rhinosinusitis - 52 (63.4%); pansinusitis - 11 (13.4%); sinusitis - 13 (15.8%); tonsillitis - 1 (1.2%); inflammation of the mastoid process - 1 (1.2%); polyposis - 1 (1.2%).



In girls, only three comorbid ENT conditions were noted: rhinosinusitis, pansinusitis, and sinusitis. In boys, eight conditions were identified. Sixty (73.2%) patients with comorbid ENT conditions lived in the city, while 22 (26.8%) lived in rural areas.

Modern bacteriological cultivation methods were used. Aerobic, microaerophilic, and anaerobic microorganisms belonging to pathogenic, opportunistic, and saprophytic groups were identified. Isolated microbiological cultures were identified using a combination of microbiological cultural, morphological, tinctorial, biochemical, and serological methods, using standard techniques in accordance with Bergey's Manual of Systematic Bacteriology and regulatory guidelines [5, 6, 10].

**Results and discussion** . Etiological agents isolated in acute and median purulent otitis showed the following: in acute and median purulent otitis, 153 strains were isolated from 155 patients, which constituted 98.7%. In chronic suppurative otitis, 56 strains (94.9%) were isolated from 59 patients.

In terms of age, the frequency of microorganism isolation from pathological materials was presented as follows: 49 strains were isolated from sick children aged 1-3 years, which amounted to 98%. In the case of chronic gastroduodenal ulcers, 12 (85.7%) bacterial strains were isolated from 14 patients.

In children aged 4-6 years with acute myeloid leukemia (AHO), 36 strains were isolated, accounting for 100% of the total number of children in this age group. For chronic myeloid leukemia (CHLOS), this figure was also 100% (14 strains from 14 patients). Similar isolation rates were also obtained in the group of children aged 7-10 years.

In children aged 11-14 years with acute myeloid leukemia (AHO), the pathogen isolation rate was 100% (19 strains from 19 patients). In chronic myeloid leukemia (CSOM), the pathogen isolation rate in the same age group was lower – 90.9%. In patients aged 15 years and older, the pathogen isolation rate was 88.9% and 100% for acute myeloid leukemia (AHO) and chronic myeloid leukemia (CSOM), respectively.

Thus, the isolation of pathogens in acute gastric otitis media and chronic gastric otitis media was most common in the 4-6-year-old and 7-10-year-old groups



(100% each). In both acute gastric otitis media and chronic gastric otitis media (98% and 85.7%), pathogens were isolated less frequently from patients in the 1-3-year-old group.

Bacteriological examination of ear discharge revealed associations of microorganisms in children with acute ophthalmopathy. These associations included both two and three microorganisms.

- microbial associations were represented by the following combinations: Staphylococcus aureus + Moraxella catarrhalis (7); Staphylococcus epidermidis + Haemophilus influenzae (4); Streptococcus pyogenes + Enterobacteriaceae (3); Klebsiella oxytoca + Staphylococcus aureus (1). Total 15.

There were significantly more three-microbial associations – 31, that is, two-microbial associations prevailed twice as much.

The greatest clinical danger, in terms of etiological and empirical treatment, is posed by associations of the type:

1 - Moraxella catarrhalis + other bacteria; 2 - Haemophilus influenzae + other bacteria; 3 – Streptococcus pneumoniae + Haemophilus influenzae ; 4 – anaerobes + Haemophilus influenzae ; 5 – anaerobes + Moraxella catarrhalis ; 6 – anaerobes + other bacteria.

be noted that all identified associations of microorganisms included gram-positive cocci - Staphylococcus aureus Staphylococcus epidermidis , Streptococcus pyogenes . It is worth noting the prevalence of pathogenic bacteria over opportunistic ones.

chronic gastroesophageal reflux disease , associations of isolated microorganisms were also noted. Associations of two or three microorganisms were encountered. Staphylococcus aureus in association with E. coli and microscopic fungi were recorded in three cases. Staphylococcus aureus with Staphylococcus epidermidis – in 2 cases. Staphylococcus associations saprophyticus with anaerobes and Staphylococcus aureus in two cases. Pseudomonas aeruginosae with Staphylococcus epidermidis was cultured in four cases. Three-microbial association : Klebsiella oxytoca + fungi + Pseudomonas aeruginosae was found in 2 patients. Two-microbial association: Enterobacteriaceae + Staphylococcus aureus ; fungi + Staphylococcus aureus ; anaerobes + fungi were noted in 3, 2, and 5 cases, respectively .



Thus, the analysis of the spectrum of bacteria isolated from sick children with acute gastric mucosa and chronic gastric mucosa has its own characteristic features: 1 - with acute gastric mucosa, gram-positive cocci prevail, while with chronic gastric mucosa, *Ps . aeruginosa* + fungi appear; 2 - anaerobic bacteria are more often cultured with chronic gastric mucosa ; 3 - the proportion of atypical bacteria is higher with chronic gastric mucosa than with acute gastric mucosa ; 4 - the proportion of gram-positive cocci is significantly higher in the group of children aged 1-3 years both with acute gastric mucosa and with chronic gastric mucosa; 5 - with chronic gastric mucosa , a high percentage of isolated associations of microorganisms, both two- and three-component, is noted; 6 - the greatest clinical danger, in terms of treatment, is posed by associations: a) fungi with other bacteria; b) aerobes and anaerobes; c) associations of fungi with *Pseudomonas aeruginosae* ; d) associations of fungi with anaerobes.

## Conclusions

1. The spectrum of bacteria isolated from pathological material of the ears of sick children with OGSO and CGSO has its own characteristic features.
2. Isolation of pathogens in acute gastroesophageal reflux and chronic gastroesophageal reflux was highest in children aged 5-6 and 7-10 years (100% each). Pathogens were isolated less frequently from patients aged 1-3 years.
3. A analysis a During bacteriological examination of discharge from the ear of sick children with OGSO and CHGSO, microbial associations of both two and three microorganisms were encountered
4. The greatest clinical danger, in terms of the etiological treatment of OGSO and CGSO , is posed by associations of: a) fungi with other bacteria; b) aerobes and anaerobes; c) associations of fungi with *Ps . aeruginosae* ; d) associations of fungi with anaerobes.
5. The greatest clinical danger, in terms of etiological treatment, is posed by associations : 1 - *Moraxella catarralis* + other bacteria; 2 - *Haemophilus influenzae* + other bacteria; 3 - *Streptococcus pneumoniae* + *Haemophilus*



influenzae; 4 - anaerobes + Haemophilus influenzae; 5 - anaerobes + Moraxella catarrhalis; 6 - anaerobes + other bacteria.

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