

Rational Antimicrobial Therapy for Respiratory Tract Disease

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Abstract: The role of a healthy carrier in the spread of infectious diseases is recognized as the most important for maintaining an epidemiological threat in a team region or state as a whole. Therefore, the study of such a phenomenon as "microbiocenosis - an infectious agent" is a significant public health problem, where infections caused by facultative anaerobes play an important role.

Keywords: species, virulence, microbiocenosis, biomaterial resistance of colony- forming units, identification.

Common infections of the upper and lower respiratory tract include acute otitis media, acute tonsillitis, pharyngitis, bacterial rhinosinusitis, and other purulent- inflammatory diseases.

Acute otitis media (OCO) is an infectious inflammation of the membranes of the air cavities of the middle ear with the appearance of an effusion in the tympanic cavity. Children are more likely to get sick. The source of infection of the tympanic cavity are microorganisms that colonize the pharynx, therefore, the leading bacterial pathogens (**OCO**) *Streptococcus pneumoniae* and *Haemophilus influenzae*, *Staphylococcus aureus* and *Streptococcus pyogenes* play a certain role [1.2]. The type of pathogen affects the nature of clinical manifestations ASD: in the presence of *N. influenzae*, conjunctivitis is more common (4.83; 95 %; 3.76—6.20) and fever rarely occurs (0.69; 95%; 0.56-0.86), while pneumococcal infection, on the contrary, is accompanied by a high body temperature (1.32; 95%: 1.08-1.63) and the absence of conjunctivitis (0.50; 95%; 0.40-0.63) [3]. In 60-80% of patients, within 1-7 days, complete resolution of clinical manifestations (pain syndrome and fever) occurs with early symptomatic treatment in the absence of antibiotic therapy, therefore, the appointment of antibiotics for all patients diagnosed with OCO at the onset of the disease impractical. Antibiotics must be prescribed to children under 2 years of age, as well as in the absence of positive dynamics within 24-72 hours of observation. As a rule, β - lactam antibiotics are used orally, and in case of their intolerance, macrolides and, in adult patients, additionally levofloxacin. The development of complications (mastoiditis, meningitis, brain abscess) is an indication for hospitalization and requires parenteral antibiotic therapy.

Acute tonsillopharyngitis (OTF) is an infectious inflammation of the mucous membrane of the oropharynx and palatine tonsils, prone to spontaneous resolution, complicated in some cases by the development of purulent processes in the surrounding tissues, and in streptococcal etiology - acute rheumatic fever or glomerulonephritis. It belongs to the most common diseases of the upper respiratory tract in different age groups, but more often affects children of preschool and school age.

Antibiotic therapy is aimed primarily at the eradication of *S. pyogenes*. For outpatient treatment, penicillins are administered orally for 10 days (phenoxymethylpenicillin 1500 mg x 2 r/day, amoxicillin 500 mg x 3 r/day, amoxicillin /clavulanate 875/125 mg x 2 r/day, for children, the dose of amoxicillin is 45 mg/ kg/ day in 2 doses), and alternative therapy is clarithromycin (15 mg/kg/ day in 2 doses), azithromycin (12 mg/ kg / day for 5 days), clindamycin (20 mg/ kg/ day in 3 doses), cefuroxime axetil (20 mg/kg/day in 2 doses), or levofloxacin (500 mg/day in adults), characterized by high antistreptococcal activity [6].

In almost 30% of cases, OTP therapy with penicillin is not effective, which may be due to: insufficient concentration of the antibiotic in the focus of inflammation due to non-compliance with dosing regimens; production of β -lactamase by the oral flora, which inactivates penicillin before it interacts with *S. pyogenes*; difficulty in the penetration of the antibiotic into the oropharyngeal secretion; localization of *S. pyogenes* within the epithelial cells of the respiratory tract, where they are protected from the action of the antibiotic. In this regard, the ability of macrolides and levofloxacin to intracellular localization provides them with pharmacokinetic advantages over β -lactams in the treatment of OTP.

Indications for hospitalization and parenteral antibiotic therapy are: the spread of the infectious process to deep tissues, the development of paratonsillar abscess, retro- and parapharyngeal abscesses, phlegmon. Bacterial rhinosinusitis is an infectious inflammatory disease of the paranasal sinuses. It occurs with equal frequency in all age groups and is usually a secondary infection after a viral infection caused by rhinoviruses (in 50% of cases), coronaviruses, respiratory syncytial virus, influenza A and B viruses. Adenoviruses, parainfluenza viruses. According to the duration of the disease, acute sinusitis (less than 3 months), recurrent acute sinusitis (2-4 cases of acute sinusitis per year), chronic sinusitis (more than 3 months), exacerbation of chronic sinusitis (intensification of existing and/ or appearance of new symptoms) are distinguished. The main pathogens in acute bacterial sinusitis (OBS) are *S. pneumoniae* (with pneumococcal infection, unlike other pathogens, spontaneous resolution of the infectious process is rarely observed) and *H. influenzae*. *M. catarrhalis*. *S. pyogenes*. *S. aureus* are much less common, anaerobes [7]. The etiology of recurrent acute rhino sinusitis is not fundamentally different from OBS, but with exacerbation of chronic rhinosinusitis, the role of staphylococcal and streptococcal infectious increases with a decrease in the proportion of *S. pneumoniae* and *H. influenzae*, fungi and enter bacteria are more common [8].

In mild to moderate OPS, patients are given oral amoxicillin, amoxicillin /clavulanate, and cefuroxime axetil for 7-10 days. In case of allergy to β -lactams, macrolides are used. Inhibitor-protected penicillins and respiratory fluoroquinolones are recommended for patients treated with antibiotics in the previous 4 to 6 weeks. In severe cases, the drugs of choice are II-III generation parenteral cephalosporins, fluoroquinolones; if possible, use stepwise therapy with the transition to taking drugs inside. As adjuvant therapy, intranasal saline solutions and local vasoconstrictors are used. Antihistamines are not recommended for routine use.

With exacerbation of chronic sinusitis, stepwise therapy with respiratory

fluoroquinolones and inhibitor-protected penicillins, combined therapy with III-IV generation cephalosporins with metronidazole are used. In accordance with modern approaches to the management of adult patients with CAP, a significant number of them can be treated at home. Among them, two groups are distinguished, differing in the etiological structure and tactics of antibiotic therapy. The first group included patients under the age of 60 without concomitant pathology, in which an adequate clinical effect can be obtained with the use of oral drugs - amoxicillin or modern macrolides (the latter should be preferred in case of intolerance to β -lactams or if mycoplasmas and chlamydia are suspected); respiratory fluoroquinolones are recommended as alternatives. The second group included persons over 60 years of age and/ or with concomitant diseases affecting the etiology and prognosis of CAP: COPD, diabetes mellitus, congestive heart failure, liver cirrhosis, alcohol abuse, drug addiction, dystrophy. In patients, of this group, oral antibiotics may also be effective, but due to the increased etiological

role of enterobacteria, amoxicillin / clavulanate is recommended, and due to the likely chlamydial etiology of CAP, it is possible to conduct a combined therapy with β -lactams and macrolides. Parenteral antibiotics can be used only in isolated cases, for example, the alleged low compliance with oral medications. refusal or impossibility of timely hospitalization. Usually intramuscular ceftriaxone is recommended, it may be combined with macrolides or doxycycline. In case of mild CAP, antibiotic therapy can be completed with stable normalization of body temperature for 3-4 days. With this approach, the duration of treatment is 7-10 days.

When a patient is hospitalized it is necessary to assess the severity of his condition to decide whether the place of treatment is in the general department or in the ICU. Severe CAP is manifested by symptoms of respiratory failure and/or signs of severe sepsis or septic shock, is characterized by a poor prognosis and requires intensive care. It is advisable to start treatment with parenteral antibiotics. After 3-4 days of treatment, with normalization of temperature, reduction of intoxication and other symptoms of the disease, it is possible to switch to oral antibiotic use until the completion of the full course of therapy. In non-severe CAP, the use of aminopenicillins and cephalosporins of the II-III generation is recommended, and the presence of a drug active against "atypical" pathogens in the initial regimen of therapy, according to a number of studies, improves the prognosis and reduces the length of the patient's stay in the hospital [23].

Conclusion

Modern antibacterial therapy of respiratory infections is based on the use of three main groups of drugs - β -lactams, modern macrolides and respiratory fluoroquinolones. They occupy a strong position in the standards of treatment in accordance with the nosology and severity of the disease.

According to the absolute level of antistreptococcal activity, semisynthetic lactams are not superior to natural penicillin.

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