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Results of Studying the Sensitivity of S. *Pneumoniae Strains* Isolated From Patients 2ith Pneumococcal Meningitis to Antibiotics

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Annotation: The choice of empirical antibacterial therapy (ABT) for community-acquired pneumonia is most dependent on monitoring antibiotic resistance to *S. pneumoniae* and *H. influenza* . Today, the spread of isolates among pneumococci with reduced sensitivity to beta-lactam antibiotics, penicillins, third-generation cephalosporins, and the increase in resistance to macrolides is an urgent problem. [1,9,15]. At the same time, an important element in this issue is the high level of resistance of *S.pneumoniae* to tetracyclines and cotrimoxazole in pneumococcal isolates isolated from sick children with purulent meningitis and healthy carriers of pneumococcus. [3,5,11]. In recent years, updated data on AMP resistance show an increase in the level of pneumococcal resistance to benzylpenicillin and ampicillin from 6.0 to 14.3% [2,6,10,12]. Resistant strains *of S.pneumoniae* are most often isolated from elderly patients, when an antibiotic of this group has been used in the next 3 months, recent use of beta- lactam antibiotics, penicillins or co- trimoxazole , HIV infection, as well as in close contact with persons with nasopharyngeal carriage by resistant isolates [8,14].

Keywords: S.pneumoniae, cephalosporins, cephalosporins

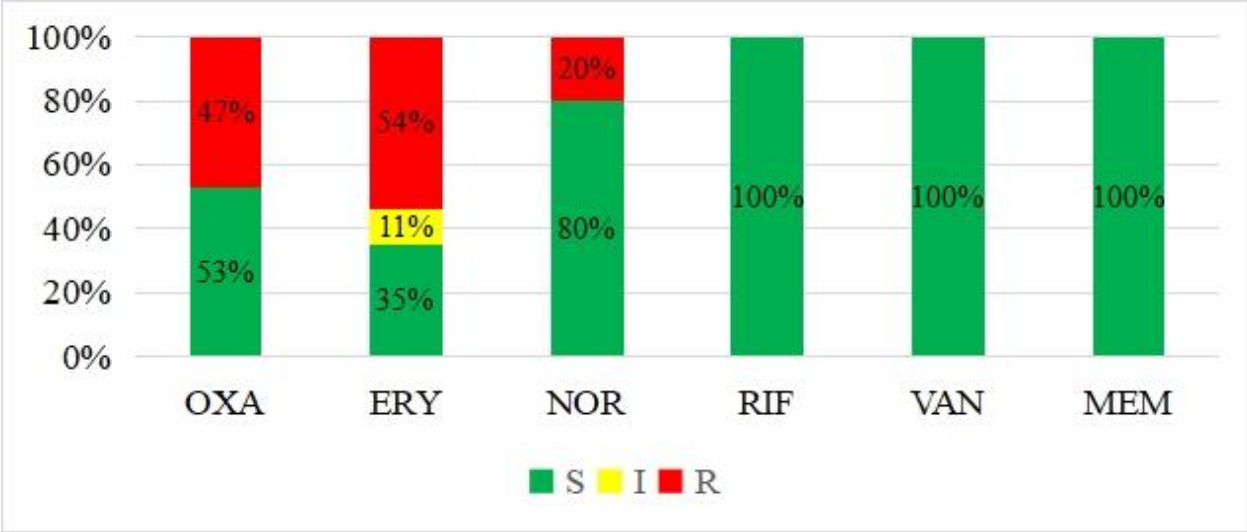
Research in recent years has shown an increase in resistance to penicillins in clinical strains of pneumococcus, while in clinical practice one has to deal with the ineffectiveness of penicillin antimicrobials. In this regard, current recommendations for the treatment of HD in both children and adults suggest third-generation cephalosporins, vancomycin, rifampicin or their combinations [9, 11,13].

This issue is of particular importance in the treatment of invasive severe forms of pneumococcal diseases, when favorable outcomes of the disease depend on the correct choice of antibacterial therapy and competently conducted pathogenetic therapy. In this regard, the issues of epidemiological surveillance of the sensitivity to antimicrobial drugs of nasopharyngeal and clinical strains *of S.pneumoniae* isolated from patients with invasive pneumococcal diseases are very important and allow clinicians to have data on antibiotic-resistant strains of *S.pneumoniae* .

Determining the sensitivity of microorganisms is becoming increasingly important due to the emergence and widespread prevalence of antibiotic resistance in bacteria. The epidemiological significance of pneumococcal infections is increasing in parallel with the increase in antibiotic resistance. Since, most often, antimicrobial therapy in the treatment of pneumococcal diseases is prescribed empirically, knowledge of data on the sensitivity of *S.pneumoniae* isolated from patients to antibacterial drugs is of great practical importance. To achieve our objectives, we

analyzed the results of a study on the sensitivity of 55/100% clinical strains *of S.pneumonia e* isolated from patients.

Figure 1 shows the results of the study, which revealed that *S.pneumoniae strains isolated from patients* showed sensitivity in 53% of cases in a screening test with oxacillin , which meant their sensitivity to all groups of beta-lactamase antibiotics, including 3rd generation cephalosporins (ceftriaxone, cefataxime). Resistant strains *of S.pneumoniae* were identified in 47% of cases, which indicates high resistance to penicillin antibiotics, as well as to β- lactamase antibiotics.



Rice. 1 Results of the test for sensitivity to AMPs *S.pneumoniae* isolated from cerebrospinal fluid (n=55)

A screening test with erythromycin showed high resistance (54%), which means resistance to a group of macrolides in clinical strains *of S. pneumoniae* isolated from patients. Also, intermediate sensitivity was detected in 11% of *S.pneumoniae isolates* , while the effectiveness of using a macrolide antibiotic can be achieved when using the maximum daily dose. Sensitivity to macrolide antibiotics was detected in 35% of *S.pneumoniae isolates* .

Sensitivity to antibiotics of the fluoroquinolone group was determined by a screening test for norfloxacin (NOR), while high (80%) sensitivity of cultures to this group of antibiotics (ciprofloxacin, moxifloxacin , levofloxacin , ofloxacin) was detected, while resistance was detected in 20% of cases.

It should be noted that today, vancomycin, rifampicin, meropenem are recommended as reserve drugs for antibacterial therapy of invasive pneumococcal diseases (sepsis, meningitis) , to which sensitivity has been detected in all 100% of pneumococcal isolates. In our studies, all clinical strains *of S.pneumoniae* were also highly sensitive to meropenem , rifampicin, and vancomycin (Fig. 1).

Thus, analysis of the results of the test for sensitivity to antibiotics of clinical strains *of S.pneumoniae* isolated from the examined patients showed that there is resistance to antibiotics of the macrolide group (erythromycin 54% - resistant strains *of S.pneumoniae*), penicillins (47% of resistant strains *of S.pneumoniae*) . The data obtained require a differentiated approach to the treatment of pneumococcal diseases in adults, taking into account data from monitoring sensitivity to *S.pneumoniae strains* .

Many countries monitor the resistance of *S. p neumoniae strains* to penicillin . Thus, according to the literature, in the USA, France, Spain and some Asian countries, resistance to

penicillin reaches 50%, but in some countries such as Finland, Sweden, Germany, less than 5% of cases are recorded [6,7,8]. At the same time, excessive use of antibiotics, HIV infection, chronic lung diseases, frequent inflammatory diseases of the bronchopulmonary system, and frequent hospitalizations are the main factors in the development of antibiotic resistance. In cases of invasive pneumococcal diseases in adults, which include pneumococcal meningitis/meningoencephalitis, empirical antibacterial therapy is recommended with highly sensitive antimicrobial drugs, in particular with vancomycin, which, according to our studies, has shown high sensitivity to strains *S.pneumoniae* isolated from cerebrospinal fluid.

In connection with the above, invasive pneumococcal diseases among adults, such as purulent meningitis/meningoencephalitis, are very relevant, and the study of clinical and diagnostic aspects, approaches to early diagnosis, tactics for antibacterial therapy of patients will allow timely diagnosis of the disease, initiation of etiotropic therapy and reduction of residual manifestations, mortality.

Conclusions : a high level of resistance of clinical isolates *of S.pneumoniae* to penicillin (47%), macrolides (54%), and fluoroquinolones (20%) was revealed, which indicates an unfavorable trend associated with the spread of resistant strains of *S.pneumoniae* . isolated from adults.

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