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**ANALYSIS OF ANTIBIOTIC RESISTANCE OF *STAPHYLOCOCCUS* SPP., ISOLATED FROM PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA**

**Kovalenko Natalya Ilivna,**

PhD, associate of professor

Kharkiv National Medical University

Kharkiv, Ukraine

yatiger@ukr.net

**Zamazii Tatiana Mykolayivna,**

PhD, associate of professor

Kharkiv National Medical University

Kharkiv, Ukraine

[tzamazii@gmail.com](mailto:tzamazii@gmail.com)

**Novikova Iryna Volodymyrivna,**

Head of the laboratory

Municipal non-profit enterprise of the Kharkiv regional council "Regional clinical hospital"

Kharkiv, Ukraine

**Abstract:** The study showed that the resistance of *Staphylococcus* spp. as a causative agent of community-acquired pneumonia to aminopenicillins, some fluoroquinolones, macrolides (azithromycin), cephalosporins increase, while maintaining its sensitivity to clarithromycin and ampicillin.

**Key words:** *Staphylococcus* spp., resistance to antibiotics, pneumonia.

Staphylococci are one of the most studied representatives of opportunistic pathogens, but they still continue to attract the attention of specialists in various fields. Interest in them is due to both the importance for the normal functioning of the human body and the ability to cause purulent-inflammatory diseases.

The vast majority of infections caused by staphylococci are endogenous. The condition for the colonization of staphylococcus in a particular ecological niche is the ability of bacteria to resist the mechanisms of anti-infective resistance of the host organism. Infections caused by *S. aureus* have more than 100 nosological forms. Staphylococci can affect almost any organ and tissue of the human body.

Community-acquired pneumonia is one of the most common diseases of infectious etiology in people of all ages and is one of the leading causes of death from infectious diseases [1, p. 8]. In the XXI century, the incidence of pneumonia increased by 20 % and mortality by 12% [2, p. 4].

Thus, in the United States community-acquired pneumonia is the second most common cause of hospitalization and the most common cause of death, where 1.5 million patients are hospitalized each year [3, p. 1806].

According to official statistics, the incidence of pneumonia among adults in Ukraine is 4-6 cases per 1,000 young and middle-aged people and 12-18 cases per 1,000 older people; mortality is 13-15 cases per 100,000 population or 3 % [4]. In the structure of mortality from respiratory diseases, pneumonia takes second place after chronic obstructive pulmonary disease [1, p. 14]. In January 2020, 621 people died of pneumonia in Ukraine [4].

Staphylococci do not belong to the leading microorganisms in the etiological structure of community-acquired pneumonia, according to various authors, ranging from 0.5 to 5 %. However, in severe disease, staphylococci are detected in 10.5 % of cases. According to Jan Kluytmans et al. [5, p.200], 26 % of community-acquired pneumonias with a high risk of adverse outcome are caused by *S. aureus*.

Modern algorithms for antibacterial therapy of community-acquired pneumonia are set out in domestic recommendations that take into account the experience of European countries. However, there are still enough mistakes in the choice of antibiotic for the treatment of this disease. Improper administration of antibacterial drugs has a decisive impact on the outcome of the disease, reduces the cost-effectiveness of treatment and leads to the selection of resistant strains of pathogens [6, p.59]. The prevalence of resistance to respiratory pathogens has regional differences, so when choosing drugs, it is important to use local data on the sensitivity of microorganisms to antibacterial drugs.

In this regard, regional epidemiological data on the spread of antibiotic-resistant bacteria that cause community-acquired pneumonia are important.

**The aim of the study.** Study of sensitivity to antibiotics *Staphylococcus* spp., isolated from patients with community-acquired pneumonia.

**Materials and methods.** The results of bacteriological researches of various clinical materials from 336 patients with community-acquired pneumonia are used in the work. Bronchial lavage fluid and sputum were taken as clinical material.

Identification of isolated microorganisms was carried out by morphological, cultural and biochemical properties according to the Order of the Ministry of Health of the USSR № 535 from 22.04.1985. [7].

Determination of the sensitivity of the microflora to antibiotics was performed by the method of diffusion into agar (method of standard disks) in accordance with the Order of the Ministry of Health of Ukraine № 167 from 05.04.2007 [8].

**Results.** In previous studies, the analysis of microecological indicators of the microflora of the studied habitats revealed the spread of endogenous nasopharyngeal microorganisms in the lung biocenosis, which was confirmed by indices of consistency and dominance. It was shown that gram-positive cocci, which were isolated from sputum in 38.3 % of patients, play a significant role in the etiological structure of pneumonia [9, p. 136]. The most common among bacteria of the genus *Staphylococcus* was *S. aureus*, which was excreted in sputum in 6.3 % of patients [9, p. 137]. The highest levels of colonization were recorded for *S. epidermidis* (6.7 lg CFU / ml).

The basis of treatment of community-acquired pneumonia is antimicrobial therapy, which is effective in identifying the pathogen and determining the antibioticogram. However, in 20-60 % of cases the etiological factor of community-acquired pneumonia is not determined and antibacterial therapy is prescribed empirically [10, p. 102].

In the empirical treatment of patients with pneumonia a combination of beta-lactam antibiotics and macrolides or respiratory fluoroquinolones are used [11, p. 8; 12, p. 1662].

The most important are aminopenicillins, including combination with beta-lactamase inhibitors. As an alternative drug, one of the macrolide antibiotics or doxycycline is prescribed [1, p. 47].

In the analysis of sensitivity of *Staphylococcus* spp. to antibiotics the greatest efficiency was found in clarithromycin and ampicillin, which inhibited 100 % of the studied strains.

Most of the studied strains of *Staphylococcus* spp. were resistant to several antibiotics. Thus, 60.9 % of strains of *S. aureus* and 80.0 % of strains of *S. epidermidis* showed resistance to oxacillin, 71.4 % and 50 % to ceftazidime, 47.6 % and 42.9 % to amoxiclav, 81.8 % and 33.3 % of strains to meronem, respectively.

Fluoroquinolones have a special place among a number of antimicrobials. Resistance to fluoroquinolones is formed more slowly than to other antibacterial agents in common microorganisms, so they can compete with beta-lactam antibiotics in their microbiological and pharmacodynamic characteristics [13, p. 58; 14, p. 62; 15, p. 234].

Ciprofloxacin was the most active among fluoroquinolones, to which 71-76 % of staphylococci were sensitive. Norfloxacin inhibited the growth of 62-67 % of staphylococci, 83 % of *S. aureus* strains were sensitive to ofloxacin.

Thus, studies have shown that the widespread use of antibiotics leads to a high increase in resistance of *Staphylococcus* spp. to traditional drugs for empirical therapy. In this regard, regional monitoring the susceptibility of the bacterial microflora to antimicrobial drugs is of particular importance to identify the tendency to develop resistance of the leading pathogens to antibiotics.

**Conclusions**

There is an increase in resistance of *Staphylococcus* spp. isolated from patients with community-acquired pneumonia to fluoroquinolones, aminopenicillins, cephalosporins, macrolides (azithromycin), while maintaining its sensitivity to clarithromycin and ampicillin.

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