http://dx.doi.org/10.35630/2199-885X/2020/10/26

ANALYSIS OF MICROFLORA IN MODERN OUTPATIENT CLINIC

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ABSTRACT — Antibiotic resistance is a global problem of modern medicine. In the research a microflora of out-patient department visitors in 2018–2019 was examined. It was revealed that the most often microbes were Staphylococcus aureus, Streptococcus pyogenes, Escherichia coli. The dynamics of bacterial resistance to antibiotics was also analyzed. The multiple bacterial resistance to antibiotics were detected. The data show a rapid resistance genes spread among non-hospital strains, which necessitates constant monitoring of antibiotic sensitivity in order to develop the right tactics to combat antibiotic resistance.

KEYWORDS — antibiotics, bacterial resistance, outpatient clinic.

INTRODUCTION

Antibiotics has opened a new era in the treatment of infectious diseases. Due to widespread of antibiotics anew infectious diseases are now emerging that could not be treated with antibacterial drugs. Microbes adapted to antibacterial drugs and developed special protective mechanisms [1]. Antibiotic resistance has been defined by the World Health Organization as a global problem that requires immediate joint action to solve it [2].

MATERIALS AND METHODS

To study the results of microbiological examination of the materials obtained in the outpatient department of State Clinical Hospital No.7 (Tver, Russia) in order to get condition of extra-hospital bacterial resistance. 280 results of microbiological examination of pharynx, nose, eyes, wounds and ears Bodydischarge, as well as sputum and urine were processed.The bacterial resistance to antibiotics were to was also analyzed. The results of microbiological examination subjected to statistical analysis.

RESULTS

In total 12 species of pathogens were detected. The study revealed that in case of outpatient infection, the most frequentwere Staphylococcus aureus (24.6%), Streptococcus pyogenes (16.1%), pathogenic Escherichia coli (20.0%).

The resistance of Escherichia coli strains to 3rd generation Cephalosporins was 30.9% and to 4th generation Cephalosporins 28.8%. Compared to the data of 2010–2011 there is a significant increase in the resistance of Escherichia coli to antibiotics of Cephalosporin series [3]. In comparison with the data of 2010–2011 we noted a massive increase in the resistance of Escherichia coli to Aminoglycosides from 0.3% to 56%, and to Gentamicin — 10.0% to 66.7%. If in 2010–2011 there was an absolute sensitivity to Imipenem, at present 33.3% of resistant strains have been identified. Resistance to Amoxiclav has decreased from 41.7% to 35.7% compared to 2010–2011, which may be associated with growth of antibiotic resistance [3, 4].

The most common pathogen of extra-hospital infections, Staphylococcus aureus, is characterized by low resistance to 3rd and 4th generation of Cephalosporins and to Ciprofloxacin (3.1%). However, high resistance to amikacin (65%) has been detected, and is expected to be high against Amoxicillin/Clavulanate (66.7%), due to its widespread use in the treatment of most non-hospital bacterial infections [5].

Etiologically, Klebsiella pneumoniae ranks second in prevalence among the agents of extra-hospital infections of the Enterobacteriaceae group. Strains of Klebsiella pneumoniae showed a high level of resistance to inhibitor-proof Penicillin (Amoxicillin/Clavulanate) 52.6%, 4th generation Cephalosporin (Cephepin) 30.8%, 3rd generation Cephalosporins (Cefotaxime and Ceftriaxone 19% and 21.4%, respectively). 42.9% of the selected crops were insensitive to Amikacin. Carbapeneme-resistant (Imipenem) were 20% of obtained isolates. The 3rd generation of Cephalosporin (Cephoperazone/Sulbactam) was the most active against Klebsiella pneumoniae.

Enterobacter is one of the most difficult groups for β-lactam antibiotics. Among all isolated strains of Enterobacter aerogenes 25% of Cephalosporin-resistant strains and 36.4% of cultures insensitive to Cephoperazone have been identified. Also in our study, 100% of Enterobacter aerogenes strains were found to be sensitive to imipenem. Due to the absolute activity of Imipenem and inhibitor-proof Cephalosporins, preparations of these groups can be recommended for treatment of infection caused by Enterobacter aerogenes.

Evaluation of the resistance results of Staphylococcus epidermidis showed a high level of resistance to Amoxicillin/Clavulanate (42.9%), Imipenem (57.1%),

4th generation unprotected Cephalosporins (30%), and 3rd generation (22.2% to Ceftriaxone and 25% to Cefotaxime). Absolute insensitivity to 2nd generation Fluoroquinolones (Ofloxacin and Norfloxacin) and 50% resistance to Ciprofloxacin have been detected.

In our study, 50% of Pseudomonas aeruginosa strains were found to be completely resistant to imipenem, and not a single strain showing sensitivity to Carbapeneme group antibiotics. To prevent the risks associated with the increase and spread of resistance to the antibiotics of the surveillance group, it is necessary to limit the use of Imipenem in the treatment of diseases caused by Pseudomonas aeruginosa.

CONCLUSIONS

The spectrum of dominant species in 2018–2019 identified during the sampling of the outpatient clinic included gram-negative Escherichia coli, Klebsiella pneumoniae and gram-positive Staphylococcus aureus, Streptococcus pyogenes microorganisms, among which strains with multiple resistance to antibiotics were detected. The data indicate a rapid resistance genes spread among non-hospital strains, which necessitates constant monitoring of antibiotic sensitivity in order to develop the right tactics to combat antibiotic resistance.

REFERENCES

1. **Arsalan A., Naqvi S.B., Sabah A., Bano R., Ali S.I.** Resistance pattern of clinical isolates involved in surgical site infections. Pak J PharmSci. 2014, Vol. 27(1) P. 97–102.
2. **Golubovskaja O.A.** The problem of antibiotic resistance and international efforts to overcome it. Klinicheskaja infektologija I parazitologija. [Clinical infectiology and parasitology] 2015, №1(12) P. 6–11 (in Russian).
3. **Palagin I.S., Suchorukova M.V., Dechnich A.V., Eidelshtein M.V., Shevelev A.N., Grinev A.V., Perepanova T.S., Kozlov R.S., Kogan M.I.** Current state of antibiotic resistance of pathogens of extrahospital urinary tract infections in Russia: results of "DARMIS" (2010–2011) research. Klinicheskaja mikrobiologija I antimikrobnaja himioterapija. [Clinical Microbiology and antimicrobial chemotherapy]. 2012, №4 (14) P. 280–302 (in Russian).
4. **Champion S., Annonay M.** Resistance to Co-Amoxiclav (Augmentin) in Community-Acquired and Nosocomial Pleural Infections. J Pulm Respir Med 5:284. doi:10.4172/2161-105X.1000284
5. **Belevskij, A.S.; Zajcev A.A.** Protected aminopenicillins: 35 years of clinical application in therapy of lower respiratory tract infections. Prakticheskaija pulmonologija. [Practical pulmonology]. 2015, №3 P. 43–48 (in Russian).