

ETIOLOGICAL STRUCTURE OF CHRONIC OSTEOMYELITIS IN PATIENTS AND THE EFFECTIVENESS OF ANTIBIOTIC THERAPY

Fotima Sh. Mamatmusaeva ¹, Zulfiya B. Djuraeva ², Dilnoza F. Raimkulova ³,
Botir S. Ermatov ⁴

1 Associate Professor (PhD) at the Department of Microbiology, virology and immunology of Tashkent Medical Academy, Tashkent, Uzbekistan
E-mail: mkomfo@mail.ru

2 Senior Lecturer at the Department of Microbiology, Virology and Immunology of the Tashkent Medical Academy, Tashkent, Uzbekistan

3 PhD, Associate Professor of the Department of Therapeutic Sciences No. 1 of the Tashkent State Dental Institute, Tashkent, Uzbekistan

4 Assistant Professor, Department of Clinical Sciences, Alfraganus University, Tashkent, Uzbekistan

ABSTRACT

Purpose of the study. To study the main causative agents of chronic osteomyelitis and their sensitivity to antibiotics. **Materials and methods.** The composition of purulent discharge was studied in 41 patients with chronic osteomyelitis aged 18-70 years who were treated in the Department of Purulent Surgery of the Multidisciplinary Clinic of the Tashkent Medical Academy. **Analysis and discussion of results.** 41 patients with chronic osteomyelitis were selected for screening. All these patients underwent bacteriological examination. **Conclusion.** According to the results of our study on antibiotic resistance, it is necessary to identify microorganisms and conduct an antibiogram. In the course of our studies, according to the results of a bacteriological study, it was found that the drugs of choice in treatment are levofloxacin, augmatini, tetracycline, sefaperazon.

Key words: chronic osteomyelitis, antibiotics, *S.aureus*.

INTRODUCTION

There are many factors that can cause osteomyelitis. An increase in the number of injuries as a result of road traffic accidents, iatrogenicity in hospital surgery, including an increase in the number of arthroplasty operations, leads to the

development of chronic osteomyelitis [1, 3, 8]. Much attention is always paid to assessing the role of microorganisms in chronic osteomyelitis. Features of the course of the disease and morphological changes in tissues depend on the species composition and specific characteristics of the microorganisms that caused the infectious process. [1, 7, 9].

Complex antibiotic therapy occupies one of the leading positions in the treatment of osteomyelitis. The widespread and unjustified use of antibiotics has led to an increase in the number of microorganisms resistant to them and the emergence of antibiotic-resistant strains [4, 6]. Chronic osteomyelitis is a common disease, accounting for 6% of musculoskeletal diseases and 7-12% of surgical infections. It is known that the difficulty of treating osteomyelitis is associated with a decrease in the reactivity of the human body [2]. One of the main factors that worsen the results of antibiotic therapy and require changes in antibiotic therapy tactics is the resistance of pathogens to antibiotics. Staphylococci are resistant to the most commonly used antibiotics: penicillin (95.6%), streptomycin (80.5%), neomycin (88%), monomycin (69%), tetracycline (84%), erythromycin (79%), etc. d. [5]. Monitoring pathogenic pathogens and their sensitivity to antibiotics is one of the main tools that allows timely changes in empirical antibiotic treatment regimens, development of measures to maintain resistance and monitoring their effectiveness.

Purpose of the study. Study of the etiological structure of pathogens and the effectiveness of antibiotic therapy in patients with chronic osteomyelitis.

Materials and methods of research: the composition of purulent discharge of 41 patients with osteomyelitis aged 18-70 years who were treated in the department of purulent surgery of the Multidisciplinary Clinic of the Tashkent Medical Academy was studied. The bacteriological method was used as a research method. The bacteriological method is one of the most widely used methods, the essence of which is that it increases the effectiveness of treatment by the attending physician through the correct use of antibiotics based on the test result.

Analysis and discussion of results. During a bacteriological study of purulent discharge from 41 patients with chronic osteomyelitis, 64 strains of microorganisms were isolated.

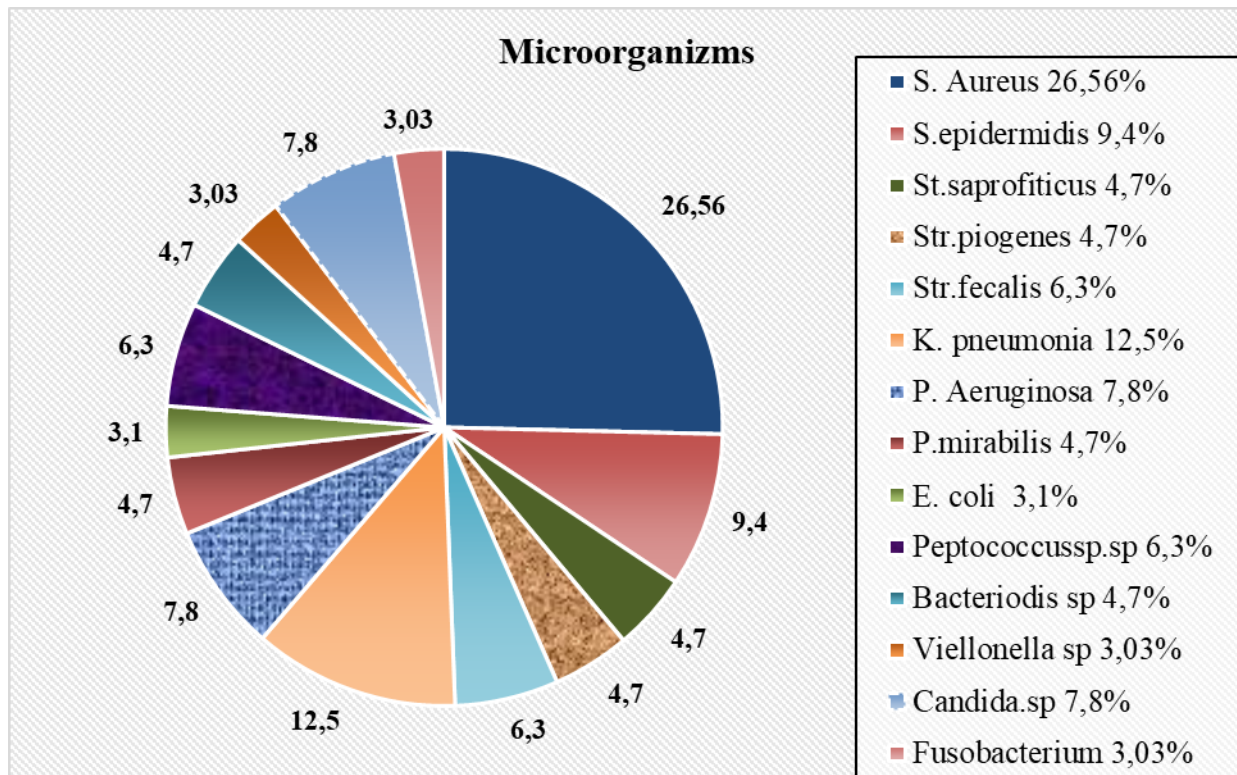


Diagram 1. Frequency of occurrence of microorganisms (n=33)

As can be seen from Figure 1, of all these strains, 51 belonged to facultative anaerobes (79.68%), 9 strains belonged to anaerobic microorganisms and 4 belonged to the *Candida* spp group. Among facultative anaerobes, the most common causative agents of “Chronic osteomyelitis” are gram-positive bacteria; 33 strains have been identified.

Which corresponded to 17 (26.56%) *S.aureus* strains, 6 (9.375%) *S.epidermidis* strains, 3 (4.68%) *St.saprofiticus* strains, 3 (4.68%) *Str.piogenes* strains, 4 (6.25%) *Str. fecalis* strains. In second place were gram-negative bacteria, which amounted to 18 strains. Among them, 8 (12.5%) strains of *K. pneumonia*, 5 (7.81%) strains of *P. aeruginosa*, 3 (4.68%) strains of *P. mirabilis* and 2 (3.12%) strains of *E. coli*. 9 (14.06%) strains of anaerobic microorganisms were also identified. Among them, the most prevalent were 4 (6.25%) strains of *Peptococcus* spp., 3 (4.68%) *Bacteriodis* spp, as well as 1 strain each of *Viellonella* spp and *Fusobacterium*. *Candida* spp. was detected in 4 patients (7,81%).

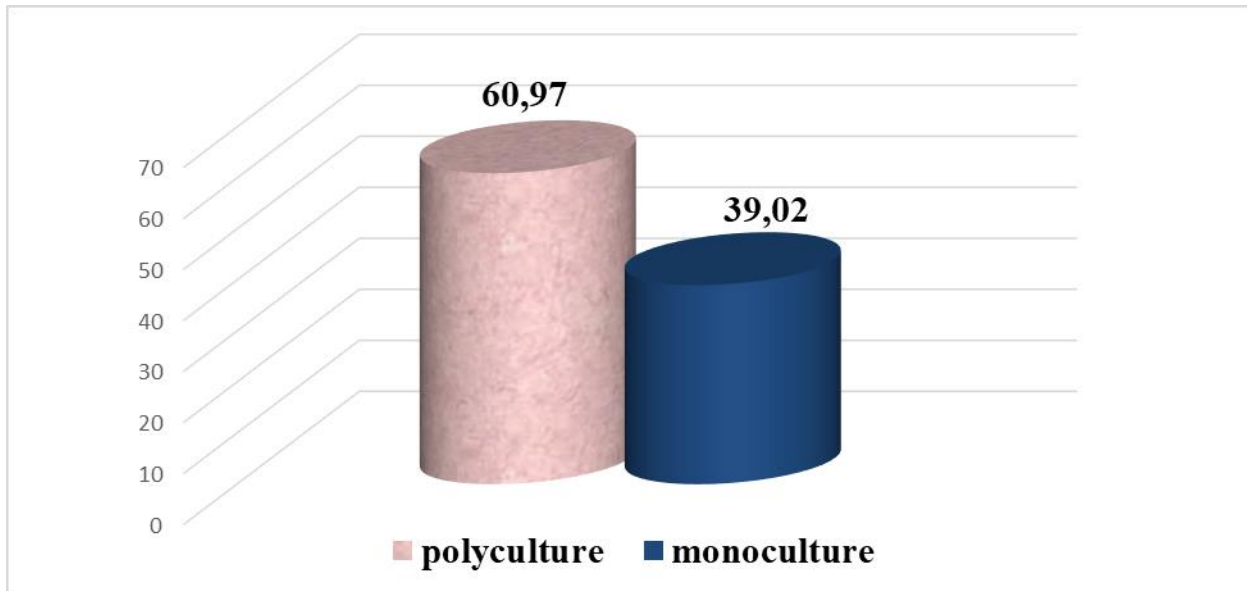


Diagram 2. The degree of occurrence of microorganisms in mixed and monoculture

As can be seen from Diagram 2, 16 of 41 patients (39.02%) who underwent bacteriological examination had two or more microbial associations; monocultures caused purulent inflammation in 34 (60.97%) patients. The most common mixed culture is *Staphylococcus aureus*+*Klebsilla pneumoniae*+*Candida spp.* was found in 3 patients. In 2 patients the cause of the disease was *Staphylococcus aureus*+*Staphylococcus epidermidis*+*P.aeruginosa*, in another 2 patients it was *Streptococcus faecium*+*Staphylococcus epidermidis*. Monoinfection was caused mainly by *S.aureus* (26.56%), *K.pneumonia* (12.5%) and *S.epidermidis* (9.37%) were found in smaller quantities. When determining the sensitivity of the most commonly detected *St. aureus* to the most commonly used antibiotics in treatment.

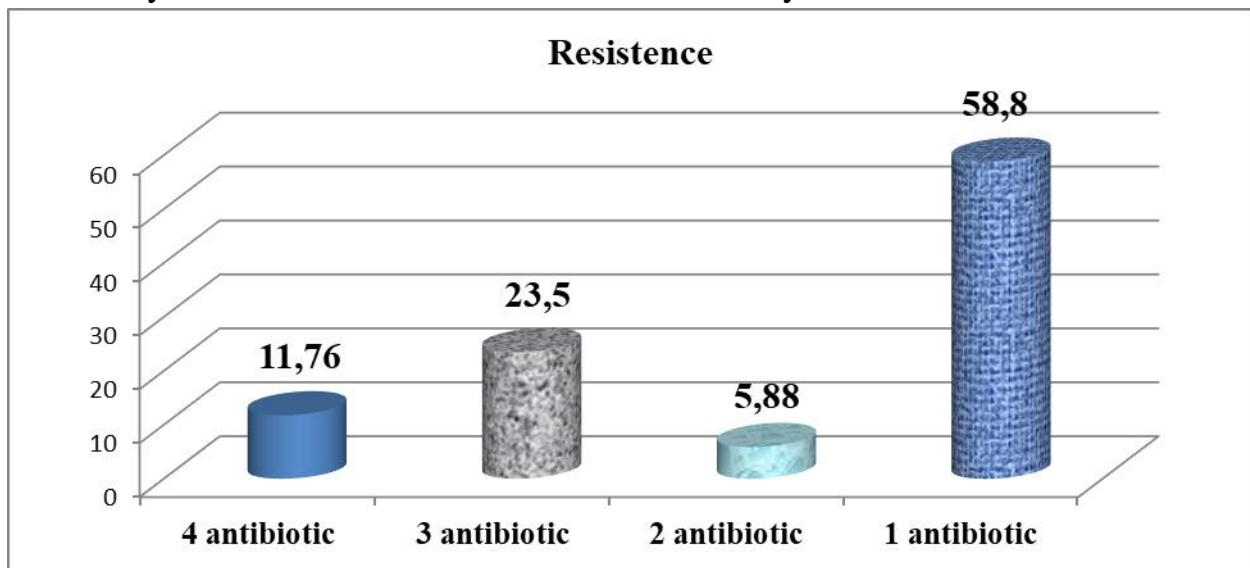


Diagram 3. Sustainability status of *St. aureus* to antibiotics

As can be seen from diagram 3, of the 17 tested strains of *St. aureus*, only two (11.76%) turned out to be multidrug-resistant, that is, they lost sensitivity to 4 antibiotics at the same time. 4 (23.5%) strains were resistant to 3 antibiotics, 1 (5.88%) strain was resistant to 2 antibiotics, and 10 (58.8%) strains were resistant to 1 of 8 antibiotics tested.

1-table

The degree of sensitivity of strains St. aureus to antibacterial drugs

Antibacterial drugs	Sensitivity (%)	Average sensitivity (%)	Insensitivity (%)
Levofloxacin	94.11	11,76	0
Augmentin	82.36	11,76	5,88
Amoxicillin	35,2	17,75	47,05
Tetracycline	76,47	17,64	5,88
Doxycycline	35,2	5,88	17,64
cefoperazone+ sulbactam	94.11	11,76	0
Rifampicin	64,7	23,52	11,78
Levomycesin	47,05	41,17	11,76

As can be seen from Table 1, sensitivity to Augmetin, amoxicillin, cefoperazone + sulbactam, levofloxacin, rifampicin and tetracycline, and additionally levomycin and doxycycline was studied. When analyzing the isolated strains of *St. aureus*, according to the antibiogram data, it was established that most strains are sensitive to levofloxacin and cefoperazone + sulbactam (16 strains - 94.11%), doxycycline and amoxicillin have the lowest bacterial sensitivity - 35.2. amounted to %. The drug rifampicin retained activity against 11 (64.7%) strains; 9 (52.9%) strains did not lose sensitivity to levomycin, 13 (76.4%) strains to tetracycline, and 14 (82.3%) strains to augmentin. Among the antibiotics studied, *St. aureus* showed the highest level of resistance to amoxicillin.

It should be noted that in recent years, many experts in literature reviews have noted that the sensitivity of bacteria to antibiotics is becoming unique in different regions. In addition, pathogenic bacteria become resistant to most antibiotics widely used in medical practice; most bacteria synthesize β -lactamase, which

makes them resistant to antibiotics that have a β -lactam ring in their structure. These mainly include the penicillin and cephalosporin series, therefore, before choosing etiotropic treatment, it is necessary to check the antibiotic resistance of bacteria.

Conclusions. Based on the results of studies of antibiotic resistance, it became clear that the study of the antibiotic sensitivity of bacterial strains isolated from osteomyelitis is important in the rational choice of an antibacterial drug for the treatment of the disease, which not only reduces the length of stay of patients in the hospital, but also prevents the disease from becoming chronic. Thus, the drugs of choice for the treatment of chronic osteomyelitis are levofloxacin, cefoperazone + sulbactam, tetracycline and augmetin.

REFERENCES

1. Amiraslanov Yu.A., Svetuxin A.M., Borisov I.V., Ushakov A.A. // Vibor xirurgicheskoy taktiki pri lechenii bolnix osteomielitom dlinnix kostey v zavisimosti ot xaraktera porajeniya // Xirurgiya. 2016. № 9. S.46-50.4
2. Aytac S., Schnetzke M., Swartman B., Herrmann P., Woelfl C., Heppert V., Gruetzner P., Guehring T. / Posttraumatic and postoperative osteomyelitis: surgical revision strategy with persisting fistula // Arch Orthop. Trauma Surg. – 2014. – Vol. 134 (2). – P. 159-165
3. Kilmotov T.A., Axtyamov I.F., Galmutdinov I.Sh., Gatina E.B., Yeremin, I.K., Aliev E.I., Ismailov X.G. / Lokalnaya antibiotikoterapiya pri infektsii oblasti endoproteza sustava // Kazanskiy meditsinskiy jurnal. – 2014. – №2. – S. 180-184
4. Mamatmusaeva F., Nuruzova Z., Yodgorova N., Abdullaev U., Yuldosheva N., Jumamuradov S./ Biochemical Composition Of Bile In Children Of Convalescents Of Viral Hepatitis «A»// European Journal of Molecular & Clinical Medicine ISSN 2515-8260 Volume 07, Issue 08, 2020, P. 4385-4389
5. Mamatmusaeva F., Tuychiyev L., Nuruzova Z., Yodgorova N., Fayzullayeva Z./ Microscopic composition of bile in children with convalescents of viral hepatitis “A” and “C”// Tematics journal of Microbiology ISSN 2277-2952, Hindiston Vol-5-Issue-3-2021 P. 51-58
6. Mamatmusaeva F., Tuychiyev L., Nuruzova Z., Yodgorova N., Z.Orinboyeva / Optimizing the treatment of biliary disease in children with viral hepatitis/ International Journal of Pharmaceutical Research /Oct-Dec 2020\ Vol 12/, Hindiston, Issue 4, pp. 536-541
7. Nan Jiang, Yun-fei Ma, Yi Jiang, Xing-qi Zhao, Guo-ping Xie, Yan-jun Hu, Cheng-he Qin, Bin Yu / Clinical Characteristics and Treatment of Extremity Chronic Osteomyelitis in Southern China // Medicine. – 2015. – Vol. 94. – No. 42

8. Proxorenko V.M., Pavlov V.V. / Infeksii oblasti xirurgicheskogo vmeshatelstva pri endoprotezirovanii sustavov // Endoprotezirovanie v Rossii: Vseros. monotematich. sb. nauch. statey. Kazan-SPb., 2017. Vip. S. 278-281.

9. Vugt T., Geurts J., Arts J. / Clinical Application of Antimicrobial Bone Graft Substitute in Osteomyelitis Treatment: A Systematic Review of Different Bone Graft Substitutes Available in Clinical Treatment of Osteomyelitis // BioMed Research International. – Vol. 2016. <http://dx.doi.org/10.1155/2016/6984656>