

# СЕКЦІЯ ЕКСПЕРИМЕНТАЛЬНОЇ МЕДИЦИНИ

## FEATURES OF THE SPECIES COMPOSITION OF PATHOGENS SUPPURATIVE INFLAMMATORY PROCESSES IN PATIENTS OF SURGICAL DEPARTMENT OF TERNOPIL UNIVERSITY HOSPITAL

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**Introduction:** Nowadays the risk of purulent-inflammatory infections of postsurgical wounds is remained in the spotlight among health care practitioners. After all, postoperative complications are the reason for a longer and more expensive treatment of surgical diseases, and an increase in mortality. According to the WHO (2014) report, the resistance of microorganisms to antibiotics is one of the most significant problems and the most serious threats to human health

**Aim:** The studying of bacterial species of pathogens isolated from postsurgical wounds in patients of surgical departments of Ternopil University Hospital in 2018, with further analysis of their susceptibility to antibiotics.

**Materials:** The samples were taken from postsurgical wounds, trophic ulcers, polytraumatic injuries and were carried out before the antibiotic therapy.

**Methods:** Species of microorganisms were identified according to standard methods. Determination of the susceptibility of isolates to antibiotics was carried out by Kirby-Bauer method using antibiotic disks (HiMedia, India). WHO-NET 5.1 program was used for statistic on the spectrum of microorganisms and their susceptibility to antibiotics.

**Results:** 66 bacterial strains were isolated, 54. 5% of them were gram-positive cocci. Most of cocci belong to *S. aureus* – 87. 2% (34 isolates); 7. 7 % – to *S. saprophyticus* (3), *S. epidermidis* – 5. 1% (2). Gram negative microorganisms were represented by enterobacteria and nonfermented rod-shaped microbes. Almost a quarter of them were nonfermenting rod (16); 68,8 % isolates of them were *A. baumannii* (11) and 7,6% – *P. aeruginosa* (5). Enterobacteria were isolated in 16. 7% cases: *K. pneumoniae* (6), *E. aerogenes* (4), *E. Coli* (1). All of isolated cocci were susceptible to rifampicin, gentamicin and levofloxacin, 66. 7%-87. 5% to moxifloxacin, ciprofloxacin, norfloxacin, ofloxacin, clindamicin, clarithromycin; and resistance to azithromycin, vancomycin, oxacilin and ertapenem. *P. aeruginosa* were susceptible to meropenem, ciprofloxacin, gatifloxacin, levofloxacin, ceftazidim, cefepim; and resistant to ceftazidime and amikacin. 100 % of *A. baumannii* isolates were resistant to amikacin, cefepim, ceftazidim, ciprofloxacin, levofloxacin, gatifloxacin, gentamicin, imipenem, piperacilin, tazobactam, tobramycin, tikartasilin. All isolates of *Enterobacteria* were resistant to ciprofloxacin, gentamicin, 50%-66. 7% of them – to ceftazidime, ceftazidime, levofloxacin, ertapenem, meropenem, gatifloxacin, amikacin.

**Conclusion:** Thus, the monitoring of a bacterial susceptibility to antibiotics to prevent the development of their multi-resistance should be done. The dominant microorganisms isolated from patients of surgical departments were both gram positive *S. aureus* and gram-negative *A. baumannii*, which should be taken into account when using antibiotics.

## ANTIFUNGAL ACTIVITY OF AMPICILLIN-CHITOSAN-MAGNETITE NANOPARTICLES

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**Relevance:** It is known that broad spectrum antibiotics can cause dysbiosis and candidiasis as side effects. The question is how to preserve the antibacterial properties of these agents and at the same time to prevent the development of fungal infections. Most often, this is achieved by combining with antifungal agents, but there are other possibilities, including those related to iron oxide (II, III), or magnetite, nanoparticles (NPs).

**The purpose of the work:** is to study the antifungal properties of magnetite NPs conjugated with ampicillin and stabilized with polyvinylpyrrolidone (PVP) or chitosan.

**Materials and methods:** A composite NPs with an antibiotic was constructed by the use of initial magnetite NPs 5-8 nm of size obtained by precipitation of the steam flow of iron in sodium chloride crystals in vacuum. They were stabilized with 3% solution of PVP or 1% chitosan solution and conjugated with ampicillin (50 mg / ml). Composite NPs isolated from solutions by magnetic sedimentation were investigated. The hydrodynamic size of the NPs was determined by the method of laser correlation spectroscopy. Their antifungal activity was studied by the standard serial dilutions method using a reference strain of *Candida albicans* ATCC 10231 and a clinical isolate of *Candida albicans*.

**Results:** It is shown that in the samples with ampicillin an average hydrodynamic size of particles is 640 nm (with PVP) or 410 nm (with chitosan). It is found that magnetite NPs, stabilized by PVP and loaded with beta-lactam antibiotic, did not inhibit the growth of test cultures of the standard strain *Candida albicans* ATCC 10231 and the clinical isolate of *Candida albicans*. At the same time, if chitosan was used to stabilize the NPs, these particles have antifungal activity with a minimum fungistatic concentration within the range of 10-5. 5 µg / ml. It does not significantly differ for the standard strain and clinical isolate of *Candida albicans*.