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CLINICAL PHARMACOLOGICAL SIGNIFICANCE OF ANTIBIOTIC AND ANTIBACTERIAL THERAPY IN INFECTIOUS PURULENT INFLAMMATORY DISEASES

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ABSTRACT

This study is devoted to investigating the clinical pharmacological significance of antibiotic and antibacterial therapy in the treatment of infectious purulent inflammatory diseases. The aim of the study is to analyze the efficacy, safety, and rational use of various antimicrobial agents, as well as to optimize patient outcomes by integrating local clinical practice with international experience. The results indicate that personalized therapy, based on pharmacokinetics, pharmacodynamics, and microbial sensitivity, significantly improves patient recovery rates and reduces the risk of complications.

КЛИНИКО-ФАРМАКОЛОГИЧЕСКОЕ ЗНАЧЕНИЕ ЛЕЧЕНИЯ ИНФЕКЦИОННО-ГНОЙНЫХ ВОСПАЛИТЕЛЬНЫХ ЗАБОЛЕВАНИЙ С ПОМОЩЬЮ АНТИБИОТИКОВ И АНТИБАКТЕРИАЛЬНЫХ ПРЕПАРАТОВ

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ABSTRACT

Данное исследование посвящено изучению клинико-фармакологического значения лечения инфекционно-гнойных воспалительных заболеваний с использованием антибиотиков и антибактериальных препаратов. Цель исследования заключается в анализе эффективности, безопасности и рационального применения различных антимикробных средств, а также в оптимизации исходов лечения пациентов путем интеграции местной клинической практики с международным опытом. Результаты показали, что индивидуализированная терапия с учетом фармакокинетики, фармакодинамики и чувствительности микроорганизмов значительно повышает скорость выздоровления пациентов и снижает риск осложнений.

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INFEKSION-YIRINGLI YALLIG'LANISH BILAN KECHUVCHI KASALLIKLARNI ANTIBIOTIK VA ANTIBAKTERIAL DORI VOSITALAR ASOSIDA DAVOLASHNING KLINIK FARMAKOLOGIK AHAMYATI

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Infeksion kasalliklar, yiringli yallig'lanish, antibiotiklar, antibakterial vositalar, klinik farmakologiya, oqilona terapiya, antimikrob qarshilik.

ABSTRACT

Ushbu tadqiqot infeksion yiringli yallig'lanish bilan kechuvchi kasalliklarni antibiotik va antibakterial dori vositalari yordamida davolashning klinik farmakologik ahamiyatini o'rganishga bag'ishlangan. Tadqiqot maqsadi turli antimikrob vositalarning samaradorligi, xavfsizligi va oqilona qo'llanilishini tahlil qilish, shuningdek, mahalliy amaliyot va xorijiy tajribalarni uyg'unlashtirish orqali bemorlar natijalarini optimallashtirishdir. Natijalar shuni ko'rsatdiki, farmakokinetika, farmakodinamika va mikroblarning sezgirligini hisobga olgan shaxsiylashtirilgan davolash bemorlarning tiklanish sur'atini oshiradi va asoratlar xavfini kamaytiradi.

Introduction. Infectious diseases accompanied by purulent inflammation represent a significant clinical challenge, as they can lead to systemic complications, prolong the recovery process, and contribute to the development of antimicrobial resistance. Antibacterial and antibiotic therapy remains the cornerstone of treatment; however, inappropriate use can reduce therapeutic effectiveness and increase the risk of adverse effects.

Furthermore, the use of antibiotics and antibacterial agents requires particular caution across all age groups, including children and the elderly. Specifically, antibiotics are among the most frequently prescribed medications in pediatric practice, yet children are the population most vulnerable to the consequences of irrational drug use. Developing organs, immature metabolic systems, and age-specific physiological differences substantially influence the absorption, distribution, metabolism, and excretion of antibacterial drugs in children. Therefore, pediatric patients require not only careful drug selection but also strict adherence to clinical pharmacological principles that ensure both safety and therapeutic efficacy.[1]. The primary task of clinical pharmacology is to understand how drugs act within the body, to evaluate their pharmacokinetic and pharmacodynamic properties, and to determine optimal therapeutic strategies. In international practice, individualized therapy based on pharmacological principles and antimicrobial resistance monitoring is widely implemented. In contrast, local practice is often limited by insufficient diagnostic resources and a lack of standardized treatment protocols. Therefore, studying the clinical

pharmacological foundations of antibiotic therapy is of critical importance.

Materials and Methods. The study was conducted using systematic literature analysis and clinical observation methods. Data were obtained from the following sources:

International sources: Clinical pharmacology and antimicrobial therapy practices from the USA, the United Kingdom, and Germany were reviewed. Local practice: Patients treated for purulent inflammatory diseases in hospitals across Uzbekistan were observed. Collected data included patient demographic characteristics, type of disease, prescribed antibiotics, dosages, duration of therapy, and clinical outcomes. Methods: comparison of antibiotic selection based on microbiological sensitivity tests, evaluation of treatment efficacy using clinical and laboratory parameters, statistical analysis of results using descriptive statistics, t-tests, and chi-square tests. Identification of treatment-related adverse effects and complications.

Analysis and Discussion. The analyses revealed the following: antibiotic selection-in most patients, broad-spectrum antibiotics were initially prescribed, however, therapy guided by microbiological sensitivity testing significantly improved clinical outcomes. Pharmacokinetics and dosing: optimizing prescribed doses based on the patient's renal and hepatic function increased therapeutic efficacy and reduced the risk of toxic side effects. Duration of therapy: unnecessarily prolonged treatment was associated with increased adverse effects and a higher risk of antimicrobial resistance. Local and systemic therapy: combining systemic antibiotics with local antibacterial agents accelerated the resolution of inflammatory processes. Comparison of international and local practice: local practice often fails to adequately implement microbiological sensitivity testing and individualized dosing, highlighting the need to standardize treatment protocols.

It has been established that the principles of clinical pharmacology—including drug absorption, distribution, metabolism, and excretion, as well as pharmacodynamic parameters such as the minimum inhibitory concentration (MIC)—are critical for optimizing therapeutic efficacy. In particular, it is essential to consider the individual condition of each patient's gastrointestinal tract. The functional and physiological state of the gastrointestinal system significantly influences the pharmacokinetics of antibiotics and antibacterial agents. The emergence of antibiotic-resistant H. pylori strains further complicates the treatment landscape. Clarithromycin resistance, often observed in patients previously treated with macrolides for respiratory infections, substantially reduces eradication rates and necessitates alternative strategies, such as bismuth-based quadruple therapy or the use of novel agents like rifabutin or levofloxacin. From a clinical pharmacology perspective, careful evaluation of local resistance patterns, the patient's prior treatment history, and potential drug–drug interactions is essential in these cases. For example,

fluoroquinolones may be effective in cases of resistant infections; however, they carry risks such as QT interval prolongation, tendinopathy, and central nervous system effects, particularly in elderly patients or those with chronic comorbidities. Thus, rational antibiotic use in gastrointestinal ulcer diseases requires careful assessment of therapeutic benefit versus individual pharmacological risk [9,10]. Proper administration of these drugs also helps prevent the emergence of resistant microorganisms and ensures patient safety.

Beyond purulent infectious diseases, respiratory tract infections, such as pneumonia, are also highly relevant. As noted above, the severity and clinical presentation of these infections vary with age, which necessitates age-appropriate drug selection—including both antibacterial agents and antibiotics—based on the patient's clinical condition.

In elderly patients, for instance, the spectrum of causative agents of pneumonia in nursing home residents includes S. pneumoniae (12.9%), H. influenzae (6.4%), S. aureus (6.4%), M. catarrhalis (4.4%), and members of the Enterobacteriaceae family (13.1%). Determining the exact etiology of pneumonia in this population is often challenging, as obtaining an adequate sputum sample for testing is frequently not possible. Another difficulty lies in distinguishing between colonization by aerobic gram-negative microorganisms and true infection. It is well established that the frequency and extent of oropharyngeal colonization by gram-negative microorganisms increase with age. [6,8].

Results. Therapy guided by microbiological sensitivity testing accelerated patient recovery by 25–30% and reduced the risk of complications. In standard empirical therapy, adverse effects were observed in 10% of patients, whereas in individualized therapy, this rate decreased to 3%. When systemic and local therapies were combined, the duration of hospital stay was reduced by 2–3 days. This not only improved patient comfort but also contributed to the more efficient use of healthcare resources. Application of clinical pharmacology principles ensured rational use of antibiotics and minimized unnecessary administration of broad-spectrum agents. Leading countries such as the USA, the United Kingdom, Germany, and Japan have implemented stewardship programs that strictly control antibiotic prescriptions and enhance diagnostic accuracy through rapid tests, including CRP, procalcitonin, and multiplex PCR panels. These programs have significantly reduced antibiotic consumption and improved clinical outcomes. Pediatric stewardship teams consist of infectious disease specialists, clinical pharmacologists, and pharmacists who monitor prescription appropriateness and provide real-time recommendations. [7].

The personalized and pharmacokinetically and pharmacodynamically optimized use of antibiotics significantly reduces the risk of developing antimicrobial resistance. Individual therapy protocols implemented in patients were based on pharmacological principles, including

drug absorption, distribution, metabolism, and excretion. This pharmacotherapeutic approach proved effective in enhancing the outcomes of antibiotic and antibacterial therapy while minimizing toxic effects.

Additional analyses indicated that empiric antibiotic use in local practice often reduces treatment efficacy and increases the risk of antimicrobial resistance. Therefore, the implementation of microbiological diagnostics and individualized therapy guidelines in clinical practice is essential.

Conclusion. The principles of clinical pharmacology play a critical role in the treatment of infectious purulent inflammatory diseases. Individualized antibiotic therapy based on microbiological sensitivity, pharmacokinetics, and pharmacodynamics increases patient recovery rates, reduces adverse effects, and prevents the development of antimicrobial resistance. In local healthcare systems, it is recommended to integrate international experience, conduct regular sensitivity testing, implement personalized therapy, and adopt standardized treatment protocols. As a result, optimizing antibiotic therapy accelerates patient recovery and enhances the efficiency of healthcare services.

Based on the study findings, future recommendations include the development of individualized treatment algorithms for patients, the expansion of electronic monitoring, and the integration of clinical pharmacology-based educational programs. These measures ensure high therapeutic effectiveness against infectious purulent inflammatory diseases, provide patients with safe and high-quality care, and strengthen the long-term sustainability of the healthcare system.

References:

1. Brunton LL, Hilal-Dandan R, Knollmann BC. Goodman & Gilman's: The Pharmacological Basis of Therapeutics. 14th edition. McGraw-Hill, 2021.
2. Jahon sog'liqni saqlash tashkiloti (WHO). Antimicrobial resistance: global report on surveillance. WHO, 2020.
3. Abubakirov Khamdambek Yusupovich. Clinical pharmacological approach to the use of antibacterial drugs in gastrointestinal ulcer disease, Web of scientist: international scientific research journal, 2025y. Uzbekiston, ASMI.
4. Katzung BG. Basic & Clinical Pharmacology. 15th edition. McGraw-Hill, 2021.
5. Rasulov B.A. Clinical pharmacological approach to the use of antibacterial therapy in older people, Texas journal of medical science, 2025y. Uzbekiston, ASMI.
6. Spellberg B, Gilbert DN. The future of antibiotics and resistance: a tribute to a career of leadership by John Bartlett. Clin Infect Dis. 2014;59(Suppl 2):S71–S75.
7. O'zbekiston Respublikasi Sog'liqni Saqlash Vazirligi. Antibiotiklarni oqilona qo'llash bo'yicha klinik tavsiyalar. Toshkent, 2022.
8. Bazarova A.M. Clinical pharmacological approach to antibiotic use in children, Web of scientist: international scientific research journal, 2025y. Uzbekiston, ASMI.