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Susceptibility of microorganisms involved in urinary tract infections: international literature trends and findings

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Introduction

Urinary tract infections (UTIs) represent a significant public health issue, ranking among the most common bacterial infections globally. The pathogens involved in UTIs are increasingly developing resistance mechanisms to antibiotics, complicating treatment and raising the risk of complications. The analysis of international literature provides insight into current trends regarding the susceptibility of these microorganisms to antimicrobial agents.

Material and methods

A systematic review was conducted using international databases (PubMed, ScienceDirect, Scopus), covering the period 2015–2024. The review included observational studies, multicenter clinical research, and microbiological surveillance reports concerning the susceptibility profiles of the main species involved in UTIs: *Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Enterococcus faecalis,* and *Pseudomonas aeruginosa*.

Rezults

The analysis of international literature confirms the dominance of *E. coli* as the primary uropathogen. Resistance rates among *E. coli* strains are concerning, with up to 75% showing resistance to fluoroquinolones and third- and fourth-generation cephalosporins.

Additionally, extended-spectrum beta-lactamase (ESBL)-producing *E. coli* strains have become increasingly prevalent, especially in hospitalized patients and individuals with recurrent infections. *K. pneumoniae*, the second most frequently isolated pathogen in UTIs, demonstrates high levels of multidrug resistance. Carbapenem resistance has been documented in 26.4% of isolates, and resistance to aminoglycosides and cephalosporins is also on the rise. Pseudomonas aeruginosa has shown an alarming resistance profile in nosocomial UTIs. Studies report resistance rates of 69% to carbapenems, 75% to aminoglycosides, and 65.4% to third-generation cephalon-sporins. *P. mirabilis*, although less prevalent, is another important pathogen, particularly in catheter-associated UTIs. It exhibits notable resistance to tetracyclines and trimethoprim-sulfamethoxazole. *E. faecalis* have shown high resistance rates to commonly used antibiotics: 62.43% for *E. faecalis* and 65.18% for *E. faecium*. Moreover, vancomycin-resistant enterococci are increasingly reported, complicating treatment and infection control measures.

Conclusions

The increased resistance of UTI pathogens to commonly used antibiotics highlights the need for continuous monitoring of susceptibility profiles and the adaptation of therapeutic guidelines based on local and regional data. The implementation of effective antibiotic stewardship strategies and the promotion of rational antimicrobial use are essential for preventing the spread of resistance and ensuring the efficacy of available treatments.

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