

The international debate on The relation between antibiotic use and changes of antimicrobial resistance at intensive care unit

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ABSTRACT:

Statement of the Problem: Antimicrobial resistance in major bacterial pathogens has become a serious medical health problem. To provide reference data or guideline for treatment of antimicrobial therapy, we studied a change pattern in the antimicrobial resistance rates of clinically important microorganisms at a veteran's hospital. In general, higher resistance rates are observed among intensive-care-unit (ICU) isolates than non-ICU isolates. Antimicrobial resistance is an emerging problem for ICU. Therefore, we also studied the trend of antibiotic consumption in ICU at the same hospital between 2012 and 2016. **Methodology & Theoretical Orientation:** Susceptibility data were collected from Seoul VHS Hospital's EMR (Electronic Medical Record) system and antimicrobial resistance monitoring system annual report between 2012 and 2016. We used days of therapy (DOT) to calculate the annual antibiotic consumption for 17 antibiotic groups, retrospectively. **Findings:** Total number of detected bacteria in the medical center was 96,410. Frequently isolated organisms in decreasing order were *Staphylococcus aureus* (12%), *Pseudomonas* spp. (10%), *Acinetobacter* spp. (10%), *Klebsiella* spp. (9%). Methicillin-resistant *S. aureus* (MRSA), vancomycin-resistant *S. aureus* (VRSA), vancomycin-resistant *Enterococcus* spp. (VRE), multidrug-resistant *P. aeruginosa* (MRPA), multidrug-resistant *Acinetobacter baumannii* (MRAB) and carbapenem-resistant *Enterobacteriaceae* (CRE, *Klebsiella pneumoniae*) were isolated at 75~80%, 0%, 12~37%, 10~15%, 55~68% and 2~15%, respectively; the resistance rate increased gradually. Average annual antibiotic consumption during 2012–2016 was 18002 DOT/year. The prescription rates of injection antibiotics are in the order of glycopeptide, carbapenem, β -Lactam/ β -Lactamase inhibitor, 3rd generation cephalosporin, 1st generation cephalosporin and quinolone. However, no statistically significant change in the total amount of antibiotics was observed during the study period. Consumption of 2nd generation cephalosporin, lincosamide, monobactam and aminoglycoside was significantly decreased, while that of β -lactam/ β -lactamase inhibitor, 3rd and 4th generation cephalosporin, carbapenem, quinolone, polymyxin, glycycline and oxazolidinone with broad spectrum increased significantly. **Conclusion & Significance:** High rates of antibiotic consumption were associated with high resistance rates of microorganisms. The increase of multidrug-resistant microorganisms requires an update of guidelines and a more strict control of antibiotics. **Recent Publications** 1. Ji M, et al. (2017) Trends in microorganisms isolated from blood cultures at a veterans hospital from 2012 to 2015. *Journal of Laboratory Medicine and Quality Assurance* 39(3):141–146. 2. Bryce E A and J A Smith (2015) Focused microbiological surveillance and Gram-negative beta-lactamase-mediated resistance in an intensive care unit. *Infection Control: Hospital Epidemiology* 16(6):331–334. 3. Kang C-I (2015) Antimicrobial therapy for infections caused by multidrug-resistant Gram-negative bacteria. *Korean Journal of Medicine* 88(5):502. 4. Jun K I et al. (2013) Trends in antibiotic use in a single university hospital. *Korean Journal of Nosocomial Infection Control* 18(2):44. 5. Shin K A and S K Hong S B (2013) Change pattern of species and antimicrobial susceptibility of microorganisms isolated from blood culture. *J Exp Biomed Sci* 19:245–53.

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