Antibiotic consumption and resistance patterns of major Gram-negative bacteria in the Teaching Hospital of Infectious Diseases from Cluj-Napoca

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BACKGROUND

The rate of antibiotic resistance is increasing in community and healthcare-associated infections. The inappropriate and excessive use of antimicrobials is a major factor responsible for the development and spread of antimicrobial resistance in acute care settings.

OBJECTIVES

The objective of this study was to analyse the trends in antibiotic consumption and local resistance patterns of Gram-negative bacteria.

METHODS

We conducted a prospective study that involved the computerised pharmacy database from 2007 to 2015 and laboratory-based surveillance of antimicrobial resistance during 2010-2015 in the Teaching Hospital of Infectious Diseases, Cluj-Napoca.

Targeted microorganisms included *E.coli*, *Klebsiella* spp., *P. aeruginosa* and *Acinetobacter* spp. Identification of strains and antibiotic susceptibility tests were performed with API bioMerieux system or Vitek-2. Antimicrobial consumption was expressed as defined daily doses/100 bed-days (DDD/100BD), according to anatomic therapeutic chemical classification (WHO, version 2005).

RESULTS

Total mean antibiotic use remained stable over time (160.46 DDD/100BD, 95%CI 148 to 172). Overall penicillins were the main antibiotics used. Significant decreased consumption of penicillins (+/- betalacatamase-inhibitors) and significant increasing trends for 3rd generation cephalosporins, carbapenems and colistin consumption were reported [Fig.1]. Penicillins consumption was associated with decreased incidence density of ESBL-producing *E. coli* (OR 1.68, 95%CI 1.27-2.2) and ESBL-producing *Klebsiella* spp. (OR 1.87, 95%CI 1.43-2.4) [Fig.2]. A significant relationship between carbapenems consumption and incidence density of carbapenem-resistance was observed [Fig.3].

Fig.1 - TREND OF ANTIBIOTICS CONSUMPTION

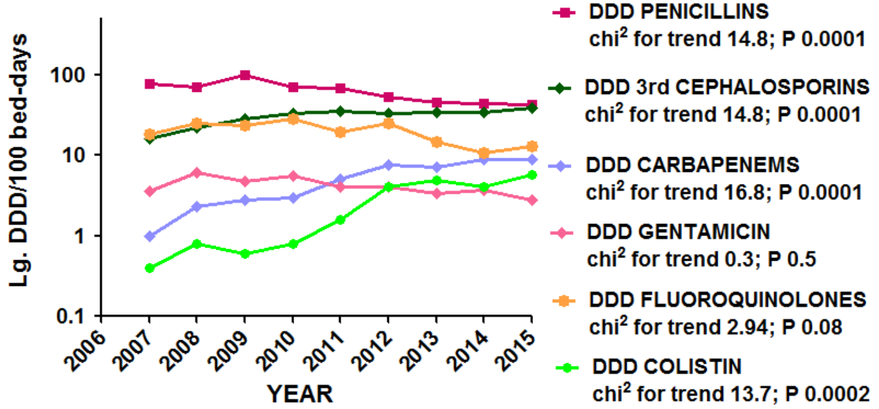


Fig.3 - CARBAPENEM-RESISTANCE AND CARBAPENEMS CONSUMPTION

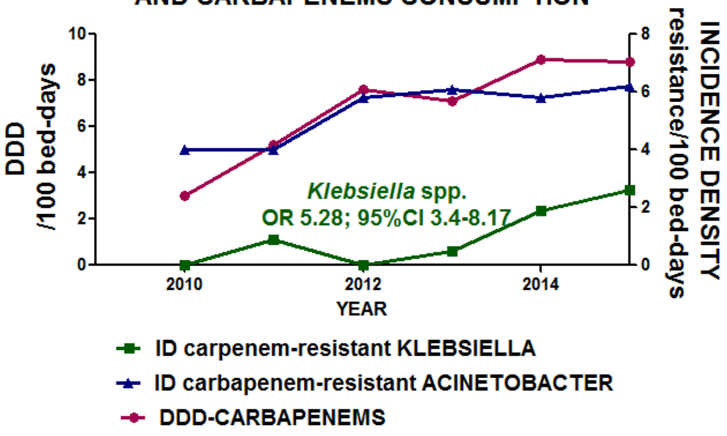
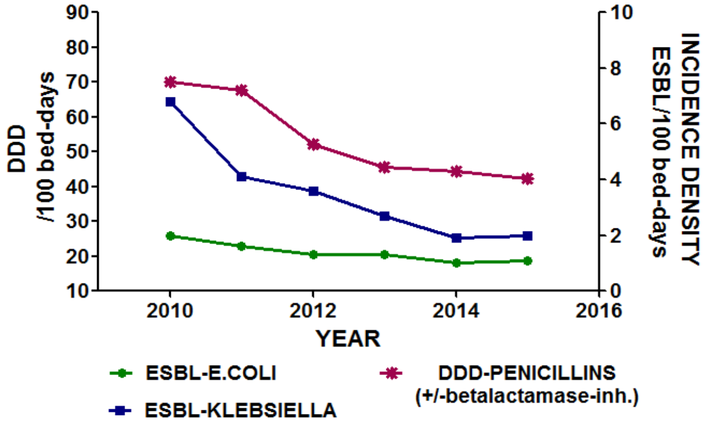


Fig.2 - TREND OF PENICILLINS CONSUMPTION AND INCIDENCE DENSITY OF ESBL-PRODUCING BACTERIA



CONCLUSION

This study highlighted significant relationship between antibiotic use and antimicrobial resistance of major Gram-negative bacteria.

The restriction of antibiotic overuse, especially of broad-spectrum antibiotics, is essential to limit the emergence of resistant strains.