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Antimicrobials: Epidemiology of MDR-Gram-negatives

Clinical and bacteriological epidemiology of extended-spectrum beta-lactamases-producing Enterobacteriaceae in a French hospital: an observational study

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Background: Infections caused by extended spectrum β-lactamases (ESBL)-producing Enterobacteriaceae have been increasing worldwide and could be associated with increased morbidity, mortality and high healthcare associated costs. Carbapenems constitute the treatment of choice but their large use is associated with emergence of carbapenemase-producing bacteria. Piperacillin-tazobactam (PTZ) and cephalosporins could represent alternative therapies. New guidelines of susceptibility to cephalosporins were adopted in 2009. In that context, the aim of the study is i) to describe management of such infections in real life ii) to update epidemiological data concerning susceptibility of ESBL-producing Enterobacteriaceae to ATB.
Methods: From may 2012 to may 2013, each positive bacteriological sample for ESBL-producing Enterobacteriaceae detected in our hospital was reported from the bacteriology department to the infectious disease department (IDD). A physician or a pharmacist of the IDD retrospectively retrieved the medical file of each patient and abstracted clinical and microbiological data before and after ESBL report.
Results: A total of 653 ESBL positive isolates (456 different bacteria) were notified and corresponded to 316 colonisations (among 162 patients) and 209 infections (among 174 patients) including 53 bacteremia (25% of infections). The mean age of infected patients was 65 years. In the last 3 months before ESBL infection, 101 patients had taken ATB (65%), 112 had been hospitalised (64%) and 21 travelled to a foreign country (12%). Thirty-five were diabetic (20%), 62 were immunosuppressed (36%). Infections were mainly nosocomial (N=119, 57%). Site of infection was mostly urinary (N=87, 42%) followed by digestive (N=59, 28%) and pulmonary (N=26, 12%). *Escherichia coli* and *Klebsiella pneumoniae* represented 208 and 126 of isolated bacteria involved in infections or colonisations, respectively (46% and 28%). Isolated bacteria were all susceptible to imipenem (456), 228 were susceptible to PTZ (50%), and 3 to cefotaxime (1%). Empirical treatment was PTZ for 70 patients (33%), carbapenem for 59 patients (28%) and cephalosporin for 39 patients (19%) and was inadequate for 121 patients (58%). Among the inadequate empirical treatment, only 79% (96) were adapted to the results of antibiotics susceptibility testing. Twenty-five ESBL infected patients died (12%) and there were 35 transfers to intensive care unit (17%).
Conclusion: Infections due to ESBL-producing Enterobacteriaceae had a high mortality rate. Empirical treatment was adequate in only 42% of infections. According to new guidelines, 99% of ESBL-producing Enterobacteriaceae were resistant to cephalosporins, which might suggest that they should not be prescribed in empirical treatment. In order to improve management of those severe infections and to enhance adequacy of empirical antibiotherapy, it would be relevant to better identified patients with high risk of ESBL infection and to have quick test to rapidly determine which infections is due to ESBL-producing bacteria.