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Optimization of carbapenems in intra-abdominal infection

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Background: The spread of multidrug-resistant (MDR) microorganisms has become a serious public health problem worldwide. The use of broad-spectrum antibiotics, such as carbapenems, is often necessary in the context of severe intra-abdominal infections, although their overuse may result in an increasing of resistances. Several factors that suggest the presence of MDR microorganisms have been identified. The aim of this study was to analyze the usefulness of known risk factors to identify biliary tract infections caused by extended-spectrum beta-lactamase (ESBL)-producing bacteria.

Material/methods: We prospectively reviewed all patients evaluated by the Stewardship Group at General Surgery Service in a third-level hospital in Spain from January to June 2016. Clinical, epidemiological and microbiological data and laboratory findings were reviewed. Risk factors of presence of ESBL-producing bacteria were recorded, according to Spanish guidelines of intraabdominal infection proposed in 2009 (Guirao, 2009). In 2015 those criteria were reviewed, and according to the value of each criteria, two cut-offs were proposed: a 3-points predictive score and an 8-points predictive score (Rodríguez Baño, 2015).

Results: Two hundred and ten patients were reviewed, and 131 of them (62%) were in 4th day of antibiotic therapy. In this group, there were 70 men (53%), mean age 68 years (SD=15 years). The most frequent reasons for antibiotic treatment were intraabdominal abscess (17%) or cholecystitis (16%). The initial antimicrobial agent was a carbapenem in 73 patients (56%), piperacillin-tazobactam in 24 (18%) and amoxicillin-clavulanic acid in 21 patients (16%). Surgery was performed in 75 patients (59%). The most frequent microorganisms isolated were: *E. coli* (22%; 2% ESBL-producing), *E. faecalis* (11%) and *E. faecium* (5%). *E. cloacae* ESBL-producing was isolated in 3% of cultures. Five patients died, one of them due to infectious cause.

Sensitivity, specificity and positive and negative predictive values for risk factors proposed by 2009 Spanish guidelines as predictors of ESBL-producing *enterobacteria* were 50%, 45%, 9% and 88%, respectively; for “3-points predictive score” in 2015 Spanish guidelines, 66%, 33%, 10% and 89%, respectively; and for “8-points predictive score” in 2015 Spanish guidelines, 16%, 90%, 16% and 90%, respectively. Despite the high negative predictive value of all these 3 scores, carbapenems were chosen as initial therapy in 50% of patients without 2009-Risk Factors, in 38% of patients without “3-points predictive score”-risk factors and in 89% of patients without “8-points predictive score”-risk factors.

Conclusions: This study shows how risk factors proposed in intraabdominal infection caused by ESBL-producing bacteria present a high negative predictive value. Scores could be useful in order to reduce the overuse of carbapenems and other broad-spectrum antibiotic treatments as initial therapy in patients with such infections.