Carbapenem Resistance, Initial Antibiotic Therapy, and Mortality in Klebsiella pneumoniae Bacteremia: A Systematic Review and Meta-Analysis

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BACKGROUND Mortality associated with infections caused by carbapenem-resistant Enterobacteriaceae (CRE) is higher than mortality due to carbapenem-sensitive pathogens. OBJECTIVE To examine the association between mortality from bacteremia caused by carbapenem-resistant (CRKP) and carbapenem-sensitive Klebsiella pneumoniae (CSKP) and to assess the impact of appropriate initial antibiotic therapy (IAT) on mortality. DESIGN Systematic review and meta-analysis METHODS We searched MEDLINE, EMBASE, CINAHL, and Wiley Cochrane databases through August 31, 2016, for observational studies reporting mortality among adult patients with CRKP and CSKP bacteremia. Search terms were related to Klebsiella, carbapenem-resistance, and infection. Studies including fewer than 10 patients per group were excluded. A random-effects model and meta-regression were used to assess the relationship between carbapenem-resistance, appropriateness of IAT, and mortality. RESULTS Mortality was higher in patients who had CRKP bacteremia than in patients with CSKP bacteremia (15 studies; 1,019 CRKP and 1,148 CSKP patients; unadjusted odds ratio [OR], 2.2; 95% confidence interval [CI], 1.8-2.6; I2=0). Mortality was lower in patients with appropriate IAT than in those without appropriate IAT (7 studies; 658 patients; unadjusted OR, 0.5; 95% CI, 0.3-0.8; I2=36%). CRKP patients (11 studies; 1,326 patients; 8-year period) were consistently less likely to receive appropriate IAT (unadjusted OR, 0.5; 95% CI, 0.3-0.7; I2=43%). Our meta-regression analysis identified a significant association between the difference in appropriate IAT and mortality (OR per 10% difference in IAT, 1.3; 95% CI, 1.0-1.6). CONCLUSIONS Appropriateness of IAT is an important contributor to the observed difference in mortality between patients with CRKP bacteremia and patients with CSKP bacteremia. Infect Control Hosp Epidemiol 2017;1-10.