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Oral Session
Healthcare - associated infections - from analysis to interventions

MULTI-DRUG RESISTANCE IS AN IMPORTANT RISK FACTOR FOR INAPPROPRIATE EMPIRIC THERAPY AMONG ICU PATIENTS WITH GRAM-NEGATIVE SEPSIS: A COHORT STUDY

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Objectives: Inappropriate empiric antimicrobial therapy (IEA), defined as treatment with initially prescribed antibiotics not active in vitro against the identified pathogens, and/or failing to administer an appropriate antimicrobial treatment within 24 hours of hospital admission, carries an increased risk of death. Escalating antimicrobial resistance makes it difficult for clinicians to select appropriate empiric coverage. We hypothesized that among ICU patients with Gram-negative bacteremia (GN-BSI), multi-drug resistance (MDR) is a strong predictor of IEA.

Methods: We conducted a single-center retrospective cohort study, 2008-2012, of adult ICU patients at Barnes-Jewish Hospital, a 1200-bed urban teaching hospital. We identified critically ill patients with GN-BSI complicated by severe sepsis or septic shock. We determined the culprit pathogen and defined as MDR the following organisms: MDR *Pseudomonas aeruginosa* (MDR-PA; resistance to ≥3 anti-pseudomonal classes), extended spectrum beta-lactamase (ESBL) and carbapenemase producing (CP) organisms. Descriptive statistics to compared patients with MDR to those without and logistic regression estimated the impact of MDR on IEA risk. Proportions and odds ratios (OR) with 95% confidence intervals (CI) are presented for categorical variables; median values with interquartile ranges (IQR) for continuous.

Results: Out of 1,076 patients with GN-BSI, 63 (5.8%) tested positive for a MDR pathogen, 26 of which were MDR-PA, 33 ESBL and 10 CP organisms (6 samples had multiple MDRs). Patients with MDR did not differ from those without MDR in terms of age, race or APACHE II score. They had a marginally higher chronic disease burden than those with non-MDR (median Charlson score 5 [IQR 3, 8] vs. 4 [2, 7], p=0.082), and were slightly less likely to be admitted from home (OR 0.66, 95% CI 0.40-1.11). They were more likely than those without MDR to have the following risk factors for a healthcare-associated infection: hemodialysis (OR 2.88, 95% CI 1.50-5.51), prior hospitalization within 90 days (OR 3.00, 95% CI 1.50-5.98), and immune suppression (1.79, 95% CI 1.07-3.01). In addition, they had higher odds of receiving prior antibiotics within 90 days (OR 1.60, 95% CI 0.93-2.74) and to have had a prior bacteremia within 30 days (OR 2.09, 95% CI 1.12-3.89) of onset of current BSI. Hospital mortality among patients with MDR (50.9%) was double that among persons without (27.9%), p<0.001. The OR of receiving IEA among MDR relative to those without MDR was 11.79, 95%, CI 6.55-21.23. In a logistic regression adjusting for important covariates, harboring an MDR pathogen remained a strong predictor of IEA (adjusted OR 13.05, 95% CI 7.00-24.31).

Conclusions: Although MDR pathogens are infrequent in GN-BSI complicated by severe sepsis or septic shock, they are associated with elevated mortality. The mechanism for this elevation is likely the dramatic increase in the odds of receiving IEA if infected with an MDR organism.