Path to Resistance: Risk Factors Associated With Carbapenem-Resistant Pseudomonas aeruginosa

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**Results:**

Traditional risk factors for resistance include ICU stay, mechanical ventilation, previous hospitalization and major comorbidities. As microbes evolve, risk factors also may evolve.

**Purpose:**

To determine if traditional and/or new risk factors for *P. aeruginosa* resistance are valid and predictive of infection with carbapenem-resistant *P. aeruginosa*.

**Methods:**

We retrospectively studied inpatients and outpatients ≥ 18 years old who presented to an Aurora Health Care facility with a positive *P. aeruginosa* culture during 2014. Cultures were obtained from the ACL Laboratories database, and patient medical records were reviewed in Epic. Chi-squared test with Yates correction and two-sample t-tests were performed on categorical and continuous variables, respectively. Binary regression was used for multivariable modeling. Significance was associated with P<0.05.

**Results:**

Study population (N=1,763) characteristics were: mean age 68.0, body mass index 30.4 kg/m², 51.2% female sex, and 89.3% white race. Resistance to imipenem or meropenem (14.0%) on univariable analysis was associated with younger age (66.0 vs 68.3 years, P=0.027), hospitalized patients (19.7% vs 8.6%, P=0.0001), male sex (16.0% vs 12.0%, P=0.017), nonwhite race (23.5% vs 12.3%, P=0.0001), respiratory culture (30.9% vs 12.1%, P=0.0001), history of pulmonary disease (19.4% vs 12.9%, P=0.005), history of congestive heart failure (18.6% vs 13.0%, P=0.016), history of multidrug resistance (33.3% vs 13.6%, P=0.003) and recent surgery (17.8% vs 12.2%, P=0.002), as well as transfer from institution, Foley catheter, vasopressor treatment, central/PIC lines, mechanical ventilation, ICU admission, and bedridden status (all P=0.0001). In multivariable modeling, nonwhite race, respiratory culture, recent transfer, vasopressor use and central/PIC lines were significant. Only 0.57% of strains were resistant to the six traditional non-carbapenem drugs and both carbapenems.

**Conclusion:**

Demographic and traditional risk factors, as well as respiratory cultures, were predictive of carbapenem resistance. Such information may guide initial antibiotic treatment of *P. aeruginosa*. Fortunately, less than 1% of strains were resistant to all drugs tested. Further studies looking at change in outcome while incorporating these risk factors in determination of empiric coverage for patients should be performed.