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O0129 Positive correlation of carbapenem-non-susceptible Pseudomonas aeruginosa and Enterobacteriaceae rates in US hospitals

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Background: Carbapenem-resistant Enterobacteriaceae receive attention globally. However, recent data demonstrate a growing threat from carbapenem-resistant *Pseudomonas aeruginosa* (PsA), with resistance levels of 30% reported in intensive care units. Due to overlapping risk factors, institutions may experience a double threat from PsA and Enterobacteriaceae. We examined their correlation within US hospitals.
Materials/methods: We analyzed electronic microbiological data (1 April-30 June 2017) from the BD Insights Clinical Research Database (Becton, Dickinson & Co., Franklin Lakes, NJ, USA). Non-duplicate PsA or Enterobacteriaceae (*E. coli, K. pneumoniae, K. oxytoca, E. aerogenes, E. cloacae, S. marcescens, C. freundii, P. mirabilis, M. morganii*) isolates were considered carbapenem non-susceptible (CNS) if they tested resistant/intermediate to imipenem, meropenem, doripenem, or ertapenem as per CDC definitions. CNS PsA and Enterobacteriaceae rates and their correlation (Pearson) were analyzed across all included hospitals. Analysis was stratified by teaching status, hospital size, and infection onset (isolates obtained ≤3 [community-onset] vs. >3 [hospital-onset] days from admission).
Results: Of 416 US hospitals considered, 287 tested both PsA and Enterobacteriaceae isolates for carbapenem susceptibility and were included in this analysis (teaching hospitals: 29.6%; large hospitals [>300 beds]: 27.5%). Across all hospitals, the mean rate of CNS PsA was 17.5% (median 12.5% [IQR: 0.0%, 21.8%]) and the mean rate of CNS Enterobacteriaceae was 1.9% (median 0.5% [IQR: 0.0%, 2.0%]). Among 1344 CNS PsA cases, 63.6% were hospital-onset and respiratory was the most common source (44.4%). Of 596 CNS Enterobacteriaceae cases, 62.2% were hospital-onset; the most common source was urine (44.1%). The overall correlation of carbapenem non-susceptibility among PsA and Enterobacteriaceae was 0.289 ($p<0.0001$), and 0.213 ($p=0.0004$) when considering CNS PsA and *K. pneumoniae* (top contributor among CNS Enterobacteriaceae cases). For hospitals in the highest quartile for CNS Enterobacteriaceae rates (>2.4%), 46.2% were also in the highest quartile for CNS PsA rates (>22.2%) ($p<0.0001$). The correlation was consistently observed when stratifying by teaching status, hospital size, and infection onset, with correlation coefficients ranging from 0.164-0.291 (all $p<0.05$).
Conclusions: There was a significant correlation of CNS PsA and Enterobacteriaceae in US hospitals. This suggests that clinicians must consider the risk of both threats when selecting antibiotics for use.