P1005
Poster Session IV
Molecular epidemiology and surveillance of MDR Pseudomonas and Acinetobacter

KPC-PRODUCING PSEUDOMONAS AERUGINOSA FROM THE UNITED STATES: WHAT IS NEXT?

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Objectives: To evaluate carbapenem-resistant *P. aeruginosa* isolates from United States (USA) hospitals for the presence of serine-carbapenemase and metallo-beta-lactamase encoding genes and to analyze genetic elements carrying these resistance determinants. KPC serine-carbapenemases are frequently detected among Enterobacteriaceae isolates in USA and although KPC-producing *P. aeruginosa* have been reported in other countries, these strains have not been described in the USA.

Methods: *P. aeruginosa* collected as part of the SENTRY Antimicrobial Surveillance Program (2010-2011) were susceptibility tested using CLSI reference methods and 91 carbapenem-resistant isolates were further analyzed. Isolates were screened for bla_{KPC}, bla_{NDM}, bla_{VIM} and bla_{IMP} by PCR methods. Amplicons were sequenced on both strands. *Tn*4401 element was analyzed by PCR, restriction digests and sequencing. Genetic location of bla_{KPC} was investigated by S1 nuclease and ICeuI hybridizations. And clonality was assessed by PFGE and MLST.

Results: Carbapenem-resistant *P. aeruginosa* were collected in 20 different states, being 16.6% from Texas, 13.2% from Kentucky and 12.1% from New York. These isolates displayed high level resistance (% non-susceptible according to CLSI/ EUCAST breakpoints) to ceftazidime (100.0/100.0), cefepime (96.7/96.7), piperacillin/tazobactam (98.9/98.9), aztreonam (98.9/ 100.0) and levofloxacin (81.3/ 89.0). Gentamicin (54.9% susceptible for both criteria), tobramycin (61.5%) and amikacin (85.7/69.2%) retained moderate activity and colistin (98.9/100.0% S) was the only compound displaying good in vitro activity against these isolates. Two *P. aeruginosa* (imipenem and meropenem MIC values, >=32 mg/L) from one New York City hospital (2010) was positive for bla_{KPC-2}. Isolates were recovered from tracheal aspirate and sputum samples. No other carbapenemases were detected. Although recovered within one month KPC-producing *P. aeruginosa* were genetically distinct by PFGE and MLST (ST244 and ST654). bla_{KPC} was located on a copy of *Tn*4401 element; however a 134-bp deletion upstream of bla_{KPC} was observed in one isolate (ST244). Probe hybridizations of S1 nuclease and ICeuI digested DNA indicated that bla_{KPC-2} was carried in the chromosome of one isolate and in a 45-Kb plasmid in the other strain (ST654). Carbapenem-resistant Enterobacteriaceae and *Acinetobacter* spp. from the same hospital where the KPC-producing *P. aeruginosa* were detected were screened for the presence of bla_{KPC} and seven *K. pneumoniae* isolates carried this gene, but different isoforms of Tn*4401* were observed in these Enterobacteriaceae strains.

Conclusions: This is the first report of KPC-producing *P. aeruginosa* in the United States. Two isolates from the same hospital carried bla_{KPC-2} in distinct genetic environments, which indicate separate acquisition events and sources. Additionally, the only two samples detected were collected in a hospital with high incidence of KPC-producing Enterobacteriaceae that could be the reservoir for these genes. Among all antimicrobial agents tested, colistin retained greatest activity against the KPC-producing *P. aeruginosa*.