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Abstract (poster session)

First description of the metallo beta-lactamase FIM-1 in Pseudomonas aeruginosa in Germany

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Objectives: Multidrug-resistance in P. aeruginosa is an ever increasing worldwide problem. Several mechanisms are responsible for resistance to carbapenems in P. aeruginosa like decreased expression of OprD1, increased efflux pump expression or overexpression of the intrinsic AmpC-betalactamase. Even more worrisome is the worldwide spread of carbapenemase-producing P. aeruginosa strains. The most frequent carbapenemases in P. aeruginosa are metallo-betalactamases like VIM and IMP. In 2012 a novel metallo-betalactamase FIM-1 has been described in a P. aeruginosa strain originating in Florence, Italy. To date this carbapenemase has never been described outside of Italy. Methods: Species identification was performed by MALDI-TOF analysis. For susceptibility testing disk diffusion and Etest were used. A modified Hodge-Test was performed both on MacConkey agar with E. coli ATCC 25922 and on Mueller-Hinton agar with K. pneumoniae ATCC 700603 as indicator strain. For detection of metallo-betalactamases a combined disk test using EDTA, an Etest MBL and a bioassay based on cell-free extracts was used. The presence of carbapenemase genes was checked by PCR for KPC, GES, VIM, IMP, NDM, SPM, GIM, SIM, DIM, AIM, KHM, SMB, TMB, FIM and integron sequencing. Results: P. aeruginosa strain 2888 was referred to the National Reference Laboratory for multidrug-resistant Gram-negative bacteria. It was isolated in tracheal aspirate from a 78-year-old male patient in January 2012. The isolate was resistant to piperacillin, piperacillin-tazobactam, ceftazidime, cefepime, aztreonam, imipemen, meropenem, gentamicin, tobramycin, amikacin, ciprofloxacin and susceptible only to colistin and fosfomycin. The modified Hodge-test was positive for ertapenem, imipenem and meropenem. PCRs for KPC, GES and several metallo-betalactamases were negative, but phenotypic tests clearly demonstrated a metallo-betalactamase. PCRs for class 1 integrons revealed genes coding for Aac6'-Ib and OXA-205 as well as genes for PSE-1 and AadA2 within integron structures without a metallo-betalactamase. However, PCR for FIM-1 was positive and sequences showed 100% homology to the published sequence JX570731. Conclusion: FIM-1 has been described very recently in one single P. aeruginosa strain from Italy. To the best of our knowledge this is the first description of this newly described metallo-betalactamase in Germany and outside Italy. This report highlights the importance of surveillance for new resistance mechanisms.