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Paper Poster Session V

Recent epidemiological data on carbapenem-resistant Enterobacteriaceae

Report of the National Reference Laboratory for multidrug-resistant Gram-negative bacteria on carbapenemases in Germany in 2013

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Objectives

Multidrug-resistance in *Enterobacteriacea*, *Pseudomonas aeruginosa* and *Acinetobacter baumannii* is of utmost therapeutic importance since hardly any innovative antimicrobial drugs against gramnegative bacteria will be introduced into clinical practice within the next years. Among all resistance mechanisms the worldwide spread of carbapenemases is the most worrisome development. However, the correct identification of carbapenemases is challenging for the microbiological laboratory.

Methods

The National Reference Laboratory for Multidrug-Resistant Gramnegative Bacteria offers the free service of carbapenemase detection in bacterial isolates with elevated carbapenem MICs. All isolates are tested by a wide array of phenotypic and molecular methods. A bioassay based on cell-free extracts allows the detection of still unknown β-lactamases.

Results

A total of 3390 isolates were investigated for carbapenemases in the National Reference Laboratory during the first nine months of 2014. Specimen sources were mostly rectal swabs (24.4%), urine (23.1%) and respiratory samples (21.8%). Carbapenemases were found in 1012 *Enterobacteriaceae* strains (45.9%), 248 *P. aeruginosa* (23.5%) and 421 *A. baumannii* (94.6%). The most frequent carbapenemases in *Enterobacteriaceae* were OXA-48 (31.9%), KPC-2 (30.0%), VIM-1 (14.8%), NDM-1 (13.5%) and KPC-3 (4.1%). OXA-181, OXA-232, OXA-162, OXA-244, NDM-5, GIM-1 and VIM-4 were found in less than 1.8% each. In *P. aeruginosa* VIM-2 was the most frequent carbapenemase (84.3%), followed by VIM-1 (5.6%). FIM-1, GES-5, IMP-7, IMP-13, IMP-28, NDM-1 and VIM-4 were found in less than 2.4% each. OXA-23 was the most frequent carbapenemase in *A. baumannii* (76.5%) followed by OXA-72 (12.1%) and OXA-58 (9.3%). GIM-1, NDM-1 and NDM-9 were found in less than 1.4% each.

Conclusions

A variety of different carbapenemases arrived in Germany. However, the molecular epidemiology in Germany with a predominance of OXA-48 differs significantly from observations made in other countries like Greece, Israel or the USA. NDM-9 was found for the first time in Europe.