28th ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES
Madrid, Spain
21 – 24 April 2018

O0811 Sepsis by carbapenemase-production Enterobacteriaceae: a full MALDI-based approach

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Background: The increasing occurrence of sepsis caused by carbapenemase-producing enterobacteria (CPE) represents the most worrying expression of the spreading of those strains in hospital settings. Given its high morbidity and mortality, a prompt detection of the carbapenemase production strongly affects the patients' clinical outcome.
In this study, an innovative full MALDI-based approach to quickly detect CPE in positive blood cultures was evaluated, applying the novel tools of Biotyper system (Bruker Daltonik) directly on the bacterial pellet extracted from the positive bottles. KPC-producers were identified by automated detection of the 11109 KPC-specific peak by the Biotyper software, while an imipenem hydrolysis assay was used to verify the carbapenemase activity.

Materials/methods: 169 blood cultures positive for *Klebsiella pneumoniae* (n=85 carbapenemase-producers, n=84 susceptible to carbapenems) were analyzed.

The bacterial pellet was extracted by Sepsityper® kit (Bruker Daltonik).

The automated detection of the 11109 m/z KPC-specific peak was performed by the Biotyper software simultaneously with the species ID, processing the mass spectra generated from the bacterial pellet. The prevalence of the KPC+ strains that presented such peak was evaluated by visual inspection of the spectra.

The same pellet was used to perform the STAR-CARBA imipenem hydrolysis assay (Bruker Daltonik).

Results: The KPC-specific peak was detected in 68/69 (98.5%) of the KPC+ strains in which this peak was present, corresponding to 68/74 (91.9%) of the total KPC+ strains. The peak was detected in none of the other strains.

STAR-CARBA assay resulted positive for 85/85 carbapenemase-producing strains, and negative in the carbapenem-susceptible strains (84/84).

The novel approach provided a conclusive result in a time frame between 30 min (when the KPC-specific peak was detected – 73.9% of the positives) and 2 h (all other cases).

Conclusions: Please The full MALDI-based approach enabled the rapid detection of different kind of carbapenemases directly from the positive blood culture bottles, with absolute sensitivity and specificity, and allowing a significant shortening of potential reporting time in comparison with the actual routine (30 min-2 h).

Considering the analytical performance and the user-friendly workflow, these promising results suggest the possibility of an efficient implementation in routine practice of these novel MALDI Biotyper applications.