29th ECCMID Amsterdam, Netherlands 13 – 16 April 2019

The congress of ESCMID

P0447 Bloodstream infections caused by enterobacteria: application of MALDI-TOF MS for the rapid detection of ESBL/AmpC

Miriam Cordovana*[1], Markus Kostrzewa[2], Markus Peer[2], Simone Ambretti[1]

[1] University Hospital of Bologna Policlinico Sant'Orsola-Malpighi, Bologna, Italy, [2] Bruker Daltonik GmbH, Bremen, Germany

Background: Enterobacteria are among the most common causative agents of bloodstream infections. β-lactam antibiotics are commonly included into empiric therapy as broad spectrum agent. Cephalosporinase- (ESβL, AmpC) producing enterobacteria threaten the effectiveness of antibiotic treatment. The early identification of these strains is crucial for the clinical outcome, but the currently available laboratory methods are either laborious, slow and not applicable directly to positive blood cultures (phenotypical methods), or expensive and limited in targets (molecular methods).

In this study we investigated a combination of the novel applications of the MALDI Biotyper system (Bruker Daltonik GmbH, Germany) for the rapid detection of ESβL/AmpC-producing enterobacteria strains directly from positive blood culture. The bacterial pellet extracted from the flask was used first for rapid species identification. In case of identification of enterobacteria, the residual pellet was used for direct evaluation of cephalosporinase activity by a MALDI-based cephalosporin hydrolysis assays.

Materials/methods: N=92 blood cultures positive for different enterobacteria were analyzed. The bacterial pellet was obtained by the Sepsityper® kit, using the rapid version of the method (Rapid Sepsityper). The same pellet was used for the species identification and for the subsequent evaluation of ESβL/AmpC-production by MBT STAR-Cepha®, a CE-IVD labelled cefpodoxime hydrolysis assay. Results were compared with results of EUCAST reference phenotypical algorithm (disk-diffusion synergy test with inhibitors).

Results: 92/92 isolates were identified at species level at high confidence level.

STAR-Cepha assay resulted positive for 16/16 ESβL-producers, 3/3 AmpC-producers, and for 13/13 KPC- and 2/3 MβL-producing isolates. Negative results were obtained for the n= 57 *wild-type*, penicillinase- or constitutive AmpCs-producing strains, and for 1/3 MβL-producer.

Conclusions: In this study, the MBT STAR-Cepha assay proved to be a reliable and accurate method to detect ESβL- and AmpC-producing enterobacteria directly from positive blood culture bottles, moreover extremely rapid, delivering a conclusive result in less than 2 h. The bacterial pellet extracted by Sepsityper was suitable to be used to perform directly hydrolysis assay, thereby saving the time required by subculturing steps. Further, the ease of use and the execution of all assays on the same MALDI Biotyper platform make this approach suitable for implementation into routine workflow.