P047

BATTERIOLOGIA

DEVELOPMENT AND EVALUATION OF A NEW LOW COST METHOD FOR THE RAPID DETECTION OF CARBAPENEMASE OR EXTENDED SPECTRUM BETA-LACTAMASE-PRODUCING ENTEROBACTERALES DIRECTLY FROM POSITIVE BLOOD CULTURE BOTTLES: "DIRECT BETA-LACTAM INACTIVATION METHOD" DBLIM

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INTRODUZIONE

The rapid detection of ESBL-producing Enterobacteriaceae (Ep-EB) and carbapenemase-producing Enterobacteriaceae (Cp-EB) from severe infections, especially bloodstream infections (BSIs), is of paramount importance, since the early administration of effective antibiotic therapy may help to both improve patient outcomes and limit the spread of these highly resistant pathogens. In this study, we present and evaluate Direct Beta-Lactam inactivation Method (dBLIM), a novel method for the rapid detection of ESBL and carbapenemase activity directly from positive blood culture bottles. dBLIM originates from Carbapenem Inactivation Method (CIM). To date, no studies experimented potentiality of this diagnostic tool to detect other hydrolysing enzymes, such as ESBLs, and furthermore its direct application to clinical specimens, e.g. BC samples. dBLIM that we proposed here, is intended to simultaneously detect both ESBLs and carbapenemases production directly from positive BC bottles achieving results in less than 7 hours.

METODI

dBLIM was performed on both aerobic and anaerobic BC bottles spiked with 422 characterized EB strains classifiable in 4 phenotypic group: extended-spectrum-cephalosporinases/carbapenemase-non-producing (nEp-nCp) EB (n= 116), ESBL-producing EB (n= 111), AmpC-β-lactamase-producing EB (n=33) and carbapenemase-producing EB (n=162).

RISULTATI

No false positive results was obtained in nEp-nCp EB, in ESBL and in AmpC groups, proving an 100% overall specificity. No significant discrepancy was observed in the performance of dBLIM between aerobic and anaerobic BCs for all groups except for VIM-expressing EB. A sensitivity rate of 53.6% were obtained in anaerobic bottles vs 100% achieved in aerobic ones among BCs spiked with blaVIM-harbouring EB. This finding gives rise to the hypothesis that the metallo-enzymes may be downexpressed or rapidly degraded or inactivated in anaerobic bottles conditions. Conversely, in KPC, OXA-48, NDM and carbapenemases co-producers groups, an excellent performance was observed, ranging from 99% to 100% in both bottle types. About the detection of extended-spectrum-cephalosporinases activity, dBLIM showed a sensitivity of 100% and 84-87% for ESBL and AmpC-type, respectively.

CONCLUSIONI

The dBLIM test may be a cost-effective and highly robust phenotypic method for the reliable detection of extended-spectrum-cephalosporinases and carbapenemases directly from BCs in the same day of bottles positivity detection.