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BATTERIOLOGIA

EARLY DETECTION OF BACTERIAL RESISTANCE PHENOTYPES BY DIRECT ANTIMICROBIAL SUSCEPTIBILITY TESTING (AST) FROM POSITIVE BLOOD CULTURES USING MICROSCAN SYSTEM

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INTRODUZIONE

Antimicrobial Susceptibility Testing (AST) is a crucial step for a proper antibiotic treatment of infectious diseases, in order to reduce exposure time to broad-spectrum antibiotics and to monitor local trends in antimicrobial resistance. However, typical AST requires an additional 16–24 hours of culture of the isolated pathogens. Therefore, the aim of our study was to evaluate a new approach based on an early readings, using a broth microdilution method, to perform a rapid profile of antibiotic resistance directly from positive blood cultures. Our modifications can be useful to report timely resistance phenotypes.

METODI

The identification of the pathogens from Gram-negative growth blood cultures was performed by molecular assay or MALDI-TOF technology. AST MDR panels (EUCAST criteria) for gram-negative bacteria were directly inoculated with an aliquot of positive blood cultures using MicroScan WA System (Beckman Coulter). AST manually readings were assayed after 6 and 8 hours of incubation and validated after 16 hours (direct-AST). AST with MicroScan WA was also carried out from overnight blood subcultures, in accordance with the manufacturer's instructions (standard-AST). The results, obtained by the direct and routine methods, were compared and expressed as: agreement, very major error (false susceptibility), major error (false resistance) or minor error (susceptibility/resistant vs. intermediate susceptibility).

RISULTATI

Our studied strains include K.pneumoniae, E.coli, S.marcescens, K.oxytoca, A.baumannii isolates. The two earliest manually readings were recorded for all isolates except for A. baumannii strains, in which after 6h of incubation, no growth was still observed. The comparative analysis of the direct-AST showed good agreement with standard-AST; moreover resistance phenotypes were correctly detected by both approachs. Between the two earliest manually readings, we found some very major errors concerning the following antibiotics: Cefotaxime, Ceftazidime, Ceftazidime/K clavulanate, Imipenem and Fosfomycin; moreover very few minor errors were detected, but importantly, we did not find any major errors.

CONCLUSIONI

Early antibiotic susceptibility testing of bacteria causing bloodstream infections is deemed to be a very high priority in the microbiological laboratories. This rapid approach can enable clinicians to estimate appropriate antimicrobial therapy as soon as 6/8h after the blood culture positivity, however further data are required. This simple method can be a turnaround versus the conventional procedures, in order to report timely results, such as to allow a future applicability in sepsis diagnostic flowchart.