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Evaluation of DNA Microarray System in the Identification of Microorganisms Isolated from Blood

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Abstract : Bacteremia is a clinical entity with high morbidity and mortality rates when immediate diagnose, or treatment cannot be achieved. Microorganisms which can cause sepsis or bacteremia are easily isolated from blood cultures. Fifty-five positive blood cultures were included in this study. Microorganisms in 55 blood cultures were isolated by conventional microbiological methods; afterwards, microorganisms were defined in terms of the phenotypic aspects by the Vitek-2 system. The same microorganisms in all blood culture samples were defined in terms of genotypic aspects again by Multiplex-PCR DNA Low-Density Microarray System. At the end of the identification process, the DNA microarray system's success in identification was evaluated based on the Vitek-2 system. The Vitek-2 system and DNA Microarray system were able to identify the same microorganisms in 53 samples; on the other hand, different microorganisms were identified in the 2 blood cultures by DNA Microarray system. The microorganisms identified by Vitek-2 system were found to be identical to 96.4 % of microorganisms identified by DNA Microarrays system. In addition to bacteria identified by Vitek-2, the presence of a second bacterium has been detected in 5 blood cultures by the DNA Microarray system. It was identified 18 of 55 positive blood culture as E.coli strains with both Vitek 2 and DNA microarray systems. The same identification numbers were found 6 and 8 for Acinetobacter baumanii, 10 and 10 for K.pneumoniae, 5 and 5 for S.aureus, 7 and 11 for Enterococcus spp, 5 and 5 for P.aeruginosa, 2 and 2 for C.albicans respectively. According to these results, DNA Microarray system requires both a technical device and experienced staff support; besides, it requires more expensive kits than Vitek-2. However, this method should be used in conjunction with conventional microbiological methods. Thus, large microbiology laboratories will produce faster, more sensitive and more successful results in the identification of cultured microorganisms.

Keywords : microarray, Vitek-2, blood culture, bacteremia
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