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Antimicrobial susceptibility testing and resistance detection

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Evaluation of direct E-test on lower respiratory tract samples using a chromogenic agar medium: a rapid procedure for antimicrobial susceptibility testing

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Objectives: We have previously demonstrated the accuracy of direct Etest (DET) on lower respiratory tract (LRT) samples from ICU patients as a rapid procedure for antimicrobial susceptibility testing (Cercenado et al., Diagn. Microbiol. Infect. Dis. 2007; 58:211) which may be crucial for modifying therapeutic regimens. In this study we evaluate a modification of this technique using a chromogenic agar medium in order to generate rapid susceptibility results and organism identification.
Methods: Over a period of 6 months we received 272 LRT samples from ICU patients. Samples were processed by DET onto chromogenic Mueller-Hinton agar (IZASA, Spain) as well as by the standard quantitative culture followed by identification and susceptibility testing by microbroth dilution method (MBD). Oxacillin, piperacillin/tazobactam, cefepime, imipenem, ciprofloxacin, and amikacin were the antimicrobials evaluated.
Results: A total of 143 LRT samples (94 monomicrobial and 49 polymicrobial) yielded significant counts in the MBD with microorganisms able to grow on chromogenic agar (Haemophilus spp., S. pneumoniae and M. catarrhalis were excluded from the analysis). Microorganisms isolated (n=192) were: S. aureus (54), P. aeruginosa (44), A. baumannii (24), S. maltophilia (15), E. coli (14), , Klebsiella spp. (14), P. mirabilis (11), and other Enterobacteriaceae (16). Overall, 92.7% of the isolates were recovered by the DET-chromogenic at 18 h, and 100% at 24 h (12 S. maltophilia isolates). Among the 731 microorganism-antibiotic combinations evaluated, there was a total agreement with the MBD in 94.9%. There were 5 very major errors (0.68%) (all in polymicrobial cultures), 29 major (3.9%) (9 with imipenem and A. baumannii), and 4 minor (0.5%). Discrepancies corresponded to 20 monomicrobial and 18 polymicrobial cultures, and the majority occurred with imipenem (14.4%) and cefepime (5.6%). The chromogenic medium allowed identification by colors and facilitated readings especially in polymicrobial cultures.
Conclusions: DET on respiratory samples is a reliable and clinically useful technique that provides same day susceptibility results (18-24 h) comparable to these obtained by MBD. The use of chromogenic agar medium constitutes an improvement that facilitates readings and allows concomitant identification of the pathogen involved.