



Rapid identification and susceptibility testing using the VITEK-2 system using culture fluids from positive blood cultures

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Objectives. Bloodstream infection is an important cause for morbidity and mortality. Rapid bacterial identification and susceptibility testing is crucial to improve patient therapy and outcome. In order to reduce the turnaround time for laboratory diagnosis of bacteremia, the efficacy of identification and antimicrobial susceptibility testing using samples taken directly from positive culture bottles by VITEK-2 Compact was evaluated.

Methods. A total of 168 positive blood culture bottles with growth signal from BACTEC 9050 (BD, USA) were examined with Gram-staining during the study period May-September 2014. Samples containing polymicrobial organisms were excluded. A 5 ml sample from the positive blood culture bottle was centrifuged at $160 \times g$ for 5 min to pellet blood cells. The supernatant was then centrifuged at $650 \times g$ for 10 min to pellet bacteria. The turbidity of the bacterial suspension was adjusted with VITEK Densichek (bioMérieux) to match the McFarland 0.5 standard in 0.45% sodium chloride. Afterward, appropriate identification and antimicrobial susceptibility cards of the automated system, VITEK-2 Compact (bioMérieux, France) were used according to the results of the Gram-staining. All samples were also examined by the conventional method, involving inoculation onto 5% sheep blood agar, chocolate agar and eozine-methylene blue agar plate.

Conclusions. Direct inoculation method provided excellent results for Gram-negative rods and decreased turnaround time, while it would be less reliable for identification of Gram-positive cocci. Compared with conventional methods that require 1 or 2 days, this method can make rapid reporting possible and thus permit better patient management.

Results. Of 168 positive blood culture bottles 18 were excluded as polymicrobial organisms were observed in Gram-staining. A total of 150 samples [two (1.3%) yeast, 47 (31.3% Gram-negative bacteria, 101 (67.3%) Gram-positive bacteria were included in the study. Of these, 75 (50%) were correctly identified to the species level and 18 (12%) strains could not be identified by VITEK-2 system. While 100% of yeast containing specimen were correctly identified; 78.7% (n=37) of gram-negative and 35.6% (n=36) gram-positive bacteria involving sample were identified accurately to the species level. Among gram-positive bacterial samples mostly consisted of *S.epidermidis* that were erroneously defined to the species level (n=50), 17 (34%) were misidentified as *Kocuirra* spp. Among 18 strains that could not be identified by system, 17 (94.4%) were coagulase-negative *Staphylococcus* spp. For AST, the direct method had an overall error rate of 2.6% for Gram-negative bacilli, with 0.4% major, and 2.2% minor discrepancies compared to the standard method, with no very major errors identified. The direct inoculation method detected 100% of the strains producing extended-spectrum beta-lactamases. The overall error rate in antimicrobial susceptibility testing for gram-positive bacteria was 9.8%, with 5.0% very major, 3.6% major, and 1.2% minor discrepancies.