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ABSTRACTS

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Oral Presentation – 03

Evaluation of a staining technique using toluidine blue in comparison to Gram stain for direct detection of bacteria in the positive blood culture broth

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Background

Direct Gram stain (GS) smear of positive blood culture broth remains the cornerstone of rapid identification of the causative microorganism and determining the empirical antibiotic treatment in septicaemia. There is no other staining method available equivalent to Gram stain. The objective of the study was to evaluate the accuracy of a staining technique using toluidine blue (TB) in comparison to Gram stain for the direct detection of bacteria according to their morphology in the positive blood culture broth.

Materials and methods

A diagnostic cross-sectional study was performed using 155 positive blood culture broths collected from the Microbiology Laboratory in Teaching Hospital, Karapitiya. Direct smears were stained with GS and TB, and GS of culture isolates were considered as the gold standard. Validity of tests were assessed with 95% confidence interval.

Results

Out of 155, 67.1%, 18.7%, 6.5% and 7.7% organisms were identified as cocci, bacilli, coccobacilli, and yeasts, respectively. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of GS and TB stains were close to 100% for detection of cocci. When identifying bacilli, the sensitivity of both GS (75.9% ; 60.3% - 91.4%) and TB (79.3% ; 64.6% - 94.1%) was low, but PPV of TB stain (95.8% ; 87.8 - 100.0%) was higher than GS (88.0% ; 75.3 - 100.0). Sensitivity, specificity, PPV and NPV were higher in TB than GS for the identification of coccobacilli. Yeasts were precisely identified (100%) by both GS and TB. Overall, TB smears were clearer as there was minimal background staining.

Conclusion

TB stain is useful for identifying bacteria and yeasts according to their morphology in positive blood culture broths as an accurate, rapid and cost-effective technique.