03534 Performance of T2 magnetic resonance (T2MR) for the diagnosis of bloodstream infections (BSI) in paediatric patients

04. Diagnostic bacteriology & general microbiology

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Background

BSI is one of the most important causes of childhood mortality. A tempestive diagnosis is critical to address an appropriate antibiotic therapy. Blood culture is currently the gold standard, althought it requires too long times and a high percentage of false positives can be detected, due to a frequent contamination of blood cultures by patients' skin microbiota. The implementation of rapid diagnostic technologies in the clinical microbiology laboratory is mandatory for an accurate pathogen detection in whole-blood clinical samples. T2MR technology can detect different DNA targets of bacteria and *Candida* species. The panels detect microbial cells directly within whole blood in a fully automated process. In this study, the results of the performance of T2Bacteria and T2Candida in diagnosing BSI compared to blood culture are presented.

Methods

A total of 1352 blood samples collected from 659 subjects, aged 0 to 21 years old, were contextually collected for T2 panels and culture. Positive blood cultures were subjected to a diagnostic algoritm, which includes Gram staining, culture on solid medium and direct microorganism identification by mass spectrometry (Maldi-tof, Bruker).

Results

Overall, 648 samples were examined with T2Bacteria and 106 samples with T2Candida request. The NPV ranged from 99.7% to 100%, with an overall NPV of 99.9%, for the microorganisms detectable by the T2Bacteria panel. Therefore, the overall sensitivity and specificity of the T2Bacteria Panel were 92.8% and 98%, respectively. By comparing the molecular and culture tests, the results were

negatively concordant in 96 cases (90.57%) and positively concordant in 4 (3.77%). The NPV for microorganisms detectable by T2Candida panel was 100%. The sensitivity as compared to the culture method was 100% for the detection channels of *C. albicans/C. tropicalis* and *C. parapsilosis*. In addition, the overall specificity ranged from 96.1% to 99% across the detection channels, with a total specificity of 98.1%.

Conclusions

T2MR assay can be used as a part of the initial diagnostic work up along with the blood cultures and could provide a faster bacteremia detection. Also identification of the causative organism by the T2 panels, even without antibiotic susceptibilities, could help clinicians to adjust the empiric therapy.