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T2 magnetic resonance technology in microbiological diagnosis – our experience

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Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection. Bloodcultures (BC), when properly sampled, provide clinically relevant information that can identify the causative agent, represent guide to antibiotic therapy. BC are the gold standard in the diagnosis of septicemia but have low sensitivity. T2Dx (T2Biosystems, Lexington, Massachusetts) applies Magnetic Resonance and nanotechnology (T2MR) to detect pathogen DNA directly from 4 ml a whole blood sample for 3-5 h. In the period 10.12.2018. until 14.11.2019. 117 blood samples were processed from 72 patients in medical and surgical intensive care unit, hematology and BMT (46 male and 26 female). We used T2Bacteria panel (BP;73;62.4%) and T2Candida panel (CP;44;37.6%). Out of the total number assays performed, the positive were (29.91%; 2 CP and 33 BP); negative (66.6%; 40 BP and 38 CP). Invalid result (interference with MR signal) was obtained in 4 CP (3.41%). For most patients, samples for T2Dx and for BC were not taken at the same time (42/72), or no samples were taken for BC at all (10/72). In 20 patients (20/72), blood samples were simultaneously tested by BC and T2Dx. Out of them, in 14 patients (14/20) were T2Dx+/BC+ with same microorganisam detected, in 3 patients (3/20) were T2Dx +/BC+ with different microorganisam detected, and in 3 patients (3/20) T2Dx-/BC+. The sensitivity, specificity, positive predictive value, and negative predictive value were 92.1%, 96.2%, 82.35%, and 96.15%, respectively. T2Dx could be a significant improvement for the laboratory diagnosis BSI.

Biography:

I am a Master of Medical Sciences in the field of microbiology and parasitology, specialist of microbiology and parasitology and subspecialist in the Parasitology. I have over 90 papers in the field of microbiology. I am coinvestigator (main microbiologist) in 10 clinical studies. I have been in the position of Director for 9 years (Department of microbiology, Clinical Center of Serbia).

Speaker Publications:

1.Mylonakis E, Zacharioudakis IM,Clancy CJ, Nguyen MH, Pappas PG. 2018.Efficacy of T2 magnetic resonance assay in monitoring candidemia after initiation of antifungal therapy: the Serial Therapeutic and Antifungal Monitoring Protocol (STAMP) trial. J Clin Microbiol 56:e01756-17.

2.Tang et al. Pooled analysis of T2 Candida for rapid diagnosis of candidiasis. BMC Infectious Diseases (2019) 19:798 https://doi.org/10.1186/s12879-019-4419-z

3.CDC/NHSN Patient Safety Component Manual,Summary of Updates, January 2020

4.Cornelius J. Clancy et all.Detecting Infections Rapidly and Easily for Candidemia Trial, Part 2 (DIRECT2): A Prospective, Multicenter Study of the T2Candida Panel. CID 2018;66(11):1678–86

5.De Angelis et al. T2Bacteria magnetic resonance assay for the rapid
detection of ESKAPEc pathogens directly in whole blood.

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