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Abstract (oral session)

Evaluation of a novel microarray-based Prove-it™ Bone & Joint assay for detection of pathogens from normally sterile body sites in comparison to bacterial culture and broad-range bacterial polymerase chain reaction (PCR)

V. Hinic*, A. Aittakorpi, S. Suter, S. Turan, E. Schultheiss, R. Frei, D. Goldenberger (Basel, CH; Helsinki, FI)

Objectives: Although considered as gold standard, bacteriological culture takes at least 1-2 days and may yield false-negative results after prior initiation of antibiotic therapy. To overcome these drawbacks, a novel microarray-based assay Prove-it™ Bone & Joint (Mobidiag, Finland) for detection of over 60 bacterial species from bone and joint samples was developed. We assessed the performance of Prove-it diagnostic platform in comparison to bacterial culture and broad-range bacterial PCR by analysing various clinical specimens. Methods: 171 culture positive clinical samples were collected prospectively at our tertiary care institution. Samples included 85 biopsies, 45 implants, 35 aspirates and 6 others. Bacterial culture including enrichment broth was performed according to standard protocol. DNA extracted by Biorobot®EZ1 (Qiagen, Germany) was analysed with Prove-it assay. Broad-range bacterial PCR was performed by in-house assay targeting the 16S rRNA gene. Mixed DNA chromatograms were submitted for analysis with RipSeq® algorithm (iSentio, Norway). Results: Out of 171 samples, 126 (74%) were monomicrobial and 45 (26%) were polymicrobial. Regarding monomicrobial samples, 60% (75/126) of Prove-it results were identical with culture results, whereas 40% (51/126) were negative. However, 57% (29/51) of the Prove-it negative samples contained very small quantities of bacteria grown in culture, while 37% (19/51) contained organisms not covered by the Prove-it panel. Furthermore, only 9 Prove-it negative samples were positive in broad-range bacterial PCR. Out of 45 polymicrobial samples, Prove-it correctly detected all species in 18/45 (40%), one species in 18/45 (40%), and no species in 9/45 (20%) samples. Additionally, Prove-it correctly predicted methicillin-resistance or susceptibility in all samples positive for staphylococci. Prove-it results were available after less than 4 hours. A limitation of the assay was its failure to detect species not covered by the Prove-it panel, such as Streptococcus milleri group and other streptococci (in 16 samples), Propionibacterium acnes (in 12) or yeasts (in 6). Conclusion: Prove-it™ Bone & Joint assay proved to be a very rapid diagnostic tool detecting the causing pathogen in the majority of the analysed samples. Best results were obtained in monomicrobial samples containing common bacterial agents. The assay could also be successfully used in samples from normally sterile sites other than bone and joint.