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Evaluation of the performance of 2 DNA-based methods for the detection of extra-pulmonary tuberculosis in comparison with the conventional culture technique

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Introduction: Diagnosing extra-pulmonary tuberculosis continues to be a challenge for both infectious disease specialists and microbiologists.

Objectives: This prospective study was done to evaluate the performance of 2 DNA-based methods for the detection of extra-pulmonary tuberculosis in comparison with conventional culture technique.

Methods: All extra-pulmonary specimens received by the Kuwait National Tuberculosis Reference from October 2011 till August 2013 were included in the study. Smears were stained by Zeil Nelson (Merck, Germany) followed by inoculation of the specimens into Gene Xpert MTB/RIF assay (Cepheid, USA), Prob Tec ET PCR (Becton Dickinson) and MGIT 960 (Becton Dickinson). Urine was inoculated into Lowenstein Jonson media (MAST).

Results: A total of 1674 extra-pulmonary specimens (pleural fluid 553, ascetic fluid 194, cerebrospinal fluid (CSF) 85, Urine 67, other sterile body fluids 153, Fine needle aspirates (FNA) 301, pus 181, tissue 102, swabs 27 and stool 11) were evaluated. Out of 155 extra-pulmonary specimens that grew *Mycobacterium tuberculosis* by culture, 143 were positive by GeneXpert compared to 128 by ProbTec with a sensitivity of 92% and 83%, respectively. Out of 1517 specimens which did not grow by culture, 52 were detected by GeneXpert while 46 were detected by ProbTec with specificity of 96.5 and 96.9%, respectively. All the 4 Smear- negative CSF samples which grew *M. Tuberculosis* were positive by GeneXpert with a sensitivity of 100% compared to only 2 detected by ProbTec with a sensitivity of 50%. Additionally all CSF specimens that did not grow by culture were negative by both the molecular methods showing 100% specificity. Of the 3 smear positive urine specimens that grew by culture all were positive and of the 64 samples that did not grow by culture all were negative by both the molecular methods with a sensitivity and specificity of 100%. For other sterile body fluids the sensitivity and specificity of both the methods were 68% and 99%, respectively. Finally for FNA, pus and tissue, the sensitivity of GeneXpert was 97% compared to 86% for ProbTec.

Conclusion: DNA-Based technology looks promising for the rapid diagnosis of extra-pulmonary Tuberculosis with an overall better performance of GeneXpert over PropTec.

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