Rapid diagnosis of genitourinary tuberculosis by polymerase chain reaction and non-radioactive DNA hybridization

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Abstract

Objective: To establish a polymerase chain reaction (PCR) assay for the rapid detection and identification of mycobacteria in urine, and to assess the value of such assay in routine laboratory diagnosis of genitourinary tuberculosis.

Materials and Methods: Urine specimens from 1000 patients with clinical suspicion of urinary tuberculosis were examined. Two assays for the detection and identification of Mycobacterium tuberculosis (M. tuberculosis) complex and mycobacteria other than tuberculosis (MOTT) by non-radioactive DNA hybridization of PCR-product were applied, The first assay used PCR primers and probe derived from M. tuberculosis species-specific DNA insertion sequence, IS6110. The second utilized mycobacterium genus-specific sequence encoding ribosomal ribonucleic acid (16S rRNA). The results obtained by PCR were compared with those obtained by standard microbiological methods, acid-fast bacilli (AFB) stain and culture.

Results: Compared with cultures, the sensitivity of AFB staining was 52.07% and the specificity was 96.7%. In comparison to the results of culture, the overall sensitivity and specificity of the IS6110-PCR assay was 95.59% and 98.12% respectively. While the corresponding results for the 16S rRNA gene-PCR were 87.05% and 98.9%.

Conclusion: The high sensitivity and specificity in addition to the potential for rapid detection of mycobacteria, makes this test a useful tool in the clinical management of mycobacterial infection in urine. Urine specimens may contain M. tuberculosis and/or other mycobacteria; therefore, there are advantages in using genus-specific primers in parallel with species-specific primers in PCR assay.

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