Abstract

Introduction. The performance of a drug susceptibility test may change when moving from the research stage to implementation on a population level in actual public health practice. Objective. The performance of a rapid drug susceptibility test was described for detecting multidrug-resistant Mycobacterium tuberculosis when implemented in the routine workflow of a low-resource reference laboratory. Materials and methods. A prospective study was done comparing the performance of the nitrate reductase assay with the conventional proportion method for rifampicin and isoniazid on 364 isolates were obtained from multidrug-resistant tuberculosis risk patients referred from different Colombian laboratories. Results. When compared with the proportion method, the nitrate reductase assay sensitivity was 86.8% and 84.9% for rifampicin and isoniazid, respectively, whereas nitrate reductase assay specificity was 100% for isoniazid and rifampicin. Nitrate reductase assay sensitivity was significantly higher when the age of isolate was less than 70 days. A sensitivity of 94.4% dropped to 78.1% for rifampicin resistance for fresh and old isolates, respectively (Fisher exact test, p=0.05). For isoniazid resistance using fresh and old isolates, 94.7% vs. 74.3% sensitivities, were achieved (chi square test, p=0.03). The proportion of nitrate reductase assay ambiguous results was significantly higher in multidrug-resistant than in non-multidrug resistant isolates (17.6% vs. 4.0%, chi square test, p<0.005). Conclusions. The nitrate reductase assay demonstrated provided reliable results for antibiotic resistance. However, using old cultures leads to a higher proportion of false sensitive results; furthermore, the nitrate reductase assay capability to detect multidrug-resistant tuberculosis decreased due to a higher proportion of non-interpretable results.

Keywords
Mycobacterium tuberculosis, drug resistance, microbial sensitivity tests, methods, nitrate reductase.