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High resolution melting curve analysis for rapid detection of streptomycin and ethambutol resistance in *Mycobacterium tuberculosis*

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INTRODUCTION AND PURPOSE

Development of molecular techniques for rapid detection of drug resistant tuberculosis allows for the prompt initiation of appropriate anti-TB treatment. We aimed to assess high-resolution melting (HRM) analysis for the detection of *rpsL*, *rrs* and *embB* mutations to identify streptomycin and ethambutol resistance in *Mycobacterium tuberculosis.*

METHODS

A total of 76 clinical isolates of *M.tuberculosis* including 25 SM-R, 21 EB-R and 30 drug susceptible (determined by the proportion method of drug susceptibility testing (DST)) were analyzed by HRM analysis, and the results were confirmed using DNA sequencing.

RESULTS

The sensitivity and specificity of the HRMA compared to phenotypic DST were 88% and 100.0% respectively for the detection of streptomycin resistance(SM-R), and 90.4% and 96.6% respectively for ethambutol resistance (EB-R). Three SM-R and two EB-R isolates had no mutations in the studied regions of *rpsL*, *rrs* and *embB* genes determined by DNA sequencing and therefore were not identified as resistant by HRM assay. Interestingly, one phenotypic EM-S isolate was found by sequencing to have a mutation at codon 423 (Met →Ilue) of *embB* gene and was clustered as resistant by HRM as well.

CONCLUSION

The sensitivity and specificity of HRM curve assay was in consistent with DNA sequencing which is the gold standard method for genotypic DST. This assay can be utilized as a screening method for detection of drug-resistant tuberculosis offering the advantages of high throughput, single step, cost effectiveness, and rapid work flow method.