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Abstract

Comparative study of dry-loop mediated isothermal amplication fluorescence smear microscopy and culture for the diagnosis of tuberculosis

Sabina K.C. Shi-Gan

International College of Science and Technology, Kathmandu, Nepal

Abstract:

Tuberculosis (TB) is a chronic infectious disease caused by Mycobacterium tuberculosis and still constitutes a major public health problem in the world. There are various methods for the diagnosis of tuberculosis which includes isolation and identification of bacteria (smear microscopy and bacterial culture), tuberculin skin test (immunological test), chest radiography and molecular biological test. Smear microscopy remains most practical test available in resource limited setting for tuberculosis diagnosis. Due to the low sensitivity of microscopy and long time required for culture, a new diagnostic technique is needed which can diagnose causative agent in simple and rapid way. Loop-Mediated Isothermal Amplification (LAMP) is a rapid, simple, and cost effective method. The objective of this study was to compare dry-LAMP, fluorescence smear microscopy and culture for the detection of M. tuberculosis in the pulmonary samples. A cross-sectional study was conducted at the GENETUP and Healthy Nepal Laboratory, Kathmandu, Nepal from months May to October 2017. The diagnosis of the tuberculosis was performed by using fluorescence microscopy and culture. Samples were digested and decontaminated using NALC-NaOH method. Then, auramine O fluorescence smear microscopy and culture of M. tuberculosis on Lowenstein-Jensen (LJ) medium were performed from the sediments of decontaminated samples. Then, dry LAMP was also performed from extracted DNA samples obtained by freezing and boiling method. Of 68 samples, 36.7% were smear positive, 35.2% were culture positive and 39.6% were dry LAMP positive. The sensitivity, specificity, positive predictive value and negative predictive value of dry LAMP were found to be 91.7%, 92.3%, 81.5% and 87.8% respectively. Similarly, dry LAMP had sensitivity 92.0% and specificity 90.7% while compare with smear microscopy. The sensitivity and specificity of fluorescence smear microscopy were 83.3% and 92.3% respectively as compared to culture. The overall sensitivity and specificity of dry LAMP in the current study was found to be high in compared with fluorescence smear microscopy and culture.

Biography:

Sabina K.C. Shi-Gan International College of Science and Technology, Kathmandu, Nepal German Nepal Tuberculosis Project, Kalimati, Kathmandu, Nepal

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