ASSESSMENT OF DIAGNOSTIC ACCURACY OF XPERT MTB/RIF, SMEAR MICROSCOPY, MULTIPLEX POLYMERASE CHAIN REACTION (MPCR) AND CULTURE IN DIAGNOSIS OF PULMONARY TUBERCULOSIS

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Abstract

Statement of the Problem: Pulmonary Tuberculosis (PTB) is one of the major communicable diseases. It is a serious health problem worldwide. The purpose of this study is to compare the conventional and modern diagnostic tools used in the diagnosis of PTB. Methodology & Theoretical Orientation: This cross sectional study was carried among 105 sputum samples from suspected PTB patient visiting National Tuberculosis Center. Sputum samples were examined by Auramine O staining and observed under fluorescent microscope and subsequently subjected to Xpert MTB/RIF test and culture. DNA extraction was done by Cetyl Trimethyl Ammonium Bromide (CTAB) method to process the sample for Multiplex Polymerase Chain Reaction (MPCR). MPCR assay targeting IS6110 segment and 65kDa gene was run and observed under gel documentation system for direct detection of *Mycobacterium tuberculosis*. Findings: Male patients in this study were found to be more infected than females. The highest numbers of smear positive cases were observed in Male patients of productive age groups (15-54 years). Compared with culture as a gold standard, the sensitivity of Xpert MTB/RIF was found to be higher than smear microscopy. Moreover, Xpert MTB/RIF assay could detect additional positive cases as compared to both LJ culture and smear microscopy. Additionally, three samples with resistance to rifampicin were also detected by Xpert MTB/RIF assay. MPCR targeting IS6110 segment was found to be more specific to PTB. Conclusion and significance: Modern diagnostic tools such as Xpert MTB/RIF assay and MPCR were found to be rapid, reliable, highly specific and sensitive. whereas Xpert MTB/RIF assay simultaneously detected rifampicin resistant too. Recommendations are made for clinical laboratories and hospitals to use Xpert MTB/RIF assay and MPCR for early diagnosis of TB burden.

Image

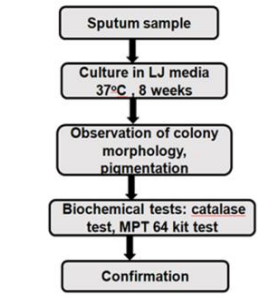


Fig: Primary culture of Mycobacteria:-

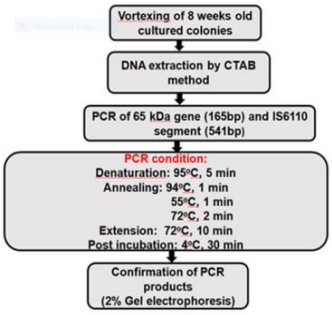


Fig: DNA extraction of Mycobacterium species and PCR:-

Photograph



Biography

Sameekshya Mainali is aspiring graduate student in Medical Microbiology actively looking for Ph.D. opportunities. She is working as a Teaching Assistant at the National College of Science. She has completed her MSc. thesis in bacteriology. She has research experience in infectious disease (Tuberculosis). She completed her research work on the National Tuberculosis Center (The Reference Laboratory), and has worked as a Research Assistant in Annapurna Research Center, one of the leading research centers in Nepal. Her research assessment on the diagnostic accuracy of conventional and modern tools based on sensitivity and specificity creates a new pathway towards the early diagnosis of patients suffering from Pulmonary Tuberculosis. The outcome of her research with the modern diagnostic approach being most rapid, reliable, specific and highly sensitive leads to early diagnosis and control of tuberculosis in one of the high TB burden countries like Nepal. She collected the samples and conducted her research with the consent from patients and followed the hospital ethics. She has experience of volunteering, attended conferences (National & International) and is passionate about teaching and learning new things.

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