

Drug Susceptibility and Genotypic Assessment of Mycobacterial Isolates from Pulmonary Tuberculosis Patients in North East Ethiopia

Authors : Minwuyelet Maru, Solomon Habtemariam, Endalamaw Gadissa, Abraham Aseffa

Abstract : Background: Tuberculosis is a major public health problem in Ethiopia. The burden of TB is aggravated by emergence and expansion of drug resistant tuberculosis and different lineages of Mycobacterium tuberculosis (M. tuberculosis) have been reported in many parts of the country. Describing strains of Mycobacterial isolates and drug susceptibility pattern is necessary. Method: Sputum samples were collected from smear positive pulmonary TB patients age ≥ 7 years between October 1, 2012 to September 30, 2013 and Mycobacterial strains isolated on Lowenstein Jensen (LJ) media. Each strain was characterized by deletion typing and Spoligotyping. Drug sensitivity testing was determined with the indirect proportion method using Middle brook 7H10 media and association to determine possible risk factors to drug resistance was done. Result: A total of 144 smear positive pulmonary tuberculosis patients were enrolled. The age of participants ranged from 7 to 78 with mean age of 29.22 (± 10.77) years. In this study 82.2% (n=97) of the isolates were sensitive to the four first line anti-tuberculosis drugs and resistance to any of the four drugs tested was 17.8% (n=21). A high frequency of any resistance was observed in isoniazid, 13.6%, (n=16) followed by streptomycin, 11.8% (n=14). No significant association of isoniazid resistance with HIV, sex and history of previous TB treatment was observed but there was significant association with age, high between 31-35 years of age (p=0.01). Majority, 89.9% (n=128) of participants were new cases and only 11.1% (n=16) had history of previous TB treatment. No MDR-TB from new cases and 2 MDRTB (13.3%) was isolated from re-treatment cases which was significantly associated with previous TB treatment (p<0.01). Thirty two different types of spoligotype patterns were identified and 74.1% were grouped in to 13 clusters. The dominant strains were SIT 25, 18.1% (n=21), SIT 53, 17.2% (n=20) and SIT 149, 8.6% (n=10). Lineage 4 is the predominant lineage followed by lineage 3 and lineage 7 comprising 65.5% (n=76), 28.4% (n=33) and 6% (n=7) respectively. Majority of strains from lineage 3 and 4 were SIT 25 (63.6%) and SIT 53 (26.3%) whereas SIT 343 was the dominant strain from lineage 7 (71.4%). Conclusion: Wide spread of lineage 3 and lineage 4 of the modern lineage and high number of strain cluster indicates high ongoing transmission. The high proportion resistance to any of the first line anti-tuberculosis drugs may be a potential source in the emergence of MDR-TB. Wide spread of SIT 25 and SIT 53 having a tendency of ease transmission and presence of higher resistance of isoniazid in working and mobile age group, 31-35 years of age may increase risk of drug resistant strains transmission.

Keywords : tuberculosis, drug susceptibility, strain diversity, lineage, Ethiopia, spoligotyping

Conference Title : ICCMB 2014 : International Conference on Cellular and Molecular Biology

Conference Location : Toronto, Canada

Conference Dates : June 16-17, 2014