

Application of Host Factors as Biomarker in Early Diagnosis of Pulmonary Tuberculosis

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Abstract : Introduction: On the basis of available literature we know that various host factors play a role in outcome of Tuberculosis (TB) infection by modulating innate immunity. One such factor is Inducible Nitric Oxide Synthase enzyme (iNOS) which help in the production of Nitric Oxide (NO), an antimicrobial agent. Expression of iNOS is in control of various host factors in which Vitamin D along with its nuclear receptor Vitamin D receptor (VDR) is one of them. Vitamin D along with its receptor also produces cathelicidin (antimicrobicidal agent). With this background, we attempted to investigate the levels of Vitamin D and NO along with their associated molecules in tuberculosis patients and household contacts as compared to healthy controls and assess the implication of these findings in susceptibility to tuberculosis (TB). Study subjects and methods: 100 active TB patients, 75 household contacts, and 70 healthy controls were taken. VDR and iNOS mRNA levels were studied using real-time PCR. Serum VDR, cathelicidin, iNOS levels were measured using ELISA. Serum Vitamin D levels were measured in serum samples using chemiluminescence based immunoassay. NO was measured using colorimetry based kit. Results: VDR and iNOS mRNA levels were found to be lower in active TB group compared to household contacts and healthy controls ($P=0.0001$ and 0.005 respectively). The serum levels of Vitamin D were also found to be lower in active TB group as compared to healthy controls ($P =0.001$). Levels of cathelicidin and NO was higher in patient group as compared to other groups ($p=0.01$ and 0.5 respectively). However, the expression of VDR and iNOS and levels of vitamin D was significantly ($P < 0.05$) higher in household contacts compared to both active TB and healthy control groups. Inference: Higher levels of Vitamin D along with VDR and iNOS expression in household contacts as compared to patients suggest that vitamin D might have a protective role against TB which prevents activation of the disease. From our data, we can conclude that decreased vitamin D levels could be implicated in disease progression and we can use cathelicidin and NO as a biomarker for early diagnosis of pulmonary tuberculosis.

Keywords : vitamin D, VDR, iNOS, tuberculosis

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