EVALUATION OF LIPID PEROXIDATION PRODUCT, NITRITE AND ANTIOXIDANT LEVELS IN NEWLY DIAGNOSED AND TWO MONTHS FOLLOW-UP PATIENTS WITH PULMONARY TUBERCULOSIS

Madhab Lamsal[1], Narayan Gautam[1], Narendra Bhatta[2], Bishamber Dass Toora[1], Shymal Kumar Bhattacharya[3] and Nirmal Baral[1]

[1]Department of Biochemistry, [2]Department of Internal Medicine, [3]Department of Microbiology, B. P. Koirala Institute of Health Sciences, Dharan, Nepal

Abstract. This case-control study followed by a longitudinal cohort study was undertaken to evaluate the level of lipid peroxidation product malondialdehyde (MDA) and nitrite as an indirect measurement of nitric oxide vis-à-vis the levels of antioxidants vitamin C and vitamin E in pulmonary tuberculosis. Fifty-six sputum smear-positive cases of pulmonary tuberculosis based on Ziehl-Neelsen (ZN) staining and 50 healthy controls without any systemic disease were included in this study. Thirty-five cases were longitudinally followed up with standard antituberculosis chemotherapy (ATT) for two months. Serum levels of malondiadehyde (MDA), nitrite, and plasma levels of vitamins C and E were measured. The mean serum MDA level was significantly higher (8.1 ± 1.61 nmoles/ml) in PTB patients before commencement of ATT as compared to healthy controls (3.45 ± 1.7 nmoles/ml) (p=0.0001) and decreased significantly after 2 months of ATT (3.84 ± 1.28 nmoles/ml) (p=0.0001). The mean serum nitrite level (47.19 ± 18.44 µmol/l) was significantly elevated before ATT compared to healthy controls (32.89 ±11.94 µmoles/l) and decreased significantly after 2 months of ATT (27.71 ± 11.97 µmoles/l) (p=0.0001). The mean plasma levels of vitamins C (0.88 ± 0.33 mg/dl) and E (0.79 ± 0.24 mg/dl) in PTB patients before commencement of ATT were lower than healthy controls (1.42 ± 0.38 mg/dl) and (1.35 ± 0.35 mg/dl), respectively (p=0.001). There was a significant increase in vitamin C levels after 2 months of ATT (1.19 ± 0.40 mg/dl) compared to before ATT (0.83 ± 0.31 mg/dl) (p=0.0001), but no significant change in mean plasma vitamin E level before and after 2 months on ATT was found. Elevated malondialdehyde and nitrite levels with concomitant depressed vitamin C and E levels are indicative of lipid peroxidation and oxidative stress. The decrease in levels of malondialdehyde and nitrite with subsequent increase in vitamin C levels after two months of follow-up indicate a good response to treatment with standard ATT. Hence, the extent of oxidative stress in PTB can be evaluated by analyzing lipid peroxidation product, antioxidant and nitric oxide levels.

Correspondence: Dr Madhab Lamsal, Department of Biochemistry, B. P. Koirala Institute of Health Sciences, Dharan, Nepal.
Tel: 00977-25-525555 (2463); Fax: 00977-25-520251
E-mail: madhablamsal@yahoo.co.uk