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SIRINTHORN PINWEHA : STUDY OF OXIDATIVE STRESS IN BLOOD OF PATIENTS WITH PARKINSON'S DISEASE. THESIS ADVISORS : YUPIN SANVARINDA, Ph.D., PRASERT BOONGERD, MD., UDOM CHANTHARAKSI, Ph.D., COL. JITHANORM SUWAN - TAMEE, MD., PIYARAT GOVITRA PONG, Ph.D. 139 P. ISBN 974-662-751-1

Oxidative stress secondary to dopamine metabolism has been proposed as a potential pathological factor in the degenerative process of Parkinson's disease (PD). Biochemical abnormalities extending beyond the central nervous system have been previously identified in these patients. The present study, therefore, investigated the alterations in activities of oxygen free radical-metabolizing enzymes in erythrocytes and platelets as well as the level of lipid peroxidation in plasma (plasma TBARS or thiobarbituric acid reactive substance) of PD patients. Twelve idiopathic PD patients without any clinical motor fluctuation (NF-PD), ten idiopathic patients in a late phase of the disease with severe motor fluctuations (MF-PD) in response to levodopa therapy, and seventeen age-matched healthy subjects (NM), were included in this study. The activities of superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) and catalase (CAT) in erythrocytes and platelets as well as plasma TBARS level were determined. The activities of all of the three antioxidant enzymes in erythrocytes were significantly decreased in MF-PD patients compared to NF-PD patients and NM group whereas in platelets, the activity of glutathione peroxidase was significantly decreased in both NF-PD and MF-PD groups compared to NM group. However, the level of plasma TBARS was significantly increased only in MF-PD group.

The correlation between the ages of the patients and the activities of the enzymes was not evident in this study. In contrast, there was inverse correlation between the severity of the disease (manifested as motor fluctuations) and all antioxidant enzyme activities in erythrocytes as well as glutathione peroxidase activities in platelets. The regression analysis indicated that there was an exponential reduction of these activities during the duration of disease.

The present results strongly suggest that oxidative stress contributes to the pathology of PD. The decrease in all three antioxidant enzyme activities in erythrocytes and glutathione peroxidase in platelets as well as the increase in plasma TBARS level are shown. These are important peripheral indices for the disease. The findings, therefore, not only support the speculation of systemic manifestations of this disease, but also suggest the possibility of using all three antioxidant enzyme activities in erythrocytes as markers for predicting the severity of the disease. In addition, glutathione peroxidase activity in platelets may provide a candidate marker to recognize the early stage of the disease.