

3536901 SIBC/M : MAJOR : BIOCHEMISTRY; M.Sc. (BIOCHEMISTRY)
 KEY WORDS : LEUKEMIA / REACTIVE OXYGEN SPECIES/ANTIOXIDANTS
 MALONDIALDEHYDE / LIPID PEROXIDATION

PREECHA JAICHEROEN OXIDANT DEFENSE INDICES RELATED TO
 TISSUE DAMAGE IN LEUKEMIA. THESIS ADVISORS: ATIP LIKIDLILID
 M.Sc. ANONG PIANKIJAGUM, M.D.,Ph.D. KLAI-UPSORN PONGRAPEEPORN,
 Ph.D. NEDNAPIS TIRAWANCHAI, Ph.D. CHAMRAS PROMPTMAS, Ph.D 118 p
 ISBN - 974-662-047-9

Oxidative or oxidant stress may defined as a condition that cause the cells or tissue damages leading to the extremely serious progressions of diseases. There is much evidence reporting that reactive oxygen species and other free radicals can accelerated the alterations in both phenotypes and genotypes including gene expression that lead from mutation to cancer. In this study, the parameters of lipid peroxidation, antioxidant vitamins such as vitamin A, E, C, and β -carotene and antioxidant enzymes represented here by superoxide dismutase as the indices of oxidative stress were investigated in blood of various kinds of leukemic patients. Sixty-five patients of various stages and activities of Chronic myelogenous leukemia, Acute lymphoblastic leukemia, Acute promyelocytic leukemia, Acute nonlymphoblastic (myeloid) leukemia, and twenty-five of normal control were recruited. This study found that SOD activity was significantly lower in all types of leukemia than that in normal subjects (2062 ± 114 , 3095 ± 60 , $P < 0.0001$). Levels of MDA in plasma was significantly higher comparing to the normal control (32.7 ± 2.4 , 9.2 ± 0.3 , $P < 0.0001$), and in red cells was significantly higher comparing to the normal control (3.1 ± 0.3 , 1.2 ± 0.1 , $p < 0.0001$). In addition, Significantly lower of antioxidant vitamins such as vitamin A, E, and β -carotene were also observed (A: 42.5 ± 3.4 , 88.1 ± 4.6 , E: 6.4 ± 0.6 , 13.1 ± 0.7 , β -carotene: 7.7 ± 0.8 , 21.6 ± 2.9 , $P < 0.0001$), although vitamin C showed no significant difference. These results indicated that the cells or tissues of leukemic patients were prone to be oxidised by reactive oxygen species due to the shortage of natural antioxidants. In addition to the shortage of natural antioxidants, the significantly higher level of uric acid in leukemic patients may be another cause of oxidative stress (7.7 ± 0.7 , 4.8 ± 0.2 , $P < 0.0001$). Plasma uric acid was increased by turnover rate of purine catabolism from cellular proliferation in leukemia. Uric acid with high concentration will act as an pro-oxidant in leukemic cells.

Thus, the membranes of cells or tissues in leukemic patients might be subjective to oxidative damage. To prove this phenomenon, the lactate dehydrogenase and creatine kinase activities as the tissue membrane damage indices were investigated. The lactate dehydrogenase activity was significantly higher (331 ± 57 , 71 ± 2 , $p < 0.0001$) whereas CK did not differ from the normal control ($p > 0.05$). Moreover, extremely significant increases of five LDH isoenzymes were also found. This result suggested that red cells and other tissues were destroyed or damaged by reactive oxygen species. However, it is generally known that the hemolysis of red cells or other tissue damage may be occurred due to the deficiency of G-6-PDH. To prove this event, the G-6-PDH activity was also observed. There was no significant difference between leukemic patients and normal control. This signified that G-6-PDH had no influence on the hemolysis or tissue damages in leukemic patients.

These findings can be conclude that leukemic patients are under oxidative stress. The imbalance in antioxidant defense mechanism can influence the cell or tissue damage. In addition, this imbalance may be the major cause of DNA damage or alterations in oncogenes or tumor suppressor genes leading to develop the leukemic cells in leukemic patients.