

The Alterations of Plasma Lipid Peroxidation and erythrocyte Superoxide Dismutase and Glutathione Peroxidase Enzyme Activities During Storage of Blood

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Abstract

Background and objective: Exposure of red blood cells to oxygen radicals can induce Lipid prooxidation, hemoglobin damage and hemolysis of erythrocyte .The present study was designed to determine the alteration of plasma lipid peroxidation and erythrocyte Superoxide Dismutase and Glutathione Peroxidase enzyme activities in stored blood and to find out the quantitative alterations and the useful length of stored blood.

Materials and Methods: First, the whole blood form 10 donors was taken. Then Red Blood Cells(RBC) were counted, the levels of Potassium(P) and lactate dehydrogenate activity(LDH) were measured to determine the amount of hemolysis, the plasma levels of malondialdehyde (MDA), erythrocyte Superoxide Dismutase(SOD) and Glutathione Peroxidase(GPx) were studied for determination of lipid peroxidation and antioxidant enzyme activities at the days of 0,1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33 and 35 of the storage.

Results: upon storage time, the plasma levels of malondialdehyde (MDA) and Potassium and lactate dehydrogenate activity increased ($P < 0.05$) whereas erythrocyte Superoxide Dismutase and Glutathione Peroxidase enzyme activities and Red Blood Cells decreased ($P < 0.05$). The alterations of MDA, SOD, GPx, P, LDH and RBC in the measurement days were as follows: MDA, P and LDH significantly increased at the day of 9, 5 and 5 whereas SOD, GPx and RBC decreased at the day of 11, 7 and 29 respectively.

Conclusion: The results of this study showed that the increased level of MDA and decreased SOD and GPx in stored blood can cause the beginning of hemolysis of erythrocyte; therefore, it is necessary to control these factors before storing the donated blood.

Keywords: lipid peroxidation, Superoxide Dismutase, Glutathione Peroxidase