

**P4 CYTOCHROME B-5 REDUCTASE ACTIVITY AND METHEMOGLOBINEMIA IN HUMAN RED BLOOD CELLS OF PATIENTS RECEIVING NITROGLYCERIN**

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**ABSTRACT**

Nitroglycerin and other organic nitrates have been used routinely in the therapy of angina pectoris and congestive heart failure. Clinical significant methemoglobinemia during administration of organic nitrates, including intravenous nitroglycerin has been occasionally reported as a serious complication. In normal individuals, methemoglobin in red blood cell is maintained at a very low level (<1%). It is immediately reduced by cytochrome b<sub>5</sub> reductase to the normal hemoglobin moiety. Since acquired methemoglobinemia is not only resulted from exposure to a variety of oxidizing agents but also related to cytochrome b<sub>5</sub> reductase deficiency, the present study was aimed to investigate the relationship of cytochrome b<sub>5</sub> reductase activity and methemoglobinemia. 114 normal blood samples from male and female healthy volunteers with 20–65 years old were used as control group and 40 blood samples of patient receiving 24,000–104,000 µg (0.5-3.0 µg/kg/min) intravenous nitroglycerin were collected. The concentration of methemoglobin in 57 men and 57 women healthy volunteers were 0.05 ± 0.02 and 0.08 ± 0.02 % of total hemoglobin (mean ± SE) respectively. The cytochrome b<sub>5</sub> reductase activity in male were statistic significantly lower (p<0.05) than female. No severe methemoglobinemia was found in these patients. However, the methemoglobin concentration and cytochrome b<sub>5</sub> activity in the treatment group were significantly higher (P<0.05) than the normal group. Our results showed that methemoglobin content of erythrocyte was independent on the activity of cytochrome b<sub>5</sub> reductase. It was found that intravenous nitroglycerin administration in the total doses of 24,000–104,000 µg can produce not only slightly increasing of methemoglobin content but also the significant increasing of their cytochrome b<sub>5</sub> reductase activity. However, the increased methemoglobin level of these patients were found to be within an acceptable level of normal conditions. In conclusion, clinically significant methemoglobinemia was uncommon with low doses of intravenous nitroglycerin administration. In addition, the correlation of cytochrome b<sub>5</sub> reductase elevation and nitroglycerin administration should be further investigated.