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Nitric Oxide in Chronic Liver Disease

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Abstract: The formation of nitric oxide (NO), a free radical, increases in liver disease, where the L-arginine-nitric oxide (L- arg-NO) pathway is activated by the increased levels of cytokines and endotoxins. In this study, we investigated the relationship between the L-arg-NO pathway and chronic active hepatitis and cirrhosis, which are classified as chronic liver disease. We determined the serum levels of nitrite and nitrate, the end products of the L-arg-NO pathway, in patients with chronic liver disease and compared them with the control group levels. Total nitrite produced by the reduction of nitrate to nitrite in the presence of nitrate reductase was determined. The measurement of nitrite concentrations was based on the Griess reaction. The nitrate concentrations were obtained by subtracting the nitrite concentrations from the total nitrite+nitrate concentration. The study group consisted of 21 patients with chronic active hepatitis and 19 patients with cirrhosis. In the cirrhosis group, serum levels of nitrite+nitrate, nitrate and nitrite were $84.8 \pm 9.43 \mu\text{mol/L}$, $74.75 \pm 9.49 \mu\text{mol/L}$ and $10.03 \pm 1.59 \mu\text{mol/L}$, respectively. In the chronic active hepatitis group, the values were $72.79 \pm 6.9 \mu\text{mol/L}$, $59.9 \pm 7.09 \mu\text{mol/L}$ and $12.88 \pm 1.65 \mu\text{mol/L}$, respectively. The control group values obtained from 10 normal persons were $29.0 \pm 4.6 \mu\text{mol/L}$, $19.41 \pm 3.16 \mu\text{mol/L}$ and $9.59 \pm 1.60 \mu\text{mol/L}$, respectively. The statistical evaluation showed a significant difference between the control and study groups ($p < 0.0001$). We found higher nitrite+nitrate and nitrate levels in the study group than in the control group. Nitrite levels did not show any significant difference between the two groups. No significant differences were found between the chronic active hepatitis and cirrhosis groups ($p > 0.5$). Our results show that serum nitrite and nitrate concentrations as an index of NO generation may be elevated in hepatic failure seen in chronic liver disease.

Key Words: Nitric oxide, chronic liver disease, nitrate and nitrite

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