

Effect of L-carnitine supplementation in hemodialysis patients.

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1

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Abstract

BACKGROUND/AIM:

L-Carnitine is important in beta-oxidation of fatty acids. A lack of carnitine in hemodialysis patients is caused by insufficient carnitine synthesis and especially by its loss during dialysis. The aim of our study was to test the influence of carnitine supplementation on plasma lipids, red blood cell count, and metabolism of free radicals.

METHODS:

Twelve regularly dialyzed patients (average age 55.5 years, average dialysis treatment period 22.5 months) were given 15 mg/kg L-carnitine intravenously three times weekly (after each hemodialysis session) for 6 months. Laboratory markers of oxidative stress, lipid metabolism, and red blood cell count were measured before the supplementation and then controlled during two 3-month intervals. Nine patients were retested 3 months after the supplementation had ended.

RESULTS:

All supplemented patients showed increased plasma free carnitine in comparison with the pretreatment values (113.3 +/- 11.2 vs. 62.3 +/- 16.7 micromol/l, $p < 0.001$). The proportion of decreased L-carnitine values after hemodialysis was reduced from 79 to 22%. Plasma total cholesterol (4.66 +/- 0.30 mmol/l after treatment vs. 5.65 +/- 1.53 mmol/l before treatment, $p < 0.05$) and LDL cholesterol (1.74 +/- 0.86 vs. 2.81 +/- 1.43 mmol/l, $p < 0.05$) decreased. The albumin concentration significantly increased from 34.8 +/- 7.3 to 46.0 +/- 5.4 g/l ($p < 0.05$). Intraerythrocyte reduced glutathione increased from 1.65 +/- 0.25 to 2.23 +/- 0.16 mmol/l ($p < 0.001$), and the plasma antioxidant capacity increased from 1.65 +/- 0.09 to 2.06 +/- 0.17 mmol/l ($p < 0.001$). At the same time, plasma malondialdehyde decreased from 4.18 +/- 0.72 to 3.07 +/- 0.35 micromol/l ($p < 0.001$). The erythropoietin dose could be reduced from an average value of 5,500 to 3,500 U/week. No significant changes in the above-mentioned parameters were observed in a control group of dialyzed patients without L-carnitine supplementation.

CONCLUSION:

Regular carnitine supplementation of hemodialysis patients can improve their lipid metabolism, protein nutrition, red blood cell count, and antioxidant status.