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Does L-carnitine increase serum TNF- α and IGF-1 during liver regeneration in the rat?



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Abstract: Aim: We sought to evaluate the effect of L-carnitine administration on the levels of IGF-1, TNF- α , and lipid peroxidation during hepatic regeneration for up to 72 h in an experimental partial hepatic resection rat model. Materials and methods: Sixty rats were divided into 3 groups: control and low-dose (100 mg/kg) and high-dose (200 mg/kg) L-carnitine. Each group was divided into 2 sub groups (24 and 72 h after partial hepatectomy). Partial (70%) hepatectomy was performed after 7 days of intra-peritoneal administration of L-carnitine. After partial hepatectomy, L-carnitine was also administered to rats until sacrifice. Serum IGF-1, TNF- α , and tissue malondialdehyde levels were determined in all groups before and at 24 and 72 h after surgery. Results: Serum TNF- α increased significantly in the control group during the regeneration period. The low dose of L-carnitine (100 mg/kg) decreased the elevation of TNF- α whereas the high dose (200 mg/kg) increased it. In the control group, the IGF-1 level decreased in the first 24 h after surgery and then increased. The IGF-1 level behaved similarly in the L-carnitine groups. The malondialdehyde level in the control group increased during the first 24 h and then decreased. Similarly in the L carnitine groups, the malondialdehyde level increased during the first 24 h and then decreased significantly in a dose-dependent manner. Conclusion: Three types of biochemical pathways are essential in liver regeneration: cytokine, growth factor, and metabolic pathways. We conclude that, in addition to its effects on energy metabolism, high-dose L-carnitine may promote liver regeneration by increasing IGF-1, TNF- α , and decreasing malondialdehyde.

Key words: Liver regeneration, partial hepatectomy, L-carnitine, TNF- α , IGF-1

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