Abstract

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Caloric restriction and L-carnitine administration improves insulin sensitivity in patients with impaired glucose metabolism.

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BACKGROUND: Reduced circulating and tissue carnitine levels, possibly leading to impaired mitochondrial function, have been postulated to be involved in the pathogenesis of insulin resistance. However, whether L-carnitine administration may improve insulin sensitivity in patients with impaired fasting glucose (IFG) or type 2 diabetes mellitus (DM-2) is still controversial. The aim of the study was to explore the role of L-carnitine supplementation in influencing insulin sensitivity.

METHODS: A randomized controlled study involving adult outpatients was designed. Adult patients referred to the outpatient clinic and within 10 days of the diagnosis of IFG or DM-2 were consecutively enrolled. Exclusion criteria were concomitant antidiabetic therapy and modifications of lifestyle during the previous 4 weeks. Patients were randomly assigned to receive a hypocaloric diet for 10 days (group C; n = 8) or the same dietetic regimen in addition to oral L-carnitine (2 g twice daily) supplementation (group LC; n = 8). Oral glucose tolerance test (OGTT), fasting plasma insulin levels, and homeostasis model assessment of insulin resistance (HOMA-IR) were assessed at the beginning and end of the study. Data were statistically analyzed using the Student t test for paired and unpaired data.

RESULTS: OGTT at 2 hours improved in both groups. Only in the L-carnitine-supplemented group did plasma insulin levels and HOMA-IR significantly decrease when compared to baseline values.

CONCLUSIONS: Considering the role of caloric restriction in increasing the intestinal uptake of carnitine, the results suggest that oral L-carnitine administration, when associated with a hypocaloric feeding regimen, improves insulin resistance and may represent an adjunctive treatment for IFG and DM-2.

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