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

Molfino A, Cascino A, Conte C, Ramaccini C, Rossi Fanelli F, Laviano A.

Department of Clinical Medicine, Sapienza University, Rome, Italy.

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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