DIABETES

Acetyl-L-carnitine therapy increases insulin sensitivity in individuals at high cardiovascular risk

Insulin resistance is a risk factor for renal and cardiovascular disease and for the onset of type 2 diabetes. Giuseppe Remuzzi and colleagues report that oral administration of acetyl-L-carnitine increases insulin sensitivity and glucose tolerance in individuals with a low glucose disposal rate (GDR).

Evidence from the early 1990s indicates that, in individuals with type 2 diabetes, intravenous infusion of L-carnitine increases whole-body glucose use. This effect is mediated by increased glucose storage and oxidative glucose consumption, which might be associated with improved lipid metabolism resulting from carnitine activity.

Remuzzi and colleagues enrolled in their study 32 individuals at high risk of decreased insulin sensitivity. Participants were subdivided into two categories depending on whether their baseline GDR, a marker of insulin sensitivity, was ≤7.9 mg/kg ($n = 16$) or >7.9 mg/kg ($n = 16$). 6-month administration of 2 g daily of acetyl-L-carnitine—an L-carnitine derivative than can be administered orally—increased GDR by an average of 37% (to an average value of 6.72 mg/kg) in individuals whose baseline GDR was ≤7.9 mg/kg. In these participants, moreover, blood glucose concentration at 60 and 90 min following a standard glucose oral load decreased significantly. Acetyl-L-carnitine treatment had no effect on any of these parameters in participants with a GDR >7.9 mg/kg. Furthermore, the researchers observed in all 32 participants (17 of whom had hypertension) a significant decrease in systolic blood pressure. By contrast, diastolic blood pressure decreased significantly only in patients in the high GDR group. The researchers say that these data might be the first evidence of an antihypertensive effect of acetyl-L-carnitine in humans.

> “...acetyl-L-carnitine increases insulin sensitivity ... in individuals with low [GDR]”

Given the small size of this study and that it lacked a placebo control arm, Remuzzi concludes that “larger clinical studies are now needed to evaluate whether acetyl-L-carnitine has additional value in the treatment of patients with type 2 diabetes mellitus and whether it may prevent new-onset diabetes.”

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Original article Ruggenenti, P. *et al.* Ameliorating hypertension and insulin resistance in subjects at increased cardiovascular risk: effects of acetyl-L-carnitine therapy. *Hypertension* **54**, 567–574 (2009).