Abstract

Background

Type 2 Diabetes is a globally growing chronic disease that needs long-term medical attention. Despite the wide range of diabetic medications, many patients don't reach satisfactory control, and most of them progress to chronic complications that decrease the quality of life and increase morbidity and mortality.

Alteration in the level of several antioxidants and micronutrients in diabetic patients have been suspected in several metabolic disturbances that associated with type 2 diabetes. There is evidence that the addition of micronutrient supplements along with oral antidiabetic agents may improve diabetic control and prevent its complications. L-carnitine and coenzyme Q10 are essential mitochondrial components that studied for their effects in various metabolic disorders and gained special attention in type 2 diabetes mellitus.

Objective

The present work designed to study the possible effects of L-carnitine and coenzyme Q10 on glycemic state, lipoprotein (a), and lipid profile when added to pre-existing oral diabetic medications in patients with type 2 diabetes. Another objective is to study their effects on low-grade inflammatory marker and oxidative stress parameters.

Subjects and Methods

Fifty-seven patients with type 2 diabetes participated in this study. Diabetic patients assigned into three groups, nineteen patients in each group. Group A receive L-carnitine in addition to oral antidiabetic drugs (sulfonylurea and metformin). Group B receive coenzyme Q10 in addition to the same mentioned oral antidiabetic drugs. Group C sustained on the same oral antidiabetic medications without any supplement and considered

as diabetic control group. In addition, nineteen apparently healthy subjects were included as a healthy control group. Patients in all groups have been kept on the same medications all over the study duration. Blood sample was collected from each patient for measuring fasting serum glucose, glycated hemoglobin, low-density lipoprotein cholesterol (LDL-c), total cholesterol, high-density lipoprotein cholesterol (HDL-c), triglyceride, non-high-density lipoprotein cholesterol (non-HDL-c), lipoprotein (a), high sensitive C-reactive protein, Malondialdehyde (MDA), and total antioxidant status. Laboratory assessment of the patients is done at beginning of study and after eight weeks of treatments.

Results:

Fasting serum glucose, total cholesterol, LDL-c, non HDL-c and lipoprotein (a) significantly decreased after eight weeks of L-carnitine and coenzyme Q10 treatment in comparison with diabetic control. However, non-significant changes in triglyceride and HDL-c were seen in any of the three groups during the study. In addition, HbA1c% significantly decreased in coenzymeQ10 treated group but non-significantly decreased in L-carnitine treated group. L-carnitine also lower inflammatory marker and significantly reduce hs-CRP level after eight weeks of treatment. Malondialdehyde (MDA) level significantly decreased in L-carnitine treated group and total antioxidant status (TAS) significantly increased in coenzyme Q10 group at the end of the study.

Conclusion:

Using of L-carnitine and coenzyme Q10 along with oral antidiabetic medications could improve glycemic control and oxidative stress. In addition, they may help in reducing the risk of cardiovascular complications in diabetic patients by decreasing total cholesterol, LDL-cholesterol, lipoprotein (a), and low-grade inflammatory marker (hs-CRP).