

# Abstract

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## Effect of coenzyme Q10 administration on endothelial function and extracellular superoxide dismutase in patients with ischaemic heart disease: a double-blind, randomized controlled study.

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**AIMS:** This randomized controlled study was designed to determine whether oral coenzyme Q(10) (CoQ(10)) supplementation (100 mg tid) was able to improve extracellular superoxide dismutase (ecSOD) activity and endothelium-dependent (ED) vasodilation in patients with coronary artery disease (CAD). ecSOD, a major antioxidant enzyme system of the vessel wall, is reduced in patients with CAD. Moreover, there is a strong correlation between endothelium-bound ecSOD and the ED dilation of conduit arteries. CoQ(10) has been recently shown to improve the ED relaxation in diabetic patients.

**METHODS AND RESULTS:** Thirty-eight CAD patients (33 M/5 F, mean age 55 +/- 4 years, ejection fraction 57.5 +/- 8%) were randomized into two groups. One group (n = 19) received CoQ(10) orally at doses of 300 mg/day for 1 month, whereas the other group received a placebo. On entry and after 1 month, all patients underwent brachial artery ED assessment, cardiopulmonary exercise test, and the measurement of endothelium-bound ecSOD activity. A total of 33 patients completed the study. ecSOD, ED relaxation, as well as peak VO(2) and O(2) pulse increases in the CoQ(10)-treated group were statistically greater vs. the variations in the placebo group. In particular, improvements elicited by CoQ(10) supplementation were remarkable in subjects presenting low initial endothelium-bound ecSOD and thus more prone to oxidative stress.

**CONCLUSION:** Improvements in the ED relaxation and endothelium-bound ecSOD activity might be related to CoQ(10) capability of enhancing endothelial functionality by counteracting nitric oxide oxidation. The enhancement of peak VO(2) and of O(2) pulse is likely due to the bioenergetic effect of CoQ(10); on the other end, the improved VO(2) could also depend on the observed enhanced peripheral endothelial function.

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