

Association between serum level of ubiquinol and NT-proBNP, a marker for chronic heart failure, in healthy elderly subjects

Simone Onur ¹, Petra Niklowitz, Gunnar Jacobs, Wolfgang Lieb, Thomas Menke, Frank Döring

Affiliations + expand

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Abstract

Ubiquinone and ubiquinol represent the oxidized and reduced forms of Coenzyme Q10 (CoQ10). CoQ10 is present in membranes of almost all human tissues and organs, with highest concentration in the heart. In patients with heart failure, serum levels of the N-terminal pro-brain natriuretic peptide (NT-proBNP) are an indicator of disease severity. Here, we investigated the relationship between serum levels of CoQ10 and NT-proBNP in healthy volunteers of an elderly study population (mean age 52 years, n = 871). We found a negative association between serum levels of ubiquinol and NT-proBNP ($P < 0.001$). Accordingly, the CoQ10 redox state (% oxidized form of CoQ10) is positively associated with serum NT-proBNP level ($P < 0.001$). Compared to patients who survived a myocardial infarction (n = 21), healthy subjects have lower NT-proBNP level (500.39 ± 631.28 pg/ml vs. 76.90 ± 120.27 pg/ml, $P < 0.001$), higher ubiquinol serum level (0.43 ± 0.19 μ mol/L vs. 0.71 ± 0.32 μ mol/L; $P < 0.001$), and a lower CoQ10 redox state ($27.6 \pm 13.8\%$ vs. $17.6 \pm 10.1\%$; $P < 0.001$). Interestingly, ubiquinol supplementation (150 mg/day; 14 day; n = 53) slightly reduces the expression of CLCN6, a gene related to NT-proBNP level. In summary, higher serum levels of ubiquinol are associated with lower serum NT-proBNP levels in healthy elderly subjects. However, to what extent a high serum level of ubiquinol is a protective factor for heart failure remains to be elucidated in prospective studies.

Keywords: CoQ10 redox state; NT-proBNP; antioxidants; heart failure; oxidative stress.

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