

Clinical Application of NO Synthesis and Lymphocyte Hsp72 Production Assessment in Chronic Heart Failure

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Introduction

The aim of our study was assessment of heat shock protein 72 (HSP72) and nitric oxide (NO) synthesis in patients with chronic heart failure (HF) and its correlation with clinical course for potential use of HSP72 as new criterion of clinical course and prognosis for patients with HF.

Methods

Fifty patients with confirmed postinfarction cardiosclerosis (PC) combined with HF, NYHA II - IV, were enrolled in our study. Forty patients with comparable demographics who had with PC without HF served as a control group. In addition to complex and thorough clinical examination, patients had determination of plasma and urinary nitrites/nitrates (n/n) concentration as well as basic and inducible levels of lymphocyte HSP72.

Results

Surprisingly, lymphocyte HSP72 content and urinary n/n levels in an overwhelming majority of patients were found to be tightly interrelated. After statistical analyses of these findings, we found close negative correlations between the following:

- NO metabolites levels vs. (1) pulmonary hypertension severity, and (2) total & LDL-cholesterol levels;
- Lymphocyte HSP72 content vs. (3) NYHA class, (4) left ventricular ejection fraction decreasing, (5) severity of peripheral edema, (6) dyspnea severity, and (7) time to regression of HF symptoms.

Interestingly, higher HSP72 content was clearly independently associated with better clinical course, whereas elevated NO metabolites levels were shown to be beneficial only in the mild-to-moderate range. In HF patients with the highest plasma and urinary n/n concentrations, we observed a partial loss of its protective effects, which confirms previously demonstrated harmful effects of iNO-synthase over-activation in HF.

Conclusions

To the best of our knowledge, this is the first report that establishes a significant positive correlation between co-elevation of lymphocyte HSP72 and NO metabolites levels and favorable HF clinical course in patients with postinfarction cardiosclerosis, with the exception of those with very high urinary and plasma n/n concentrations. Lymphocytic HSP72 content was also associated with better condition of cardioprotective systems than urinary and plasma n/n levels. Thus, this test may be used as an additional criterion in clinical and instrumental assessments of HF clinical course. Our data also provide additional clinical evidence of cardioprotective co-action of nitric oxide and heat shock proteins in patients with HF.