B-TYPE Natriuretic Peptide 1-32 Has Lipolytic Effects in Adipose Tissue of Patients with Advanced Heart Failure

ACC Poster Contributions
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Background: Enhanced lipolysis can contribute to myocardial lipid overload, insulin resistance and cachexia in advanced heart failure (HF). Natriuretic peptides were recently recognized to stimulate lipolysis in healthy subjects, but no study has ever addressed the their effects in HF patients. The goal of the study was to examine the role of bioactive form of BNP (BNP1-32) in lipolysis regulation in HF patients using adipose tissue microdialysis.

Methods: 10 non-diabetic HF patients (HF-group, 56±3y, BMI=25±1 kg/m2, all NYHA III on optimal medical therapy) and 13 healthy control subjects of similar age, gender and body composition (C-group, 48±1.5y, BMI=28±0.8 kg/m2) underwent microdialysis study of subcutaneous abdominal adipose tissue. Four microdialysis catheters (20kDa, CME, Sweden) inserted paraumbilically were equilibrated for 1 hour and perfused for 1-h with 1) 10 μM BNP1-32 solution , 2) 0.1 μM BNP1-32 solution, 3) 10 μM solution of norepinephrine and 4) and Ringer's solution as control. Outgoing dialysate was collected á 20-min, dialysate glycerol concentration (DGC) was measured as marker of lipolysis. Body composition was measured by DEXA, circulating plasma BNP with CMIA (Architect, Abbott).

Results: Plasma total BNP was markedly elevated in HF (1119±259 vs. 28±3 pg/ml, p<0.01). Spontaneous lipolysis was higher in HF compared to C (DGC: 189.0±37 vs. 152.1±35 μmol/L, p=0.03). Response to norepinephrine was similar in HF and C (1.7±1.4 vs. 1.7±0.9-fold DGC increase, p=0.9). Perfusion with 10 μM BNP increased DGC similarly in both groups (3.2±0.8 and 2.8±1.7-fold), while with 0.1 μM BNP increased DGC more in HF than in C group (p=0.04). In HF, spontaneous lipolysis was positively associated with plasma BNP (r=0.7, p<0.05), the response to 10μM BNP perfusion inversely correlated with adiposity (r=-0.8, p<0.05).

Conclusions: Using microdialysis techniques, we demonstrated that BNP1-32 exerts strong lipolytic effect in humans in-vivo. The responsiveness of adipose tissue to BNP1-32 is not attenuated in HF, probably reflecting deficiency of endogenous bioactive BNP forms. Lipolytic effects of BNP can contribute to excessive adipose tissue mobilization observed in advanced HF.