

Effects of short-term manipulation of serum FFA concentrations on left ventricular energy metabolism and function in patients with heart failure: no association with circulating bio-markers of inflammation

BACKGROUND AND AIMS:

We wanted to assess the effects of short-term changes in serum free fatty acids (FFAs) on left ventricular (LV) energy metabolism and function in patients with heart failure and whether they correlated with circulating markers of inflammation.

METHODS AND RESULTS:

LV function and phosphocreatine (PCr)/ATP ratio were assessed using MR imaging (MRI) and ³¹P magnetic resonance spectroscopy (MRS) in 11 men with chronic heart failure in two experimental conditions 7 days apart. Study 1: MRI and ³¹P-MRS were performed before and 3-4 h after i.v. bolus + continuous heparin infusion titrated to achieve a serum FFA concentration of 1.20 mM. Study 2: The same protocol was performed before and after the oral administration of acipimox titrated to achieve a serum FFA concentration of 0.20 mM. Serum concentrations of IL6, TNF- α , PAI-1, resistin, visfatin and leptin were simultaneously assessed. Serum glucose and insulin concentrations were not different between studies. The PCr/ATP ratio (percent change from baseline: $+6.0 \pm 16.9$ and -16.6 ± 16.1 % in Study 1 and Study 2, respectively; $p = 0.005$) and the LV ejection fraction (-1.5 ± 4.0 and -6.9 ± 6.3 % in Study 1 and Study 2, respectively; $p = 0.044$) were reduced during low FFA when compared to high FFA. Serum resistin was higher during Study 1 than in Study 2 ($p < 0.05$ repeated measures ANOVA); meanwhile, the other adipocytokines were not different.

CONCLUSION:

FFA deprivation, but not excess, impaired LV energy metabolism and function within hours. Cautions should be used when sudden iatrogenic modulation of energy substrates may take place in vulnerable patients.