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Force-frequency relationship during dobutamine stress echocardiography predicts exercise tolerance and BNP levels in patients with chronic congestive heart failure

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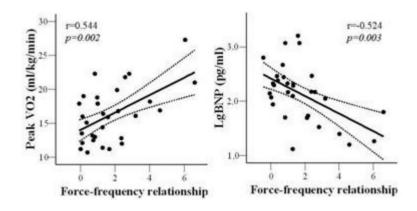
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Purpose: D obutamine stress echocardiography (DSE) is widely used to evaluate myocardial contractile reserve; it provides prognostic information in patients with chronic congestive heart failure (CHF). The force?frequency relationship (FFR) is a method for evaluate LV contractility during DSE. The aim of our study is to assess the relationship among FFR, BNP levels, and aerobic exercise capacity in CHF patients.

Methods and materials: 37 CHF patients (age 67±8 years, 54% with an ischemic etiology), underwent high dose DSE (up to 40 m g/kg/min). FFR was determined as a ratio between systolic cuff pressure and end-systolic volume (biplane using a Simposon rule) assessed at baseline and peak DSE . BNP levels were determined on blood samples withdrawn at baseline. After a few hours, CHF patients underwent cardiopulmonary exercise test with expired gas measurement.

Results: Mean ejection fraction was 32±7% and NHYA class 2.5±0.6. FFR was directly related to peak oxygen consumption (Figure Left), LV ejection fraction (r=0.398, p=0.015) and mitral annulus peak systolic velocity (r=0.428, p=0.013). FFR was inversely related to NYHA class (r=-0.43, p=0.013), LV end-diastolic diameter (r=-0.377, p=0.022), LV intraventricular dyssynchrony (r=-0.394, p=0.016), and BNP levels (Figure Right). At multiple regression analysis, FFR (B=0.502, p=0.004) and E/Ea ratio (B=-0.336, p=0.044) were the best predictors of exercise tolerance.

Conclusions: In patients with stable CHF, impaired myocardial contractility during DSE is related to higher BNP levels and poorer exercise tolerance.



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