Effects of physical exercise on cardiac dyssynchrony in patients with impaired left ventricular function

Michael Kühne, Robert Blank, Beat Schaeer, Peter Ammann, Stefan Osswald & Christian Sticherling

Aims The purpose of this study was to determine the effect of exercise on dyssynchrony in patients with left ventricular dysfunction. Methods and results Sixty patients with a left ventricular ejection fraction (LVEF) ≤35% were studied. Interventricular mechanical delay (IVMD), intraventricular mechanical delay [Ts-(lateral-septal)], and left ventricular filling ratio were measured at rest and during exercise. Significant IVMD was defined as a difference between aortic and pulmonary pre-ejection times of >40 ms. Intraventricular dyssynchrony was defined as a Ts-(lateral-septal) >65 ms. Forty-five patients with no dyssynchrony at rest were analysed (age 62 ± 14; LVEF 28 ± 6%) and compared with a control group of 15 patients with known dyssynchrony at rest. None of the 45 patients without dyssynchrony at rest developed dyssynchrony during exercise based on IVMD and Ts-(lateral-septal). In the control group, IVMD decreased from 65 ± 19 to 33 ± 11 ms (P < 0.001) during exercise, whereas Ts-(lateral-septal) did not change. Persistence of dyssynchrony during exercise (decrease of IVMD <60%) was significantly associated with response to cardiac resynchronization therapy (CRT). Whereas all 10 responders had persistent dyssynchrony during exercise, 4 of the 5 non-responders (80%) had an exercise-induced decrease of IVMD >60% (P < 0.004). Conclusion Exercise does not elicit mechanical dyssynchrony in patients without dyssynchrony at rest. In patients with significant dyssynchrony at rest, exercise-induced decrease of IVMD is common. Persistence of dyssynchrony during exercise might be a novel predictor of response to CRT.

type journal paper/review (English)
date of publishing 24-12-2010
journal title Europace
ISSN electronic 1532-2092