Stress echo in hypertrophic cardiomyopathy: the dark side of the force

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On behalf: Stressecho 2020 study group

Topic(s):
Stress Echocardiography

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Background: Left ventricular contractile reserve (LVCR) can be reduced in a subset of patients with hypertrophic cardiomyopathy (HCM) at higher risk of subsequent events.

Purpose: to evaluate the feasibility and prognostic value of non-invasive assessment of LVCR during exercise stress echocardiography (SE) in HCM.

Methods: We enrolled 188 HCM patients (age 52±15, 160 males, New York Heart Association Class I-II, 29 with left ventricular outflow tract gradient, LVOTG, >50 mmHg) referred for exercise SE in 7 quality-controlled labs from 4 countries (Italy, Portugal, Serbia, Spain). The maximal wall thickness was 20±5 mm. SE assessment included: wall motion score index (WMSI), peak LVOTG (mm Hg), LV Force (systolic arterial pressure+LVOTG/LV end-systolic volume assessed with 2-D, mmHg/mL) and LVCR (peak/rest ratio of LV Force). All HCM patients were followed-up. An age- and gender matched control group of 28 patients with normal baseline LV function and negative SE was also evaluated.

Results. Interpretable SE data were obtained in all patients (feasibility=100%). Inducible ischemia was observed in 16 HCM patients (WMSI rest=1.03±0.15 vs stress=1.06±0.19, p=.003), and in no controls (WMSI rest/stress=1.0). HCM patients showed higher values of LV Force at rest (HCM=11.5±7.6 vs Controls=4.7±1.4 mmHg/mL, p<.001), with similar values at peak stress (HCM=19.9 ±16.1 vs Controls=13.9±4.4 mmHg/mL, p<.005), with reduced LVCR (HCM =1.8±0.9 vs Controls=3.1±0.9, p<.001). During a median follow-up of 58 months, 71 major cardiac events occurred: 17 deaths (10 cardiac), 19 hospitalizations for acute heart failure, 16 ventricular tachyarrhythmias and 19 atrial fibrillations. The event-free survival was lower in the 58 patients with LVCR <1.75 (identified with Receiver-Operator Characteristic analysis) compared to the 130 with LVCR =1.75 (see figure).

Conclusion: As a group, HCM patients have higher baseline LV Force ("too good to be normal") compared to controls, but blunted LVCR. A reduced LVCR is associated to an adverse prognostic impact. A simple non-invasive integrated evaluation of LVOTG, systolic blood pressure and LV end-systolic volume during SE allows to unmask the dark prognostic side of a reduced LVCR in HCM.
Abstract: Stress echo in hypertrophic cardiomyopathy: the dark side of the force

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![Event-free survival graph](image)