Therapeutic efficacy of heparin plus exercise assessed by stress echo and global longitudinal strain in no-option patients: the CARHEXA sub-study

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Abstract:
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Background: CARHEXA trial was designed to assess the efficacy of an exercise (E) 2 week cycle (with or without heparin, H) as an anti-anginal treatment in "no-option" patients.

Purpose: To assess the value of stress echo (SE) and global longitudinal strain (GLS) in evaluation of anti-anginal intervention.

Methods: In a single-center, randomized study we recruited 25 patients (22 males; mean age 63±8 years) with chronic stable angina, refractory to optimal medical management, not suitable for revascularization therapy and with E-induced ischemia. All patients underwent 2-week supervised treadmill E (twice a day, 5 days a week), with randomization to placebo vs. unfractionated heparin (H) (100 UI/Kg up to a maximum of 5.000 IU i.v.) 10 min prior to E. Stress echo, Canadian Class Score (CCS), 12-lead-ECG for time-to-ischemia and MDCT (for coronary collateral circulation) were assessed at entry and re-assessed after treatment for echocardiography, symptomatic, ECG and anatomic end-points of CARHEXA trial. During SE, we analyzed both wall motion score index (WMSI) and peak stress Global Longitudinal Strain (GLS). Patients with post-therapy improvement of more than 15% comparing to baseline values were considered to be responders to the anti-anginal intervention.

Results: Interpretable tracings were obtained in 25/25 with WMSI and 18/25 with GLS, with a success rate of 100% vs 72% (p<0.05). In E+H (n=14), WMSI changed from 1.4 ± 0.3 pre- to 1.3 ± 0.2 post-therapy (p=0.004), and GLS changed from -17.3± 3.5 pre to -18.5 ± 4.1 post-exercise (p=0.005). On contrary, in E group there was no change in WMSI (1.4 ± 0.3 pre- to 1.4 ± 0.2 post-exercise, p=0.297), and GLS (from -15.6 ± 3.3 pre to -15.2 ± 3.5 post-exercise, (p=0.191). In comparison standard clinical and ECG criteria, SE documented improvement in WMSI and GSS (>15% from baseline) in 6 vs. 11 pts in E+H group, and in 1 vs. 2 patients in E group. Overall, we had 15 responders by any criteria (27% in E, 86% in E+H, p<0.001).

Conclusion: SE allows improved documentation of therapeutic efficacy of E+H on regional and global left ventricular systolic function. Both a simpler semiquantitative approach with WMSI and a more objective, yet less feasible approach with GLS provide useful and complimentary information on regional and global left ventricular function.