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CARDIAC REHABILITATION IMPROVES MYOCARDIAL PERFUSION RESERVE AND BLUNTS STROMAL-DERIVED FACTOR 1 OVEREXPRESSION IN PATIENTS WITH MYOCARDIAL INFARCTION

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BACKGROUND/AIMS: Although cardiac rehabilitation improves myocardial perfusion in ischemic heart disease, the underlying mechanism is unclear. The chemokine stromal-derived factor 1 (SDF-1) implicates the recruitment of circulating stem cells to enhance angiogenesis and improve cardiac function. We tested the hypothesis that plasma SDF-1 may contribute to a signaling mechanism of exercise -induced improvement of myocardial perfusion reserve (MPR).

METHODS: A total of 39 male patients with previous myocardial infarction (MI) were recruited and randomized into two groups: 20 patients underwent a 3-month training program, and 19 patients did not. Peak oxygen uptake (VO_2), MPR and SDF-1 were performed upon enrollment and 3 months after randomization. MPR was assessed at rest and during dipyridamole-induced stress by using the first-pass contrast-enhanced myocardial perfusion imaging. Twelve age-and risk factor-matched volunteers were enrolled to measure their SDF-1 twice at the same intervals to serve as normal controls.

RESULTS: Patients with MI had plasma SDF-1 at a constantly higher level than normal ($p < 0.05$) over the 3-month period. At the third month, patients who underwent rehabilitation showed an improvement in MPR and peak VO_2 (+30%, $p < 0.01$; +14%, $p=0.02$, respectively) and a decrease in plasma levels of SDF-1(-11%, $p < 0.001$). Increase in peak VO_2 with rehabilitation correlated significantly with the increase in MPR and the decrease in SDF-1 levels (both $p < 0.01$). Patients who did not undergo training showed no changes.

DISCUSSION/CONCLUSIONS: Clinical benefits of cardiac rehabilitation are associated with improvement in MPR and blunting of SDF-1 overexpression after myocardial infarction.

Key words: Cardiac Rehabilitation, Myocardial Perfusion Reserve, Stromal-Derived Factor 1