

Is there a gender difference in endothelial response on exercise training in heart failure patients with preserved ejection fraction?

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Purpose: To examine the reaction of endothelium, assess through changes of circulating blood markers of endothelial function: the stable end products of nitric oxide (NO_x), S – nitrosothiols (RSNO – reservoir for bioavailable nitric oxide), dimethylarginine (ADMA) and symmetric dimethylarginine (SDMA) that promotes exercise training in female and male patients (pts) with heart failure with preserved ejection fraction (HFpEF).

Methods: A total of 78 pts with HFpEF were enrolled in the study: 43 male (M group) and 35 female (F group). In all pts, before and after a short-term supervised 3 weeks exercise training at residential center values of NO_x, RSNO, ADMA and SDMA were determined and exercise test was performed.

Results: After 3 weeks of exercise training NO_x increased significantly in both groups: in M group (from 34.4±7.5 to 42.3±9.5 μmol/l, P<0.001), and in F group (from 31.3±6.8 to 41.5±7.2 μmol/l, P<0.001), as well as RSNO: In M group RSNO increased from 3.6±1.7 to 4.6±1.9 μmol/l (P<0.05) and in F group from 3.1±1.5 to 4.2±2.2 μmol/l (P<0,05). Increase in NO_x and RSNO after exercise training was higher in F than in M group: NO_x 32,6%

vs 22,9%; RSNO 35,1% vs 27%. Value of ADMA as well of SDMA decreased in both groups after 3 weeks: ADMA in M group from 0.315±0.09 to 0.278±0.12 μmol/l (by 11.7%; ns), and in F group from 0.342±0.08 to 0.297±0.13 μmol/l (by 13.1%; ns); SDMA in M group from 0.269±0.08 to 0.234±0.09 μmol/l (by 13%; ns), and in F group from 0.285±0.09 to 0.245±0.10 μmol/l (by 14%; ns). After 3 weeks, level and duration of exercise test were significantly higher in M (both P<0,001), as well as, in F group (both P<0.001), compared to baseline values.

Conclusions: There was no gender difference in the way of endothelial response on exercise training in pts with HFpEF. Exercise training induced favorable modification of endothelial function, expressed through significant increased of NO_x, RSNO and decreased of ADMA, SDMA in male as well as in female pts. Those positive changes in endothelial function were associated with significant improvement in exercise capacity. Some higher percentage of NO_x and RSNO increase in women suggests that they have more pronounced benefit of exercise training than men.