Low-Intensity Exercise Improves Aerobic Exercise Capacity in Rats After Myocardial Infarction and the Possible Role of Skeletal Muscle Autophagy

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Background: To investigate the effects of low-intensity exercise on aerobic exercise capacity and autophagy of skeletal muscle in rats after myocardial infarction (MI) and its possible mechanisms.

Methods: Thirty male Sprague Dawley rats, weighing 180–200 g, were randomly divided into sham, MI, and MI with exercise training (MI + Ex) groups. MI was induced by ligation of the left anterior descending artery. One week after surgery, low-intensity exercise training was carried out on a treadmill 5 days per week for 4 weeks.

Results: Infarct size of MI and MI + Ex groups was $30.8 \pm 5.5\%$ and $27.6 \pm 5.0\%$ of left ventricle, respectively ($P > 0.05$). Heart weight and heart to body weight ratio in the MI group were significantly higher than those in the sham group ($P < 0.01$), and were lowered by exercise training ($P < 0.01$). The maximal exercise distance and duration in the MI group were lower than those in the sham group ($P < 0.01$), but were significantly increased by exercise training ($P < 0.05$). Autophagosome of the gastrocnemius was not detectable in the sham group, scattered in the MI group but clustered in the MI + Ex group. Microtubule-associated protein light chain 3 (LC3-I/II) and Beclin-1 protein levels in the gastrocnemius were similar between MI and sham groups, but were significantly higher in the MI + Ex group ($P < 0.05$).

Conclusions: Low-intensity exercise improves exercise capacity in rats after MI. The effect is associated with enhanced autophagy of the skeletal muscle.

Relationship Between Arterial Stiffness and Cardiovascular Risk Scores Predicted by 2 Different Models

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Background: To investigate the relationship between arterial stiffness and 10-year atherosclerotic cardiovascular disease (ASCVD) risk predicted by models of pooled cohort equations (PCEs) or ASCVD risk in China (China-PAR).

Methods: A cross-sectional clinical study was carried out, in which clinical data were collected from 1,090 subjects aged 30–75 years who were admitted to a university affiliated hospital from 2016 to 2018. Arterial stiffness was examined by carotid–femoral pulse wave velocity (cfPWV). All subjects were divided into 2 groups: normal arterial stiffness (cfPWV <10 m/second) and elevated arterial stiffness (cfPWV ≥10 m/second). Ten-year ASCVD risk was predicted by either PCE or China-PAR.

Results: ASCVD risks predicted by 2 models in the elevated arterial stiffness group were higher than those in the normal arterial stiffness group [PCE: 16.5% (8.6%–28.3%) vs. 6.3% (2.7%–12.3%); China-PAR: 8.8% (6.1%–12.4%) vs. 3.9% (2.1%–6.6%), both $P < 0.001$]. The correlation coefficient between cfPWV and ASCVD risk predicted by China-PAR was greater than that by PCE (0.573 vs. 0.503, $z = 5.272$, $P < 0.001$). Multivariate linear regression analysis showed that 10-year ASCVD risk predicted by PCE model ($\beta = 0.475$, $P < 0.001$) and waist circumference ($\beta = 0.092$, $P = 0.001$) correlated with cfPWV. However, when PCE was replaced by China-PAR, only ASCVD risk ($\beta = 0.573$, $P < 0.001$), not waist circumference, was associated with arterial stiffness. Receiver operation characteristic curve showed that the discrimination of 10-year ASCVD risk predicted by China-PAR for arterial stiffness was better than PCE (area under curve 0.814 vs. 0.767, $z = 4.992$, $P < 0.001$). A stratification analysis revealed that the better discrimination by China-PAR mainly came from males.

Conclusions: Ten-year ASCVD risks predicted by either China-PAR or PCE are associated with arterial stiffness. The association is stronger when the risk is predicted by China-PAR, especially in males.