Cardiovascular disease

Exercise in middle age may reduce risk of heart failure

Two years of high intensity exercise training, in previously sedentary healthy middle-aged adults, improved maximal oxygen uptake (VO_2max) and reduced left ventricular (LV) stiffness, in a study from the United States. The investigators conclude that regular exercise training may protect against the future risk of heart failure with a preserved ejection fraction (HFpEF) by preventing the increase in cardiac stiffness caused by sedentary aging.

A total of 61 healthy, sedentary adults were recruited to a prospective, parallel group, randomised controlled trial. Their mean age was 53 ± 5 years and around half (48%) were male. Participants were randomly assigned to either two years of aerobic exercise and resistance training (n = 34) or a control group (n = 27). Aerobic exercise was carried out for at least 30 minutes, 4-5 days per week, and included at least one high-intensity weekly interval session. Participants also undertook two weekly strength training sessions. Those in the control group performed yoga, balance, and strength training three times a week for two years.

Right heart catheterisation and 3D echocardiography were performed with preload manipulations to define LV end-diastolic pressure-volume relationships and Frank-Starling curves. LV stiffness was calculated by curve fit of the diastolic pressure-volume curve. VO_2max was recorded to measure changes in fitness.

Of the initial 61 participants, 53 completed the study and the majority of participants in the exercise group (mean 88% ± 11%) adhered to the exercise programme.

In the exercise group, VO_2max significantly increased by 18% (95% CI: 15-22%; P < 0.001), whereas there was no improvement in VO_2max in the control group. LV stiffness was significantly reduced in the exercise group (P = 0.0018) but no change was seen in the controls. Exercise also increased LV end-diastolic volume (P < 0.001) whereas pulmonary capillary wedge pressure was unchanged, providing greater stroke volume for any given filling pressure (P = 0.007).

Poor fitness in middle age is associated with poor health and has been linked to the development of heart failure particularly HFpEF. This is likely to be mediated through increased LV stiffness.

The study authors conclude: 'Two years of intensive exercise training, at levels consistent with current public health recommendations, increases maximal oxygen uptake and decreases cardiac stiffness in previously sedentary but otherwise healthy middle-aged adults.

'Regular exercise training may provide protection against the future risk of HFpEF by preventing the increase in cardiac stiffness attributable to sedentary aging.'

This study, although small, provided clear objective evidence of the beneficial physiological adaptations of exercise in middle-aged adults. The reduction in LV stiffness provides a mechanism to prevent the onset of HFpEF — a condition for which there is little effective pharmacological intervention in comparison with heart failure with a reduced ejection fraction.

It is certainly encouraging to have evidence to support exercise as a preventative measure. Furthermore, regular exercise is also beneficial in maintaining a healthy blood pressure and with hypertension as an additional mediator for increased LV stiffness via LVH this may provide another mechanism for preventing the onset of HFpEF.

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Howden EJ, Sarma S, Lawley JS et al. Reversing the cardiac effects of sedentary aging in middle age - a randomized controlled trial: implications for heart failure prevention. *Circulation* 2018 Jan 8 pii: CIRCULATIONAHA.117.030617. doi:10.1161/CIRCULATIONAHA.117.030617 [Epub ahead of print]

Addiction

Marked regional variations identified in primary care opioid prescribing

Opioid prescribing rates are increasing and show notable geographical variations across England. They are highest in the North and in areas of social deprivation, a study on primary care prescribing has shown. Virtually all the low prescribing areas were in the south of England and nine of the ten highest prescribing areas were northern clinical commissioning groups (CCGs).

The investigators assessed opioid prescribing in primary care in England between August 2010 and February 2014 using mg morphine equivalent as the measure of quantity. They adopted this strategy on the basis that because of the association between adverse effects and opioid dose it is more appropriate to analyse risk relating to dose rather than prescription count (as has been done in a number of previous studies).

Eight opioids were included in the study: buprenorphine, codeine, dihydrocodeine, fentanyl, methadone, morphine, oxycodone and tramadol. Primary care prescribing data were obtained from the Health and Social Care Information Centre.

Over the study period total opioid prescribing showed a steady increase. Tramadol was the most prescribed opioid, followed by buprenorphine and then methadone. Fentanyl was the drug least prescribed.

Buprenorphine, codeine, oxycodone and tramadol prescribing showed the greatest rates of increase while