Background Left ventricular and atrial remodelling is traditionally considered to be deleterious. However, reduction in left ventricular end diastolic volume (LVEDV) has been observed in aging adults, associated with lower total arterial compliance and higher vascular resistance. Furthermore, endurance athletes and pregnant women develop physiologic remodelling, including left atrial enlargement.

Objective To understand the association of self-reported exercise with LVEDV index (LVEDVi) and maximal left atrial volume (LAVimax) measured using cardiac magnetic resonance imaging (cMRI) and Doppler echocardiography in older people with pre-heart failure.

Methods This is a secondary analysis of the Prospective comparison of ARni [angiotensin receptor/neprilysin inhibitor] with ArB [angiotensin-receptor blocker] in patients with natriuretic peptide eLeVation (PARABLE) study, conducted at a single centre in patients with hypertension or diabetes and pre-heart failure with preserved ejection fraction (pre-HFpEF). In addition to detailed clinical assessment, including ambulatory blood pressure monitoring, Doppler echocardiography and cMRI, patients were categorised as adherent or non-adherent to exercise advice. The primary outcomes were differences in LVEDVi and LAVimax. Secondary outcomes were systemic vascular resistance, total arterial compliance, left ventricular end diastolic stiffness and adverse cardiovascular events.

Results A total of 230 patients were included, average age 71.6 (7.65) years, body mass index (BMI) 29.5 (4.92) kg/m², of whom 144 (62.6%) were male, 226 (98.3%) had hypertension, 58 (%) had diabetes and 95 (41%) were classified as adherent to exercise advice. There were no demographic, anthropomorphic, clinical or medication differences between those adherent and non-adherent to exercise advice. There were no differences observed between the groups in terms of filling pressures. LVEDVi and LAVimax measured using cMRI were significantly higher in those adherent to exercise advice versus controls [LVEDVi 77.3 (20.1) mL/m² versus (70.0 (18.2) mL/m², P=0.005; LAVimax 51.9 (11.3) versus 48.9 (10.3) mL/m², P=0.041]. These differences remained significant with adjustment for age, gender and BMI. Differences between the groups were not significant using echocardiography. Measures of total arterial compliance were higher and measures of diastolic chamber stiffness, systemic vascular resistance (all P<0.05) as well as adverse cardiovascular events over the following 18 months (OR 0.88; 95%CI: 0.81, 0.97; P=0.008) were lower in those adherent to exercise advice.

Conclusions Adherence to exercise advice in older adults with pre-HFpEF is associated with physiologic remodelling, cardiovascular compliance, and lower adverse cardiovascular events. More work is needed to understand the relationship between exercise and physiologic remodelling in pre-heart failure with preserved ejection fraction.