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## HIGH PREVALENCE OF UNDIAGNOSED CARDIAC DYSFUNCTION IN THE OLDEST OLD: FINDINGS FROM THE NEWCASTLE 85+ STUDY

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<sup>1</sup>F Yousaf, <sup>1</sup>J Collerton, <sup>2</sup>A Kenny, <sup>1</sup>T Kirkwood, <sup>1</sup>C Jagger, <sup>1</sup>A Kingston, <sup>3</sup>B Keavney. <sup>1</sup>Institute of Ageing and Health, Newcastle University, Newcastle upon Tyne, UK; <sup>2</sup>Freeman Hospital, Newcastle upon Tyne, UK; <sup>3</sup>Institute of Human Genetics, Newcastle University, Newcastle upon Tyne, UK

**Background** Heart failure prevalence increases sharply at older ages. The section of the population aged 85 and over represents the most rapidly increasing demographic worldwide. Previous epidemiological studies of ventricular dysfunction and heart failure have included only small numbers of the “oldest old”, and have generally been conducted in hospital-based settings, potentially introducing ascertainment biases. We conducted a community-based study of the oldest old using domiciliary echocardiography to estimate the prevalence of cardiac dysfunction and heart failure. Since in elderly people with multiple comorbidities, heart failure may more frequently be incorrectly diagnosed, we cross-referenced our findings to preceding diagnoses present in general practice records.

**Methods** Four hundred and twenty-seven individuals aged 86–89 years (mean age 87.9 years; 39.1% (n=167) men, 60.9% (n=260) women) were visited in their usual place of residence. A full cardiovascular and medical history, including current medication, was taken; symptoms were graded using the NYHA classification. Previous diagnoses of heart failure (HF) were abstracted from the GP record. Participants underwent 2-D and Doppler echocardiography, including tissue Doppler measurements of LV long axis velocities, using a portable instrument (Vivid-I, GE Healthcare). LV systolic and diastolic dysfunction were graded according to American Society of Echocardiography guidelines.

**Results** LV systolic function could be quantified in 93.2% (n=398) participants and diastolic function (classified as normal, mild, moderate or severe dysfunction) in 88.1% (n=376). 37.2% of participants (n=140/376) had normal cardiac function or isolated mild diastolic dysfunction; 19.6% (n=78/398) had moderate or severe LV systolic dysfunction, which was commoner in men (27.4%) than women (14.5%); and 14.4% (n=54/376) had isolated moderate or severe diastolic dysfunction. 65.1% (278/427) of participants had valid data on previous diagnosis of HF, NYHA class and echocardiographic assessment of cardiac dysfunction. Of these, 37.4% (104/278) had clinical evidence of HF, which was defined as NYHA class II, III, or IV symptoms with underlying systolic dysfunction (29.5% (82/278)) or isolated moderate or severe diastolic dysfunction (7.9% (22/278)) on echo. Only 7.6% (21/278) had a previous diagnosis of HF. 33.1% (n=92/278) had no previous diagnosis of HF but had clinical evidence of HF and an additional 21.6% (n=60/278) had no previous diagnosis but evidence of pre-clinical HF (NYHA class I with systolic or moderate/severe diastolic dysfunction). Of those with a previous diagnosis of HF, 23.5% (n=5/21) had no echocardiographic evidence of cardiac dysfunction.

**Conclusions** Systolic and diastolic dysfunction and HF were commoner in our population than previous studies in the “younger old” have suggested. There are significant levels of both undiagnosed and misdiagnosed HF in this age group.

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## IS VO<sub>2</sub>MAX/KG A RELIABLE INDICATOR OF CARDIAC DYSFUNCTION IN OVERWEIGHT HEART FAILURE PATIENTS?

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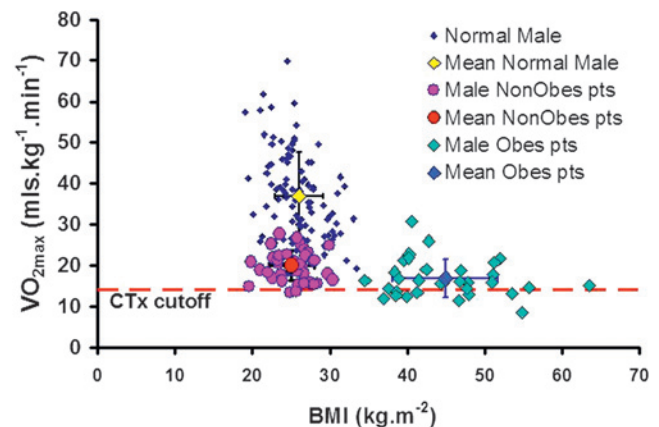
S Chinnappa, N Lewis, D Barker, L B Tan. Leeds Teaching Hospitals NHS Trust, Leeds, UK

**Background** Peak O<sub>2</sub> consumption (Vo<sub>2</sub>max) of ≤14 ml/kg/min has been widely accepted as being indicative of poor cardiac function

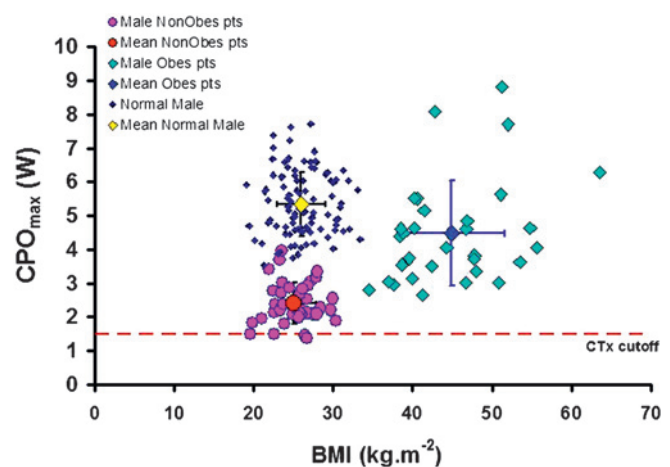
warranting consideration for transplantation (Circulation 2010; 122:173). We examined whether this variable is a good indicator of cardiac function in overweight heart failure (HF) patients.

**Methods** We compared the cardiopulmonary exercise performance and non-invasive haemodynamics of overweight (BMI >34 kg/m<sup>2</sup>) and non-overweight (BMI ≤30) male heart failure patients in NYHA Classes II and III, with those of healthy male volunteers with no known cardiovascular diseases (n=101, age 43.2±18.1 (SD) years, BMI 26.0±3.1) as controls. Their physical and cardiac functional reserves were measured during treadmill exercise testing with standard respiratory gas analyses and rebreathing method of non-invasively measuring cardiac outputs during peak exercise.

**Results** Consecutive overweight HF were screened and 24 patients (age 49±8(SD) years, BMI 44.9±6.8, NYHA 2.50±0.50) managed to exercise to acceptable cardiopulmonary limits (peak RER=1.01±0.12), and achieved Vo<sub>2</sub>max of 16.8±4.6 mls/kg/min which was significantly lower than controls (37.0±10.7 mls/kg/min, p<10<sup>-6</sup>) and also lower than those of 30 non-overweight HF counterparts (20.0±3.7 mls/kg/min, p=0.0019, age 49±15 years, BMI 25.0±2.9, NYHA 2.48±0.51). As shown in Abstract 99 figure 1, the overweight HF patients had Vo<sub>2</sub>max values which distributed around the 14 mls/kg/min cut-off value, and 9 of whom were indeed below this cut-off value. However, the uncorrected Vo<sub>2</sub>max were higher than those of non-overweight counterparts (Overweight: 2575±748 vs 1594±325 mls/min, p<10<sup>-6</sup>), and its range of 1485–4210 mls/min overlapped with the range of 1244–5774 mls/min in controls. The peak cardiac power output (CPO<sub>max</sub>, 4.5±1.6 W, minimum 2.7 W) of overweight HF patients were clearly above those of non-overweight (2.4±0.6 W, p<10<sup>-6</sup>, Abstract 99 figure 2) and all above the transplant cut-off value of 1.5 W.



Abstract 99 Figure 1



Abstract 99 Figure 2