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The effect of parity on exercise physiology in women with heart failure with preserved ejection fraction

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Introduction: Women are overrepresented amongst patients with HFrEF, however the underpinning mechanism for this asymmetric distribution is unclear. Pregnancy has been demonstrated to contribute to cardiovascular risk, and represents a potential gender specific risk factor for HFrEF.

Purpose: To investigate the relationship between parity and severity of HFrEF on invasive haemodynamic and echocardiographic studies.

Methods: Patients referred for investigation of dyspnoea with exercise right heart catheterisation from 2008-19 were included and classified as HFrEF with an ejection fraction (EF) =50% and a resting PCWP =15mmHg or exercise PCWP =25mmHg. All patients underwent detailed haemodynamic and echocardiographic assessment, and an obstetric history including socioeconomic data were obtained using a questionnaire.

Results: 58 women were included, and categorised as having either 0-2 births, or =3 births, dividing the cohort equally. Women with =3 births achieved a lower peak exercise workload than those with 0-2 births (46 [31-68] vs. 38 [24-51] W, p=0.04). Women with =3 births had a greater rise in pulmonary capillary wedge pressure indexed to workload with exercise (0.5 [0.3-0.8] vs. 0.3 [0.2-0.5] mmHg/W, p=0.03), paralleled by a greater rise in right atrial pressure (10 [8-12] vs. 7 [3-11] mmHg, p=0.01), pictured. Pulmonary vascular resistance was also higher in women with =3 births (1.9 [1.6-2.4] vs. 1.6 [1.4-1.9] mmHg/L/min rest, p=0.046, and 1.9 [2.4-2.4] vs. 1.4 [1-1.8] mmHg/L/min exercise, p=0.024). Left ventricular ejection fraction was lower at rest (60 [57-61] vs. 63 [60-66] %, p=0.008) and during exercise (65 [62-67] vs. 68 [66-70] %, p=0.038) in women with higher parity. Otherwise, echocardiographic parameters did not differ according to parity. There were no significant differences between parity groups in baseline characteristics, including age, body mass index, systemic blood pressure, natriuretic peptides or dyspnea class. Similarly, comorbidities and socioeconomic status did not differ.

Conclusion(s): Higher parity is associated with impairments in multiple physiologic parameters of HFrEF severity in women, including diastolic reserve, pulmonary vascular resistance, and systolic function. This may indicate a role for pregnancy in the development of HFrEF, and suggests that multiparous women should be targeted for intensification of preventative measures for HFrEF.