Recovery from heart failure with reduced ejection; HFrEF to HFpEF

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**Introduction**: Patients with heart failure are traditionally categorized into two groups according to size and function of the left ventricle [LV]. The systolic heart failure group with dilated LV diameters and low <45% ejection fraction [EF] or HFrEF, and those with normal EF and no evidence of LV dilation described as HFpEF. An interesting emerging group are those found to be previously HFrEF but with time and optimal medical management are reclassified to HFpEF; “responders”. We evaluated a novel tool which provides endothelial function measurements using peripheral arterial tonometry [PAT] for reactive hyperaemic index [RHI] in this group of LV responders.

**Methods**: One hundred and sixty two [162] consecutive patients recruited into a heart failure trail [64±10 years, 98 male], undergoing Echo and CMR were included along with 20 matched controls. The authors investigated the relationship between PAT-RHI and clinical characteristics, risk factors, levels of inflammatory biomarkers, and end-exercise cardiac output [CO]. Contrast bolus injections were administered for optimal Echo and CMR endocardial definition. Off-line RHU as well as LV volume analysis was performed by standard manual tracing of end-systolic and end-diastolic endocardial borders.

**Result**: In HFpEF and HFrEF, RHI, and CO were significantly lower, while significantly higher in the ‘recovered’ HFrEF and controls. Tracing of RHI images was possible in 158 patients. In 158 of 162 patients [97.5%] the RHI followed the myocardial imaging outcomes. The defining parameters obtained correlated well with both standard Echo and CMR for all: EDV (r 0.93, p<0.01: r 0.91, p<0.01) ESV (r 0.89, p<0.01: r 0.94, p<0.01), and EF (r 0.87, p<0.01: r 0.83, p<0.01).

**Conclusion**: The authors confirmed a possible link between improved RHI in the HFrEF ‘responders’ by demonstrating an impairment of endothelial function associated with LV dysfunction severity.