Hemodynamic Responses to Vasodilation in Heart Failure with Preserved vs Reduced Ejection Fraction

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Background: Clinical trials of vasodilators have produced disparate results in patients with heart failure and reduced or preserved ejection fraction (HFrEF; HFpEF). We compared the acute hemodynamic effects of arterial vasodilation with sodium nitroprusside (SNP) in HFpEF and HFrEF.

Methods: Patients with HFrEF (n=175) and HFpEF (n=83) who underwent clinically-indicated invasive hemodynamic assessment at rest and during SNP were compared.

Results: At baseline, patients with HFpEF displayed higher blood pressure (BP) and cardiac index (CI) compared with HFrEF, while pulmonary capillary wedge pressure (PCWP) and mean pulmonary artery pressure (PA) were similar (Table). Despite comparable reductions in systemic afterload (arterial elastance, Ea) and pulmonary vascular resistance (PVRI), systemic BP dropped to greater extent in HFpEF. In contrast, patients with HFrEF displayed greater increases in stroke volume (SVI) and cardiac index (CI) compared with HFpEF, with less drop in BP.

Conclusion: The hemodynamic response to arterial vasodilation is fundamentally different in HF patients with preserved versus reduced ejection fraction. Reduction in systemic blood pressure is exaggerated in HFpEF, while enhancement in stroke volume is greater in HFrEF. These findings may partially explain the treatment effect disparities noted in randomized trials for HFpEF and HFrEF.