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Response to Cardiac Resynchronization Therapy Improves Renal Function. Importance of Forward and Backward Failure

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We thank Damman and colleagues¹ for their insightful comments, which support and extend the findings and conclusions of our recent publication.²

Damman et al. importantly demonstrated that central venous pressure like renal blood flow (RBF) has a major impact on glomerular filtration rate (GFR) in patients with pulmonary hypertension.³ We strongly agree. Indeed, elevated renal venous pressure in heart failure (HF) may play a key role in contributing to renal vasoconstriction and sodium retention beyond the consequences of reduced arterial pressure and neurohumoral activation. In a study to which we briefly alluded, isolated renal vein constriction in a canine model of volume expansion markedly increased renal interstitial hydrostatic pressure (RIHP) resulting in a decrease in RBF and a reduction of urinary sodium excretion most likely due to tubular and vascular compression.⁴ At the highest level of RIHP, GFR also decreased. These findings suggest that renal venous pressure is not only an important factor for GFR but also for RBF. The broad implication of these studies is that venous pressure in HF may be key in understanding renal dysfunction and that reduction of markedly high venous pressure may be crucial to improve renal function.

As indicated in our report, we also concur with the proposal to verify our findings in more recent, larger clinical trials.^{5,6} It should be noted, however, that in the MIRACLE trial both control and treatment groups had a CRT device implanted to allow a double-blind evaluation of the symptomatic and functional benefit of CRT. This means that both groups were exposed to contrast media during the implantation, which could have negatively impacted renal function.⁷ Thus, as treatment groups did not differ with regard to their contrast media exposure, the MIRACLE trial design can be considered optimal to assess the impact of

Disclosures

Mayo Clinic has licensed chimeric and alternatively spliced natriuretic peptides to Nile Therapeutics and Anexon.

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improving cardiac function by CRT on renal function. Conversely, in more recent trials the control group did not receive an implant and therefore these trials are appropriate to assess CRT (necessarily including implantation and contrast media application) as a therapeutic strategy vs. standard therapy (without implantation). We hope and expect that the contrast media exposure would not offset the potential benefit of CRT in HF patients with renal dysfunction but this should be verified.

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