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Poster presentation

The degree of natriuretic peptide system activation in stable and high risk CHF characterized by increased cystatin C is not reflected in cGMP activation

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Background

Cardiorenal syndrome (CRS) is characterized by neurohumoral activation, sodium retention, ventricular dysfunction and congestion, and renal insufficiency (RI). The congestive heart failure (CHF) component evolves from asymptomatic, to stable symptomatic to overt symptomatic CHF. The natriuretic peptide system (NPS), including atrial (ANP) and brain (BNP) natriuretic peptides is progressively activated during progression of CHF. Less is known about the second messenger, cGMP, of the NPS across the spectrum of CHF. RI in CHF remains an important clinical challenge and Cystatin C is emerging as an important marker of RI. Further work is needed in characterizing Cystatin C across the spectrum of CHF and CRS.

Methods

We prospectively looked at the NPS, including ANP, NT-proANP, BNP, and NT-proBNP, as well as plasma cGMP, NPS to cGMP ratios and Cystatin C in three groups of subjects: normal volunteers (n = 10), stable CHF patients (n = 19), and higher risk CHF patients (based on recent hospitalization for CHF, n = 20). The groups are reported in that order below. Statistical analysis was carried out by ANOVA with $p < 0.05$ accepted as significant (*).

Results

Each component of the NPS increased in the plasma across the three groups with highest levels in the high risk CHF. However, cGMP levels did not vary significantly across groups (626 ± 303 vs 914 ± 521 vs 959 ± 509 pmol/mL, NS). The ratio NT-proANP/cGMP increased across the 3 groups (0.60 ± 0.55 vs 1.02 ± 0.52 vs 1.46 ± 1.08,*), but the ratios of ANP/cGMP, BNP/cGMP, and NT-proBNP/cGMP did not vary significantly across groups. Importantly, the mean Cystatin C levels increased with stable and high risk CHF groups (0.9 ± 0.1 vs 1.4 ± 0.3 vs 1.8 ± 0.7,*).

Conclusion

Despite the increase of each component of the NPS measured in the stable and high risk CHF, cGMP did not increase significantly across the same groups. Except for the ratio NT-proANP/cGMP, the ratios of the NPS to cGMP did not vary across groups either, suggesting the need to further refine our understanding of the coupling of the NPS with its second messenger, cGMP. Importantly, we report for the first time that Cystatin C varies across these phenotypes of CHF, suggesting that it may be an important marker of the development of CRS.