Prognostic value of novel heart failure biomarkers in patients undergoing cardiac resynchronization therapy

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Purpose: Cardiac resynchronization therapy (CRT) improves clinical outcomes in chronic heart failure (HF) patients with ventricular dyssynchrony, although some patients do not respond despite correct CRT indications. In this study we investigated a set of novel heart failure biomarkers associated with various pathophysiological pathways of heart failure. The purpose was to assess the ability to predict clinical outcomes after CRT.

Methods: We enrolled 136 HF patients undergoing CRT implantation to our prospective single-center observational study. We measured the plasma levels of pentraxin-3, fractalkine, hepatocyte growth factor, CA-125, TNF-α, MMP-9, and vitamin D before and six months after CRT with commercially available assays. Five year all-cause mortality was the primary endpoint of the study, six month reverse remodelling defined as at least 15% decrease in end systolic volume was considered as secondary end-point.

Results: During five years of follow-up 58 patients (43%) deceased, 66 were considered as non-responder. From baseline clinical variables age, NT-proBNP levels and NYHA class III-IV were predictive of reverse remodelling. Five years all-cause mortality was associated with beta blocker therapy, left brundle branch block and increasing NT-proBNP levels. After adjusting to all significant baseline parameters HGF was the only independent predictor of lack of reverse remodelling (OR: 1.83, CI for OR: 1.10–3.04, p=0.01) and 5-year mortality (HR: 1.35, CI for HR: 1.11–1.64, p=0.003). The reclassification analyses revealed that HGF reached a reclassification improvement of 39% [NRI= 0.39 (0.07–0-71), p=0.01] in reverse remodeling and 69% [NRI= 0.69 (0.39–0.99), p<0.0001] in 5-year mortality prediction. Moreover, discrimination development was 3% [IDI= 0.03 (0.00–0.06), p=0.02] in reverse remodelling and 6% [IDI=0.06 (0.02–0.11) in 5-year mortality prediction.

Conclusion: Of all studied novel biomarkers HGF, the pleiotropic cardioprotective growth factor was the only independent predictor of clinical outcomes in patients undergoing CRT, reclassification analyses showed that it may be useful in refining patient selection.