Title: Characterizing and Prognosticating Heart Failure with Improved Ejection Fraction Using NT-proBNP, Growth Differentiation Factor 15 and Global Longitudinal Strain

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Abstract

Background: Heart failure with improved ejection fraction (HFiEF) is a novel heart failure (HF) subgroup. There are sparse data on using NT-proBNP, growth differentiation factor 15 (GDF15) and global longitudinal strain (GLS) to characterize and prognosticate HFiEF patients.

Objectives: (1) To determine the level and correlation between NT-proBNP, GDF-15 and GLS in HFiEF patients. (2) To examine the correlation of each marker with NYHA, MAGGIC prognostic score, HF etiologies, comorbidities status, degree of LVEF/ LV end-diastolic diameter change from baseline and diastolic dysfunction. (3) To look for association of each marker with follow-up LVEF change and 1-year composite mortality or HF events outcome.

Materials & Methods: This was a cross-sectional observational study in Sarawak Heart Centre HF clinic. 53 HfiEF patients who had NT-proBNP and GDF15 tests performed were selected. This cohort had no HF events in the past 6 months during the blood tests. Clinical characteristics, echocardiography parameters, and 1-year composite clinical outcome were analyzed retrospectively.

Results: The mean age of the cohort was 52 years old and 81% were male. The cohort was highly comorbid (hypertension 71%; diabetes 45.3%; AF 17.3%). Most of the patients (87%) were asymptomatic by NYHA (I) and low rate of composite outcome was observed, 5.7%.

The mean NT-proBNP, GDF-15, GLS were 357 pg/ml, 1572 pg/ml, and -12.1% respectively. There were significant moderate correlation between GDF15 with NT-proBNP (r=0.414) and NT-proBNP with GLS (r=-0.351).

Higher NT-proBNP and GDF15 levels were associated with poorer MAGGIC prognostic scores (r=0.549, 0.41 respectively). NT-proBNP was the only marker

associated with a higher degree of LVEF improvement compare to baseline echocardiography. NT-proBNP was also related to severe diastolic echo parameters. Hypertension and diabetes were strongly associated with higher elevated GDF15 levels.

The lower mean GLS level was significantly associated with the presence of composite outcome (-6.45% vs -12.47%, p=0.0). Patients with NT-proBNP levels below the median cutoff had favourable follow-up LVEF improvement (+9.73%, p=0.035).

Conclusion: In our HFiEF study cohort, NT-proBNP best correlate and prognosticate future LV remodelling. GDF15 was closely related to systemic illnesses such as diabetes. The role of GLS in our HFiEF cohort remains uncertain.