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## Improved Predictive Value Of Biomarkers In Heart Failure Makes Earlier Diagnosis And Better Management Possible

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Heart failure describes a syndrome of symptoms without a single diagnostic test. However, the discovery and application of markers of disease (biomarkers) have improved risk stratification in heart failure and made earlier detection possible. Now, reports in the April issue of the European Journal of Heart Failure suggest two more efficient applications of biomarkers, and with them the promise of even earlier diagnosis and improved treatment.

### UK Findings

According to results from a study in Hull, UK, repeat measurement of the well established biomarker N-terminal pro-B-type natriuretic peptide (NT-proBNP) once treatment has been optimised provides stronger prognostic information than either the baseline value, the change in NT-proBNP, or other conventional methods of assessment.

The finding emerged from a study of 354 patients with chronic heart failure treated in a community-based heart failure programme. Measurement of (NT-proBNP) was performed at baseline and, in those surviving (318), once again between the fourth and sixth month of follow-up. During the study follow-up period (a median of 39 months) 125 patients died, and analysis showed that follow-up NT-proBNP measurement proved a better predictor of death than either baseline NT-proBNP or change in NT-proBNP. Indeed, say the authors, NT-proBNP "was consistently the strongest independent prognostic marker at predicting death or unplanned cardiovascular hospitalisations after baseline or follow-up assessment".

First author Dr Milos Kubanek from Castle Hill Hospital, Hull, UK, added: "NT-proBNP monitoring will enable the identification of patients who are not responding well to treatment or help flag those patients needing more aggressive management and monitoring. We found NT-proBNP to be a much stronger predictor of mortality and CV-hospitalisation than echocardiographic measurements of, for example, ejection fraction, and therefore repeat NT-proBNP measurement may enable a reduction in the number of repeat echocardiograms.

"We suggest that the main role of conventional echocardiography should be to diagnose and differentiate the principal causes of heart failure, with subsequent NT-proBNP monitoring used to identify worsening disease and trigger further echocardiographic assessment. Given the relatively high cost of echocardiography compared to NT-proBNP, such a policy is likely to be cost effective."

### Swedish Findings

A study from Sweden suggests the combined application of two independently established biomarkers gives better prognostic information about the risk of cardiovascular mortality in heart failure patients than just one biomarker. This was a study of 464 elderly patients with the symptoms of heart failure followed up over a ten-year period Linköping University Hospital. Throughout that time serum measurements of the biomarker cystatin C (a marker of renal function) were taken, with results showing that those with levels within the highest quartile had almost three times the risk of cardiovascular death than those with levels in the first, second, or third quartiles.

However, when these measurements were combined with measurements of NT-proBNP, the mortality risk assessment was even more emphatic. For example, if those with high concentrations of cystatin C also had a plasma concentration of NT-proBNP within the highest quartile, the risk of death increased to more than 13 times over ten years of follow-up and almost 17 times after five years of follow-up.

The study's first author, Dr Urban Alehagen from the Heart Center of Linköping University Hospital, Linköping,

Sweden, said: "Because the majority of patients with heart failure are elderly and often affected by other organ symptoms, including renal impairment, it is important to identify those at high risk, both for the provision of optimal treatment and the most effective use of health resources. The use of a single blood test and the analysis of two biomarkers is one way of identifying those patients where health resources are best focused. More and more clinicians are using information from natriuretic peptides. However, it is now possible to expand the use of these biomarkers in clinical practice, and our study proposes one such potent combination."

The use of biomarkers for identifying those at risk of cardiovascular mortality is now central to the management of patients with heart failure. Research now aims to find new, more sensitive markers and more efficient use of existing markers. The ultimate aim, as this issue of the European Journal of Heart Failure suggests, is to make earlier and more accurate diagnosis possible, and thereby improve treatment and survival.

Commenting on the implications of the findings, Professor Karl Swedberg, Editor-in-Chief of the European Journal of Heart Failure, said: "A combination of biomarkers to improve diagnosis and prognosis

Published on : Tue, 7 Apr 2009