Ruprecht-Karls-Universität Heidelberg
Medizinische Fakultät Mannheim
Dissertations-Kurzfassung

The relevance of Galectin-3 as a biomarker in heart failure – an echocardiographic correlate

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This doctoral thesis investigated whether gal-3 has any significance in the diagnosis of HFrEF/HFmrEF, HFpEF and RV dysfunction. The study encompassed a collective of 213 patients presenting with cardiovascular disease in the cardiology outpatient clinic and aimed to define a correlation between echocardiographic parameters used to diagnose HF, the corresponding clinical condition and the levels of gal-3.

The cut-off value for gal-3 in the HFrEF/HFmrEF subgroup was determined to be 17.1 ng/mL and showed a negative predictive value of 96%. Similarly, the cut-off value for gal-3 in the HFpEF group was determined to be 17.0 ng/mL (with an negative predictive value of 92.7%), and the cut-off value for RV dysfunction was determined to be 17.35 ng/mL (with a negative predictive value of 96.6%).

In the HFrEF/HFmrEF patient cohort, gal-3 showed a significant relationship between all patients and echocardiographic parameters like LVEDD, LVESD, LVPW and LA-area. In the ROC analyses, gal-3 showed potential in discriminating patients with severe forms of LV systolic dysfunction. This accuracy was potentiated with the combined use of NT-proBNP. Increased levels of gal-3 reflected higher levels of systolic dysfunction; however, the echocardiographic correlate between varying grades of LV systolic dysfunction was influenced by other variables such as renal function.

In the HFpEF patient cohort, gal-3 showed a significant relationship between all patients and echocardiographic parameters like LVPW, LA area, E/A, e' lateral and E/E'. In the ROC analyses, gal-3 could discriminate patients with higher grades of diastolic dysfunction. The diagnostic accuracy was similar to that of NT-proBNP. Increased levels of gal-3 reflected higher levels of diastolic dysfunction.

In the RV dysfunction patient cohort, gal-3 showed a significant relationship between all patients and echocardiographic parameters like RV diameter and TAPSE.

In the ROC analyses, gal-3 in combination with NT-proBNP showed potential in discriminating patients with RV dysfunction. Nevertheless, the echocardiographic correlate between the arbitrarily drawn subgroups in this patient cohort was influenced by other variables such as renal function.

The results from this study suggest that gal-3 has potential as a biomarker in the diagnosis of HFrEF/HFmrEF, HFpEF and RV dysfunction. Nevertheless, the influence of renal function on gal-3 concentrations and the results make it difficult to prescribe the individual use of gal-3 in the diagnostic and management protocols for all patient groups.

Interestingly, the study confirmed the previous work on HFpEF patients. Gal-3 was remarkably effective in its potential to identify patients with incipient and grade III diastolic dysfunction. Its use with other biomarkers such as NT-proBNP could potentially reveal early grades of HFpEF, which are not otherwise evident on routine clinical examination.

The American College of Cardiology described the role of gal-3 as a predictor of mortality and hospitalization in patients with HF and has suggested a class IIb recommendation for use in such a clinical scenario. The results of this study indicate that gal-3 in combination with echocardiography is a suitable biomarker to diagnose HFrEF/HFmrEF and RV-dysfunction, especially in patients where production of echocardiographic images and its interpretation is limited.