

Chronic heart failure patients show individual therapy response to ACE inhibitor treatment

May 22 2018, by Johannes Angerer

A cross-sectional study conducted at MedUni Vienna including patients with chronic systolic heart failure has demonstrated great variations in patients' individual therapy response to ACE inhibitors, the first-line therapy for heart failure. It seems possible that the clinical picture is composed of various subgroups characterized by the over-activation of different endogenous systems. The results provide an explanatory approach to the question, why not all patients benefit equally from ACE inhibitors. The study supports ongoing efforts to develop a targeted, individualised therapy for heart failure patients (precision medicine). Vienna will be the venue for two cardiology congresses taking place at the end of May 2018, that cardiologists from throughout the world will attend.

Chronic [heart failure](#) represents a growing socioeconomic challenge. Quality of life and survival are poor similar to cancer and prevalence is as high as of the "big four"—diabetes, hypertension, coronary artery disease or cancer. For heart failure, though not the other diseases, therapeutic options have changed dramatically in recent years, resulting in large improvements of mortality and morbidity.

ACE-I (angiotensin-converting-enzyme inhibitors) have been the first-line therapy for heart failure for the last 25 years. The drug inhibits the renin-angiotensin-system (RAS), a main hormone system responsible for the regulation of fluid homeostasis and blood pressure. Over-activation

of the RAS is a significant mechanism promoting further progression of the disease. The use of ACE inhibitors not only improves [patients'](#) symptoms and physical capacity but also reduces hospital admissions and increases survival. The prescription of ACE-I for all patients suffering from heart failure is therefor generally recommended by current guidelines. However, at the same time physicians are also aware, that these drugs may not save everyone. Obviously different phenotypes of heart failure must exist, and these phenotypes consequently affect individual therapy response.

A cross-sectional study conducted by Noemi Pavo and colleagues at the heart failure outpatient clinic of the Division of Cardiology, MedUni Vienna/Vienna General Hospital aimed on the characterization of the entire RAS in patients with chronic [systolic heart failure](#) receiving ACE-I treatment. Analysis and mapping of the entire hormone system was made possible by a novel complex mass spectrometry method developed by Attoquant/Austria. Interestingly, individual patients exhibited huge variations in their response to ACE-I treatment at the molecular level of the RAS, despite comparable dosage of medications and different severities of heart failure.

The activation of the effector peptides can be predicted by renin concentrations, which can easily be determined, making future studies including large numbers of patients realizable. One main surprising finding is that many [heart failure patients](#) exhibit no or only minimal activation of RAS, contrary to assumptions based on the predominant pathophysiologic model of heart failure. This could explain why not all patients benefit equally from ACE-I. Here, pathophysiologic changes are probably dominated by the over-activation of other endogenous systems than RAS. On the other hand, many patients show an excessive activation of the RAS, and these patients may benefit from a more aggressive treatment. Further studies investigating these new questions are already on their way.

Precision medicine for heart failure

The study supports the efforts for developing an individualized therapy for heart failure, providing rationale for adapted treatment options by existing substances as a function of the disease phenotype. At the same time the findings raise further questions about the regulation of the RAS, possibly unveiling new therapeutic targets for the treatment of heart failure.

Chronic heart failure is a growing challenge for Western societies. For this reason, [heart failure](#) is one of the main interests of the European Society of Cardiology. In May this year, more than 5,000 cardiologists are expected to visit Vienna to attend the specialist congresses dedicated to this condition.

More information: Noemi Pavo et al. Low- and High-renin Heart Failure Phenotypes with Clinical Implications, *Clinical Chemistry* (2017). DOI: [10.1373/clinchem.2017.278705](https://doi.org/10.1373/clinchem.2017.278705)

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