

Novel biomarkers in heart failure

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Several new biomarkers have been recently described in Heart Failure (HF) syndrome either in stable chronic patients as in the settings of acute decompensation. Biomarkers are used to diagnose disease risk, to predict outcome and to tailor treatment to individuals.

Speaking at a press conference at Heart Failure 2009 in Nice, France, Prof Piotr Ponikowski, spokesperson for the European Society of Cardiology, presented these new findings, namely:

- ST2 - a member of the interleukin (IL)-1 receptor family, markedly upregulated on the application of mechanical strain to cardiac myocytes; reported to be elevated in severe chronic HF, where independently predicts poor outcome; serial monitoring in acute decompensated HF may be useful for risk stratification
- ultrasensitive troponins reflecting damage/loss of cardiomyocytes; elevation in chronic HF identifies poor outcome
- advanced glycation end-products (AGEs) - molecules formed during a non-enzymatic reaction between proteins and sugar residues; there is an evidence that AGEs are related to the development and progression of HF in diabetic and non-diabetic patients;
- adrenomedullin - hormone which is a potent vasodilator, with inotropic and natriuretic properties; assessment of mid-regional

part of the proadrenomedullin (MR-proADM test) has been proved to add additional information on standard of care in the diagnosis of acute HF and to be useful in prognostic evaluation of these patients

- estrogens - it has been recently shown that both low and high concentrations of circulating estradiol are powerful predictors of a poor prognosis in men with chronic HF; subjects with either reduced or increased concentrations of serum E2 have different clinical characteristics, suggesting that the underlying pathophysiological mechanisms are not the same

"Biomarker" is a very broad term that refers to parameter reflecting or characterizing a certain biological process. It may include variety of indices/parameters derived from clinical images, physiological tests, tissue biopsies, and even genetic variants, but most often, this term is reserved for blood or urine based assessments.

As examples of biomarkers assessed in the blood, which are already well established and widely used in clinical practice:

- for lipid metabolism - blood cholesterol or LDL-cholesterol levels
- for glucose metabolism - glycated hemoglobin (HbA1c)
- for kidney function - creatinine, or recently cystatin C
- for inflammation - C-reactive protein (CRP)
- for anemia - hemoglobin

- for cardiac function -natriuretic peptides

[Biomarker](#) assessments are used in many clinical scenarios, in the emergency department, on the ward, in the outpatient clinic and in the near future at the patient's home (using telemedicine platform).

In [heart failure](#), biomarkers aid in the diagnosis, help to assess co-morbidities in patients, may be useful in the risk stratification, monitoring of therapy and even serve as a therapeutic target. Importantly, many biomarkers may provide an insight into the pathophysiology of HF.

"The field of HF biomarkers continues to grow exponentially", explains Prof Ponikowski from Military Hospital in Wroclaw, Poland. "The following is a new classification, recently proposed by Prof Eugene Braunwald, according to which biomarkers can reflect/characterize different aspects of HF:

- inflammation
- oxidative stress
- extracellular-matrix remodeling
- neurohormones
- myocyte injury
- myocyte stress"

Source: European Society of Cardiology ([news](#) : [web](#))

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