

# Negative iron balance predicts acute heart failure survival

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Negative iron balance predicts survival in patients with acute heart failure, according to research presented for the first time today at the Heart Failure Congress 2014 in Athens, Greece. The Congress is the main annual meeting of the Heart Failure Association of the European Society of Cardiology.

Professor Ewa Jankowska, first author of the study, said: "Patients with [acute heart failure](#) have a major collapse in homeostasis. Iron is a key micronutrient that is required for the maintenance of homeostasis. Iron is needed for cellular metabolism and deficiency leads to severely impaired energy metabolism and mitochondrial dysfunction."

She continued: "Previous studies have shown that patients at high cardiovascular risk – for example diabetics with coronary artery disease or patients with stable chronic heart failure – may develop [iron deficiency](#) which leads to recurrent hospitalisations and increased mortality."

Professor Piotr Ponikowski, last author, said: "We have data showing that [iron](#) may be important for clinical outcomes in [chronic heart failure](#) and correction of iron deficiency in these patients is beneficial. This is the first study of iron status in acute heart failure."

Iron deficiency has traditionally been measured using serum ferritin to track iron stores and transferrin saturation (TSAT) to assess iron utilisation in the cell. These measures cannot be reliably interpreted in

acute clinical settings because they are influenced by inflammation and oxidative stress.

The researchers therefore proposed a new, more sensitive, measure for acute heart failure which can best characterise iron deficiency in these settings. This refers to both depleted iron stores, measured by circulating hepcidin, and unmet cellular iron needs, measured by soluble transferrin receptor. The receptor is expressed on all cells and enables iron to enter the cell. When there is not enough iron in the cell, the receptor is overexpressed and shed into the circulation. Concomitance of low hepcidin and high soluble transferrin receptor reflects the most severe form of iron deficiency (lack of iron in the body accompanied by iron need), which the investigators called negative iron balance (NIB).

This prospective, observational study included 165 patients hospitalised for acute heart failure. The researchers assessed the prevalence of NIB and its impact on 12 month mortality.

NIB was found in 37% of patients. Just 29% had only high soluble transferrin receptor, while 9% had only low hepcidin and 25% had none of these abnormalities. Twelve month mortality was 20% for the whole group. Patients with NIB had the highest 12 month mortality (41%) compared to those with only high soluble transferrin receptor (15%), only low hepcidin (7%) and none of these abnormalities (0%) (p

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