Global longitudinal strain improvement after iron replacement in stable heart failure patients – FER-Strain study


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Background: Iron deficiency in patients with heart failure with reduced left ventricular ejection fraction (LVEF) confers a poor prognosis in terms of hospital admissions and mortality, worsening functional class and quality of life. Its replacement with ferric carboxymaltose (FCM) has demonstrated to improve clinical parameters, however, the way it is achieved remains unclear. Improvement of myocardial contractility is proposed as possible hypothesis and global longitudinal strain (GLS) could behave as an early and high sensitive parameter to assess this improvement in myocardial deformation due to increased iron availability after replacement of iron deficiency.

Purpose: Evaluate the effect of replacement of iron deficiency with FCM on left ventricular global longitudinal strain in patients with stable heart failure with LVEF < 50%.

Methods: Observational, analytical, longitudinal and prospective study that enrolled 45 patients with stable heart failure with LVEF <50% who presented iron deficiency without anemia defined as serum ferritin <100 μg/L or between 100 and 300 μg/L and the transferrin saturation <20%.

Results: The study population’s median age was 71 years, 67% were men, 76% had high blood pressure, 62% dyslipemia and 33% diabetes. At baseline they presented LVEF 32% ±8.75%, LV systolic volume index 62.3ml±29.56ml and LV GLS −9.09%±3.44%. Four weeks after iron deficiency replacement, they had a significant improvement in LVEF (difference 2.51%; 95% confidence interval [CI], 1.74% to 3.29%; P<0.0001), LV systolic volume index (difference −6.68ml; 95% CI −1.91ml to −11.45ml; P=0.007) and LV GLS (difference −1.11%; CI 95%, −0.4% to −1.81%; P=0.003), with a relative benefit in LV GLS of 10.57%. Other echocardiography parameters didn’t show significant differences.

Conclusion: In patients with stable heart failure and LVEF <50%, replacement of iron deficiency with FCM improves systolic parameters, especially left ventricular global longitudinal strain.