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Low irisin levels predict acutely decompensated heart failure in type 2 diabetes mellitus patients

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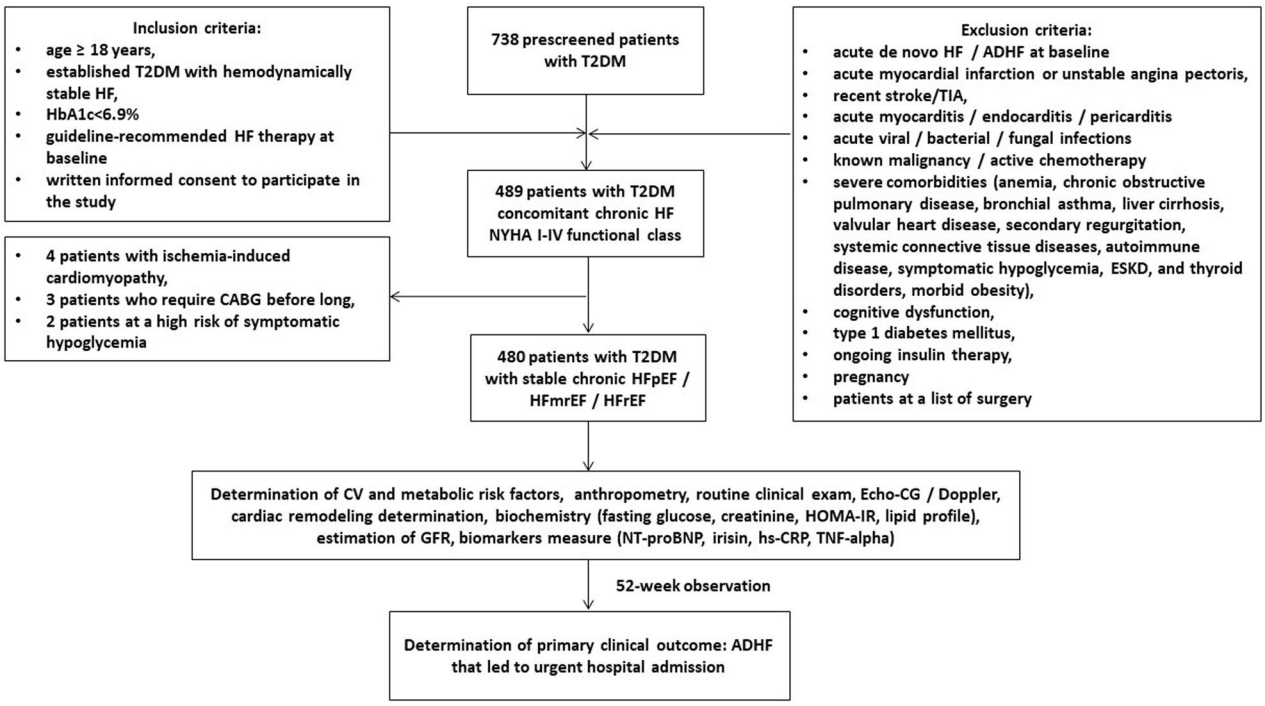
Background: Acutely decompensated heart failure (ADHF) continues to be associated with unacceptably increasing in-hospital mortality rates and one-year mortality rates. Distinct scenarios of the natural course of ADHF relate to clinical heterogeneity among patients admitted to hospitals, cardiac dysfunction etiology, precipitating factors contributing to heart failure (HF) decompensation including type 2 diabetes mellitus (T2DM). The aim of this study was to determine the discriminative value of irisin for ADHF in T2DM patients with hemodynamically stable chronic HF.

Methods: A total of 738 patients with T2DM were prescreened using the local database of "Vita Center" (Ukraine). Using criteria of inclusion (male/female with age of ≥18 years, established T2DM with hemodynamically stable chronic HF, glycosylated hemoglobin < 6.9%, informed consent to participate in the study), we enrolled 489 patients with T2DM with concomitant chronic HF I-IV New York Heart Association (NYHA) functional classes. We enrolled 480 T2DM patients with any phenotype of HF and followed them for 52 weeks. Hemodynamic performances and the serum levels of biomarkers were detected at the study entry. The primary clinical end-point was ADHF that led to urgent hospitalization.

Results: We found that the serum levels of N-terminal natriuretic pro-peptide (NT-proBNP) were higher (1719 [980-2457] pmol/mL vs. 1057 [570-2607] pmol/mL, respectively) and the levels of irisin were lower (4.96 [3.14-6.85] ng/mL vs. 7.95 [5.73-9.16] ng/mL) in ADHF patients than in those without ADHF. The ROC curve analysis showed that the estimated cut-off point for serum irisin levels (ADHF versus non-ADHF) was 7.85 ng/mL (area under curve [AUC] = 0.869 (95% CI = 0.800-0.937), sensitivity = 82.7%, specificity = 73.5%; p = 0.0001). The multivariate logistic regression yielded that the serum levels of irisin < 7.85 ng/mL (OR = 1.20; p = 0.001) and NT-proBNP > 1215 pmol/mL (OR = 1.18; p = 0.001) retained the predictors for ADHF. Kaplan-Meier plots (Figure) showed a significant difference of clinical end-point accumulations in patients with HF depending on irisin levels (<7.85 ng/mL versus ≥7.85 ng/mL). The intra-class correlation coefficient for inter-observer reproducibility of LV dimensions was 0.88 (95% CI = 0.83–0.92), of LVEF was 0.93 (95% CI = 0.90–0.97), of LAVI was 0.92 (95% CI = 0.89–0.94), and of E/e' was 0.90 (95% CI = 0.87–0.94). Along with it, the intra-class correlation coefficient for the intra-observer reproducibility of LV dimensions was 0.91 (95% CI = 0.88–0.95), of LVEF was 0.94 (95% CI = 0.90–0.98), of LAVI was 0.95 (95% CI = 0.93–0.97), and of E/e' was 0.92 (95% CI = 0.90–0.95).

In conclusion, we established that decreased levels of irisin were associated with ADHF presentation in chronic HF patients with T2DM independently from NT-proBNP.

Flow chart of the study design



The Kaplan–Meier analysis of ADHF