

Prognostic value of the glucose-potassium ratio and pulmonary capillary wedge pressure in patients with ischemic HFpEF

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Background: Heart failure with preserved ejection fraction (HFpEF) is characterized by early venous congestion and progressive multiorgan dysfunction, which often precede overt clinical decompensation. Identifying simple biochemical markers that reflect cardiorenal responses to hemodynamic stress remains a major clinical challenge.

Purpose: To evaluate the independent and combined prognostic value of the glucose–potassium ratio (GPR) and pulmonary capillary wedge pressure (PCWP) in patients with ischemic HFpEF.

Methods: This prospective observational study included 88 patients with ischemic HFpEF (46.6% men), stage II A–B, NYHA functional class II–IV. Sinus rhythm was present in 67% of patients and atrial fibrillation in 33%, with comparable baseline clinical characteristics. GPR was calculated at baseline as the ratio of serum glucose to serum potassium. PCWP was estimated non-invasively using tissue Doppler echocardiography. Patients were followed for 5 years. The primary endpoint was a composite of heart failure hospitalization or cardiovascular death. ROC analysis and logistic regression analysis were performed.

Results: During follow-up, 10.2% of patients reached the composite endpoint. A GPR >1.18 was associated with a significantly increased risk of adverse outcomes (OR 11.15; 95% CI 1.33–93.50; $p = 0.026$), as was a PCWP >14.16 mmHg (OR 8.52; 95% CI 1.65–44.14; $p = 0.011$). Serum glucose and potassium analyzed separately were not predictive. In multivariate analysis, both GPR (OR 9.79; $p = 0.039$) and PCWP (OR 7.51; $p = 0.019$) remained independent predictors. The combined model demonstrated robust discriminative performance (AUC 0.837; $p = 0.0007$), without evidence of synergistic interaction.

Conclusions: In patients with ischemic HFpEF, GPR and PCWP provide independent and complementary prognostic information. GPR appears to reflect renal metabolic responses to hemodynamic congestion, whereas PCWP represents filling pressure burden. Their combined assessment enhances risk stratification and supports a multidimensional evaluation of the cardiorenal continuum.