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Coronary Artery Disease, Acute Coronary Syndromes, Acute Cardiac Care –
Acute Coronary Syndromes – Epidemiology, Prognosis, Outcome

Global longitudinal strain and chronic kidney disease prognostic impact on acute coronary syndrome

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Background: Impaired left ventricular ejection fraction (LVEF) and chronic kidney disease (CKD) have been associated with poorer outcomes in acute coronary syndrome (ACS). Increasing evidence on global left ventricular longitudinal strain (GLS) suggests superiority over left ventricular ejection fraction (LVEF) in risk stratification.

Methods: This study was based on a retrospective analysis of consecutive patients admitted to a Coronary Care Unit between 2009 and 2016. Baseline characteristics and echocardiographic parameters, including LVEF, were assessed. For each patient, a two-dimensional speckle tracking of the left ventricle was assessed and average GLS was calculated using 2, 3 and 4-chamber views. Blood creatinine was measured during hospital stay and used to estimate glomerular filtration rate (GFR) with Modification of Diet in Renal Disease (MDRD) equation. A cox regression analysis was performed to determine mortality prediction value of average GLS, LVEF and GFR in this population. Receiver operating characteristic (ROC) curve analysis was conducted and area under the curve (AUC) was estimated.

Results: A total of 85 patients (66.7 ± 12.7 years old; 78.8% males) were enrolled. LVEF mean was $49.4 \pm 9.8\%$ and average GLS was $-16.0 \pm 4.0\%$.

GFR median was 80.0 ± 48.9 ml/min/1.73m^2. In cox regression analysis, worse average GLS was associated with greater mortality (HR 0.721; 95% CI 0.599–0.867; P=0.001). GFR was inversely related to death (HR 0.967; 95% CI 0.944–0.991, P=0.008). In cox regression analysis using average GLS and GFR as covariates, both proved to be independent predictors of mortality (for average GLS, HR 0.748; 95% CI 0.610–0.918, P=0.005; for GFR, HR 0.974; 95% CI 0.949–0.999; P=0.044). The AUC of average GLS to predict mortality was 0.78 (P<0.001, sensitivity 50.7% and specificity 100%) and for average GLS and GFR combined was 0.85 (P<0.001, sensitivity 84.0% and specificity 77.8%). Although LVEF proved to be a mortality predictor, the AUC obtained by ROC curve analysis was inferior to average GLS, with statistical significance (P=0.043).

Conclusions: GLS and CKD proved to be independent predictors of mortality in ACS patients. GLS showed superiority when compared to LVEF in risk stratification and in the future it might replace LVEF. The model combining GLS and GFR emphasized the increased risk of CKD patients and how they should be seen as high-risk patients.

ROC curve of global longitudinal strain with renal function as mortality predictor in acute coronary syndrome

ROC curve analysis