Hyperuricemia is an independently associated with left ventricular hypertrophy and left ventricular diastolic dysfunction in patients with chronic kidney disease

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Objectives: Cardiovascular disease (CVD) is the leading cause of death in patients with chronic kidney disease (CKD). Left ventricular hypertrophy (LVH) and left ventricular diastolic dysfunction (LVDD) is known for the predictor of CVD in these patients. In this study, we assessed the association between hyperuricemia and LVH/LVDD in CKD patients.

Methods: This study included 664 pre-dialysis CKD patients (estimated glomerular filtration rate (eGFR) < 60 ml/min/1.73m²) with preserved left ventricular systolic function. Two-dimensional echocardiography was performed to measure the left ventricular mass index (LVMI). Tissue Doppler imaging was used to measure the early mitral inflow velocity (E) and the peak early mitral annular velocity (E'). The LVH was defined as the LVMI > 115 g/m² in men and > 95 g/m² in women. The severity of LVDD was estimated by the E' and the ratio of E to E' (E/ E'). The presence of LVDD was defined when E' < 8 cm/s.

Results: In univariate analysis, uric acid levels correlated with indices of LVH and diastolic dysfunction. In multivariated analysis, uric acid levels were significantly associated with LVMI (β = 0.382, P = 0.009), E' (β = -0.379, P < 0.001), and E/ E' (β = 0.249, P < 0.001) after adjustment for other confounding factors. ROC analysis showed the best cut-off value of uric acid for identifying the LVH was ≥ 7.2 ng/ml with an associated sensitivity of 74.8% and specificity of 79.3% (AUC: 0.847, 95% CI, 0.817-0.874). The best cut-off value of uric acid for identifying the LVDD was ≥ 6.7 ng/ml with an associated sensitivity of 69.5% and specificity of 79.1% (AUC: 0.806, 95% CI, 0.774-0.836).

Conclusions: Increased uric acid levels were independently associated with increased LVMI, decreased E' and, increased E/E' in patients with CKD, suggesting that hyperuricemia is an independent predictor for LVH and LVDD in them.