Determination of the Informativeness of Instrumental Research Methods in Assessing Risk Factors for the Development of Renal Dysfunction in Elderly Patients with Chronic Ischemic Heart Disease

Authors : Aksana N. Popel, Volha A. Sujayeva, Olga V. Koshlataja, Irena S. Karpava

Abstract : Introduction: It is a known fact that cardiovascular pathology and its complications cause a more severe course and worse prognosis in patients with comorbid kidney pathology. Chronic kidney disease (CKD) is associated with inflammation, endothelial dysfunction, and increased activity of the sympathoadrenal system. This circumstance increases the risk of cardiovascular diseases and the progression of kidney pathology. The above determines the need to identify cardiorenal changes at early stages to reduce the risks of cardiovascular complications and the progression of CKD. Objective: To identify risk factors (RF) for the development of CKD in elderly patients with chronic ischemic heart disease (CIHD). Methods: The study included 64 patients (40 women and 24 men) with a mean age of 74.4 ± 4.5 years with coronary heart disease, without a history of structural kidney pathology and CKD. All patients underwent transthoracic echocardiography (TTE) and kidney ultrasound (KU) using GE Vivid 9 equipment (GE HealthCare, USA), and cardiac computed tomography (CCT) using Siemens Somatom Force equipment (Siemens Healthineers AG, Germany) in 3 months and in 1 year. Data obtained were analyzed using multiple regression analysis and nonparametric Mann-Whitney test. Statistical analysis was performed using the STATISTICA 12.0 program (StatSoft Inc.). Results: Initially, CKD was not diagnosed in all patients. In 3 months, CKD was diagnosed: stage C1 had 11 people (18%), stage C2 had 4 people (6%), stage C3A had 11 people (18%), stage C3B had 2 people (3%). After 1 year, CKD was diagnosed: stage C1 had 22 people (35%), stage C2 had 5 people (8%), stage C3A had 17 people (27%), stage C3B had 10 people (15%). In 3 months, statistically significant ($p<0.05$) risk factors were: 1) according to TTE: mitral peak E-wave velocity ($U=678$, $p=0.039$), mitral E-velocity DT ($U=514$, $p=0.0168$), mitral peak A-wave velocity ($U=682$, $p=0.013$). In 1 year, statistically significant ($p<0.05$) risk factors were: according to TTE: left ventricular (LV) end-systolic volume in B-mode ($U=134$, $p=0.006$), LV end-diastolic volume in B-mode ($U=177$, $p=0.04$), LV ejection fraction in B-mode ($U=135$, $p=0.006$), left atrial volume ($U=178$, $p=0.021$), LV hypertrophy ($U=294$, $p=0.04$), mitral valve (MV) fibrosis ($U=328$, $p=0.01$); according CCT: epicardial fat thickness (EFT) on the right ventricle ($U=8$, $p=0.015$); according to KU: interlobar renal artery resistance index (RI) ($U=224$, $p=0.02$), segmental renal artery RI ($U=409$, $p=0.016$). Conclusions: Both TTE and KU are very informative methods to determine the additional risk factors of CKD development and progression. The most informative risk factors were LV global systolic and diastolic functions, LV and LA volumes. LV hypertrophy, MV fibrosis, interlobar renal artery and segmental renal artery RIs, EFT.

Keywords : chronic kidney disease, ischemic heart disease, prognosis, risk factors
Conference Title : ICCCS 2025 : International Conference on Cardiology and Cardiac Surgery
Conference Location : Istanbul, Türkiye
Conference Dates : May 06-07, 2025