

Abstract Type : Poster

Abstract Submission No. : 1727

Association Between the Serum Creatinine-to-Cystatin-C Ratio and Rapid Progression of Chronic Kidney Disease

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Objectives: Chronic Kidney Disease (CKD) is a common and progressive condition that requires proper management and monitoring to prevent further progression. Cystatin C has been shown to be an effective marker of kidney function and a predictive marker of CKD progression. This study aims to investigate the effectiveness of the serum creatinine-to-cystatin-C (Cr/cysC) ratio in predicting rapid progression of CKD.

Methods: A retrospective study of 1,104 CKD patients treated at a single center was conducted. Patients had at least two simultaneous measurements of creatinine and cystatin C, spaced at least 6 months apart. The definition of rapid progression of CKD was a decrease in estimated glomerular filtration rate (eGFR) of more than 4 mL/min/1.73m² over a 1-year period or initiation of renal replacement therapy (RRT).

Results: 38.4% of the total patients showed rapid progression of CKD. The analysis showed that a lower Cr/cysC ratio was significantly associated with an increased risk of rapid progression of CKD (OR: 0.812, 95% CI: 0.761-0.867, p<0.001). After adjusting for age, sex, body mass index, and initial eGFR, a lower Cr/cysC ratio remained a significant risk factor for rapid progression of CKD (OR: 0.760, 95% CI: 0.685-0.844, p<0.001). The initiation of RRT increased with the advancement of CKD stage, with 11 patients with CKD stage 3b, 30 patients with CKD stage 4, and 41 patients with CKD stage 5 initiating dialysis treatment. After adjusting for all variables, the OR was 0.774 (95% CI: 0.667-0.898, p=0.001), indicating that as the Cr/cysC ratio increased, the progression of dialysis significantly decreased by 22.6%.

Conclusions: In this study, a lower Cr/cysC ratio was significantly associated with an increased risk of rapid progression of CKD and initiation of RRT. We suggest that monitoring the Cr/cysC ratio may provide valuable information for the management of CKD patients.