

**Potential cardiovascular risk factors in chronic kidney disease: AGEs, total homocysteine and metabolites, and the C-reactive protein.**

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**BACKGROUND:** Total homocysteine (tHcy) and advanced glycation end-products (AGEs) are implicated in the pathogenesis of vascular damage. This study aimed to investigate whether elevated serum levels of the AGEs pentosidine, N(epsilon)-carboxymethyllysine (CML) and imidazolone; tHcy, cystathionine, methylmalonic acid (MMA), and 2-methylcitric acid (2-MCA), as well as C-reactive protein (CRP), are related to a higher risk for cardiovascular events. **METHODS:** A total of 232 patients with chronic kidney diseases (mean age 57.6 +/- 13.1 years, 82 female and 150 male); 99 with chronic renal failure (CRF), 84 maintenance hemodialysis patients and 49 renal transplant recipients were followed for 2 years. The relationship between the parameters of interest, conventional risk factors and elevated levels of CRP with cardiovascular events was tested in all subjects by the Cox proportional hazards model. **RESULTS:** Mean serum levels of AGEs, tHcy, and of the metabolites were found to be significantly increased in all three groups compared to the healthy subjects ( $P < 0.01$ , respectively). Fifty-three cardiovascular events occurred during follow-up; a total of 40 patients died. Final multivariate analysis showed diabetes (RR 2.06, 95% CI 1.17-3.60,  $P = 0.013$ ), end-stage renal disease (ESRD) (RR 4.88, 95% CI 2.40-9.89,  $P < 0.001$ ) and elevated CRP levels (RR 2.00, 95% CI 1.11-3.60,  $P = 0.021$ ) as independent risk factors for cardiovascular events. **CONCLUSION:** Data from a group consisting of patients with CRF, patients undergoing maintenance hemodialysis treatment, and renal transplant recipients provide evidence that conventional risk factors such as the presence of diabetes, ESRD, as well as elevated levels of the considered risk factor CRP, seem to play a more important role for cardiovascular outcome in patients with chronic kidney disease than elevated levels of AGEs, tHcy, and related metabolites. The evidence suggests that routine CRP measurement can be recommended in cases of chronic renal insufficiency.

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