

Elevated NT-proBNP in Moderate Renal Dysfunction: Decreased Clearance or Increased Cardiac Stress?

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Background/Aims: Serum levels of N-terminal pro-brain natriuretic peptide (NT-proBNP) are often increased in patients with impaired renal function. This prospective study investigated whether this increase is due to a reduced renal clearance of the peptide or a kidney-mediated excess stress burden on the heart.

Methods: The study included 696 consecutive outpatients referred for evaluation of chronic dyspnea. The patients were assigned to 4 groups according to their estimated glomerular filtration rate [eGFR (ml/min per 1.73 m²): group 1, eGFR <60 (n=77); group 2, eGFR 60-<75 (n=139); group 3, eGFR 75-<90 (n=191); and group 4, eGFR ≥90 (n=289)]. The patients were also classified into 2 categories based on the presence (n=176) or absence (n=520) of heart disease. The effect of eGFR group membership on the log-transformed values for NT-proBNP was analyzed by a multiple linear regression model with adjustment for relevant cardiac and extracardiac covariates. The eGFR group 1 was used as a reference group.

Results: In patients with heart disease, the fully adjusted values for NT-proBNP were higher in eGFR group 1 than in eGFR groups 2, 3 and 4 (p≤0.01). In contrast, the adjusted NT-proBNP values did not differ between eGFR group 1 and eGFR groups 2, 3 and 4 in the entire cohort of the patients without heart disease. Likewise, eGFR group 1 membership had no effect on the adjusted NT-proBNP values in the subgroup of patients without heart disease exhibiting NT-proBNP levels in the highest quartile.

Conclusion: A reduced renal clearance does not explain increased NT-proBNP levels in patients with moderate renal impairment and dyspnea. Our data suggest that a moderate reduction of renal function places additional stress on the heart in patients with established cardiac disease. This excess burden of stress may further reduce the exercise tolerance and contribute to the increased cardiovascular risk of cardiac disease patients with at least moderate renal dysfunction.