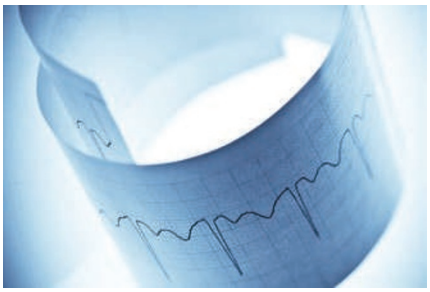
RISK FACTORS

Study reveals link between autonomic imbalance and kidney disease

New findings revealing an association between heart rate variability (HRV) and the development of renal impairment suggest that autonomic dysfunction may contribute to kidney disease, according to Daniel Brotman and colleagues. "Our findings might not change patient management immediately, but further understanding of the mechanisms involved might lead to new interventional strategies or to investigations of whether current treatment strategies already alter these pathways", explains Brotman.

Brotman believes that previous studies showing an association between impaired diurnal changes in blood pressure and renal impairment indicated a role for stress systems in the development of kidney disease. "I was intrigued by the notion that the dysregulation of stress systems can cause health problems and believed that due credit had not been given for the vascular damage that they may cause", he states. To investigate whether chronic overactivity of the nervous system contributes to renal disease, Brotman and colleagues assessed the association between HRV and renal outcomes. The researchers quantified HRV in 13,241 participants from the Atherosclerosis Risk in Communities (ARIC) study, by measuring average heart rate and beat-to-beat variability. Individuals with a healthy autonomic nervous system typically have lower resting heart rates and greater beat-to-beat variability (a higher HRV) than individuals with autonomic dysfunction.

The researchers found that high resting heart rate and low HRV were associated with the development of renal impairment, even after adjustment for known risk factors. Fully adjusted hazard ratios for the development of end-stage renal disease were 1.98 (95% CI 1.45–2.70) among individuals in the highest heart-rate quartile and 1.56 (95% CI 1.14–2.14) among individuals in the lowest HRV quartile.



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The researchers acknowledge that their study does not show causation; however, Brotman believes that their findings contribute to the body of literature demonstrating that people with abnormal stress systems seem to develop organ dysfunction. He hopes that they prompt researchers to investigate underlying differences in autonomic function in other cohorts.

Susan J. Allison

Original article Brotman, D. J. *et al*. Heart rate variability predicts ESRD and CKD-related hospitalization. *J. Am. Soc. Nephrol.* **21**, 1560–1570 (2010)