

Heart beat may provide clues to kidney health

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Individuals with a high resting heart rate and a low beat-to-beat heart rate variability have an increased risk of developing kidney disease, according to a study appearing in an upcoming issue of the *Journal of the American Society Nephrology* (JASN). The findings suggest that the behavior of the autonomic nervous system may be a sentinel marker for late development of certain cases of kidney disease.

The autonomic nervous system regulates unconscious body functions, including heart rate, blood pressure, temperature regulation, and responses to stress. Dysfunction of the autonomic nervous system (dysautonomia) has been linked to [chronic kidney disease](#) (CKD) and its progression, but the details of this association are unclear.

To study the relationship between dysautonomia and the subsequent development of kidney disease, Daniel Brotman, MD (Johns Hopkins University School of Medicine) and his colleagues examined data from 13,241 individuals enrolled in the Atherosclerosis Risk in Communities (ARIC) study, a prospective observational cohort of 15,792 individuals aged 45 to 64 years, drawn from four US communities. To assess dysautonomia, the investigators measured heart rate variability, a practical way to measure autonomic balance. In most healthy young adults, resting heart rate will predictably accelerate and decelerate as a person breathes. In general, lower resting heart rates and greater beat-to-beat variability in heart rate indicate a healthy autonomic nervous system and good cardiovascular health. On the other hand, higher resting heart rates and lower beat-to-beat variability in heart rate are signs of

dysautonomia.

Dr. Brotman and his team found that patients with higher resting heart rates had a 2-fold increased risk of developing [kidney failure](#) many years later. Individuals with a lower beat-to-beat variability in heart rate had a 1.5-fold increased risk. Therefore, heart rate measurements could serve as a way to identify patients at higher risk of developing kidney damage.

While the findings do not prove a cause-and-effect relationship, the authors postulate that dysautonomia may negatively impact the health of blood vessels in and around the kidneys. "We hope our findings will encourage further research to better define the putative role of the [autonomic nervous system](#) in precipitating and exacerbating renal disease in humans," the authors wrote. "This, in turn, may ultimately lead to novel therapeutic approaches once the mechanisms for our findings are better characterized," they added.

More information: The article, entitled "Heart Rate Variability Predicts ESRD and CKD-Related Hospitalization" will appear online on July 8, 2010, [doi 10.1681/ASN.2009111112](https://doi.org/10.1681/ASN.2009111112)

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