

## Deep Insight into Heart Rate in the Management of Hypertension

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Abnormal and excess sympathetic activation is important in the pathophysiology of hypertension as it is associated with cardiovascular events, such as heart failure, stroke, and renal failure. In this regard, heart rate would be a strong predictor of cardiovascular events in the treatment of hypertension. Resting heart rate and the risk of cardiovascular events are significantly correlated, and the adverse prognostic value of increased heart rate is independent of the concomitant presence of other cardiovascular risk factors, such as ages, gender, blood pressure, body weight and metabolic profile.

The European Society of Cardiology (ESC) and European Society of Hypertension (ESH) hypertension guidelines have already included resting heart rate among the risk factors for cardiovascular disease in hypertensive patients. Recently, the ESC/ESH hypertension guidelines identified that resting heart rate values  $> 80$  beats/minute could be a predictor of cardiovascular risk, and that treatment should consider antihypertensive drugs with heart rate-lowering effects, such as beta-blockers. Recently, Grassi et al clearly indicated that hypertensive patients with heart rate  $> 80$  beats/minute could be characterized by a marked sympathetic overactivation, and that cardiac and peripheral sympathetic activation are involved in the increased cardiovascular risk detected in this group of patients. The important clinical implication of the present study was that sympathetic activity should be markedly increased at a resting heart rate  $> 80$  beats/minute. In the treatment of hypertension, the patients with heart rate value  $> 80$  beats/minute should be considered to have higher sympathetic overactivity and cardiovascular risks compared to those with heart rate value  $< 80$  beats/minute, and should be administered antihypertensive drugs involving beta-blockers. Moreover, hypertensive patients with heart rate value  $> 80$  beats/minute and abnormal sympathetic overactivation would have impaired baroreflex function. Baroreflex failure is the major mechanism involved in the pathophysiology of short-term beat-to-beat blood pressure variability, and previous clinical and animal studies have demonstrated that baroreflex failure disrupted beat-to-beat blood pressure variability and hypertensive organ damage. In the future clinical practice, we should select the device therapy with baroreflex activation for hypertensive patients with heart rate value  $> 80$  beats/minute.

In conclusion, clinical heart rate values above 80 beats/minute in hypertensive patients are associated with a degree of sympathetic cardiovascular activation that is markedly greater than the one detected in patients having high blood pressure and clinical heart rate values  $< 80$  beats/minute. The difference in sympathetic overdrive may help in detecting hypertensive patients and clarify that beta-blocking drugs has a solid pathophysiological rationale.