Heart rate in chronic heart failure: an overlooked risk factor

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Introduction

Heart rate measured by palpation and more recently by auscultation has been used for centuries to assess the cardiovascular condition of patients (Figure 1). It is, however, only recently that the importance of heart rate measurement as a prognostic factor has been recognized in unselected healthy populations, patients with hypertension or coronary artery disease, after myocardial infarction, and in those with left ventricular dysfunction of ischaemic origin or heart failure with reduced ejection fraction. Moreover, it has been shown that in patients with chronic heart failure, reduced ejection fraction, in sinus rhythm, and with an elevated heart rate (≥70 b.p.m.) at baseline, the use of a pure heart rate-slowing agent, ivabradine, was associated with an improvement in cardiovascular outcomes. This association was also demonstrated in the analysis of the CHARM program including patients with both reduced and preserved ejection fraction, any 10 b.p.m. increase in heart rate was associated with a 8% risk of all-cause mortality in patients without atrial fibrillation, regardless of ejection fraction. A similar relationship was observed between increased heart rate and the risk of cardiovascular mortality or heart failure hospitalizations. This association was also demonstrated in the analysis of the I-Preserve population where all patients had an ejection fraction >45%. In this analysis, each increase of 12 b.p.m. was associated with a 13% increase in the risk of cardiovascular death or heart failure hospitalization, with the exception of patients in atrial fibrillation.

The analysis of Vazir et al. shows that not only the resting baseline heart rate but also the change from the preceding visit is a powerful predictor of poor outcomes in a broad population of chronic heart failure patients with either preserved or reduced ejection fraction. It therefore suggests that the simple measure of this vital sign during the course of the disease should be a warning signal and should lead to treatment and follow-up intensification in order to improve outcomes. The predictive value of heart rate changes is further strengthened by the fact that it persists even after introduction of beta-blockers or adjustment of beta-blocker dose.

One interesting observation of Vazir’s study is that unlike other studies where resting heart rate was measured by analysis of electrocardiographic tracings only, the ominous role of increased heart rate can also be determined by palpation or auscultation after 5 min of rest.

The study also shows that in patients with atrial fibrillation at baseline, there is a weaker correlation between heart rate at any time compared with patients in sinus rhythm. Previous observations in CHARM and in I-Preserve have indeed suggested that in this subgroup of patients baseline heart rate measurement is not predictive of outcome. This is possibly related to the high instantaneous rate variability induced by atrial fibrillation which makes a short time assessment inaccurate. Here, the most recent value of heart rate remains
evaluation of the ‘‘heart rate burden’’ should therefore be put into practice as a standard procedure. Whether more sophisticated assessment of heart rate by remote monitoring devices can further improve risk prediction in individual patients is an open question. In the meantime, doctors should pay more attention to palpation, auscultation, or electrocardiogram for the regular follow-up of heart failure patients.

Conflict of interest: M.K. is Member of the Steering Committee of Studies on ivabradine and was a member of the executive committee of I-Preserve sponsored by Bristol Myers Squibb.

References

Figure 1 Heart rate measurement: a simple and useful tool.