

Heart rate – the lower the better?

Epidemiologic evidence suggests that a high resting heart rate is a risk factor for mortality and cardiovascular outcomes both in the general population and in patients with cardiovascular disease [1-3]. However, among people without any known cardiovascular disease, should we treat high resting heart rate as extensively as other cardio-metabolic risk factors such as central obesity, smoking, hypercholesterolemia, or hypertension?

In clinical practice, the prognostic importance of resting heart rate has generally been overlooked. One potential reason for physician inertia in using heart rate as a valid cardiovascular risk factor is the methodological bias associated with population studies. In this issue of *Tidsskrift for Den Norske Lægeforening*, Dalby and colleagues [4] reviewed the evidence of resting heart rate and its association with risk of death, and provided support for findings that resting heart rate may be a true risk factor of cardiovascular disease rather merely a marker of risk.

The rates of death attributable to cardiovascular disease have declined over the years, yet the burden of disease remains. One plausible explanation may be that almost half of all cardiovascular events occur among individuals without prior cardiovascular disease, although, they are at lower absolute risk compared with those with established cardiovascular disease [5]. Therefore, discoveries of novel risk markers and their management serve as cornerstones in cardiovascular disease prevention guidelines which focus on development of the most effective strategies to improve cost and effectiveness of care, and stress to optimize patient outcomes. In regard with resting heart rate, it is important to note that no human study has been conducted so far to assess the efficacy, cost-effectiveness or risk-benefit ratio of heart rate lowering treatment in people without cardiac disease. However, this concern does not in any fashion suggest that health care professionals pay less attention to this clinical variable. The results from clinical trials in patients and data from animal studies strongly suggest that direct heart rate reduction is associated with significant reduction of cardiovascular endpoints. Moreover, recent findings [6] have demonstrated favourable outcomes by lowering LDL cholesterol with statin therapy in people without a history of vascular disease. These results warrant that benefits of heart rate reduction in people without prior cardiovascular disease must be tested in a randomised fashion as in BEAUTIFUL [7] and SHIFT [8] trials.

Of note, resting heart rate variability associated with physical exercise has gained much credit in recent years [1-3, 9]. Exercise induced autonomic effects (an

increase in parasympathetic but decrease in sympathetic activity), coupled with a possible reduction in intrinsic heart rate result in decreased heart rate at rest. Other factors that may change resting heart rate over time include drugs, diet, physical activity levels, psychological status, interaction of genetics and environment [3]. In keeping with the authors of present review, a balanced risk management of elevated resting heart rate should target lifestyle modifications including exercise prescription and diet intervention, or rational behavioral therapies to avoid chronic stress or depression.

In conclusion, there is convincing evidence from studies that heart rate is directly associated with increased risk, beyond being a marker of an underlying pathophysiological abnormality. Heart rate measurements are easy to obtain, and serial assessment of resting heart rate may be used as an important prognostic marker in both primary and secondary cardiovascular prevention.

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