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Rate-Responsive Pacing Unmasking Previously Undiagnosed Multivessel Coronary Artery Disease: A Case Report

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Introduction: Rate-responsive pacing is a function that adjusts the pacing rate in response to physical activity and metabolic demand[1]. In patients with obstructive coronary artery disease, increasing heart rate may result in myocardial ischemia due to increased oxygen demand and shortened duration of coronary perfusion[2]. We report a case of new-onset angina following activation of rate-responsive pacing, which led to the diagnosis of previously unrecognized multivessel coronary artery disease.

Case report: 70-year-old man with arterial hypertension, diabetes mellitus, dyslipidemia, and permanent atrial fibrillation underwent implantation of a single-chamber pacemaker in 2013 for a slow ventricular response. The device was programmed in VVI mode with a lower rate limit of 50 beats/min for backup pacing. The pacemaker generator was replaced in July 2023, with the original pacing settings, including disabled rate response, left unchanged. In December 2023 the patient presented to the Emergency Department with new-onset acute heart failure. One week later, he underwent device follow-up at a private clinic, during which rate-responsive pacing was activated. Two months later, the patient presented for an unscheduled outpatient visit due to due to recent-onset exertional angina (Canadian Cardiovascular Society class III). He was subsequently hospitalized for further evaluation. Echocardiography demonstrated concentric left ventricular hypertrophy with preserved systolic function (left ventricular ejection fraction 55–60%), basal inferior wall hypokinesis, and septal dyssynchrony. Coronary angiography revealed chronic total occlusion of the proximal dominant right coronary artery with collateral filling, along with 60% stenoses of the mid left anterior descending artery and proximal first obtuse marginal branch. Regadenoson stress test myocardial perfusion scintigraphy demonstrated reversible perfusion defects involving the septal, inferolateral, basal lateral, and apical inferior segments, without fixed defects. Following multidisciplinary Heart Team assessment, urgent surgical coronary revascularization was recommended. However, the procedure was postponed due to COVID-19 infection, and the patient subsequently declined surgery, opting for conservative management. At the latest follow-up in March 2026, the patient remained asymptomatic on medical therapy.

Conclusion: Activation of rate-responsive pacing may unmask previously silent multivessel coronary artery disease by increasing myocardial oxygen demand and precipitating angina. This case highlights the importance of considering underlying myocardial ischemia in patients presenting with new-onset angina following activation of rate-responsive pacing.

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