Abstract

An essential part of an indication for coronary revascularization is recognition of the lesion causing the myocardial ischemia. Coronary angiography fails in the diagnosis of lesions causing ischemia, primarily in so-called “borderline” lesions (lesions with a 40%–70% reduction in the lumen diameter). This problem is overcome by measuring the pressure gradient across the stenosis. In contemporary practice, we use 2 methods to measure such gradients: fractional flow reserve (FFR), which measures the pressure gradient during hyperemia and across the entire cardiac cycle; and the so-called resting indices (the most well-known of which is instantaneous wave-free ratio - iFR), which measure the pressure gradient without drug-induced hyperemia during mid-diastole. Unfortunately, having both hyperemic and resting indices also opens new problems. Based on previous trials, it is known that the correlation between FFR and iFR is around 80% and that this correlation is much lower when we compare only measurements at or near cutoff points.

Our trial was designed to analyze lesions and patients with discordant FFR and iFR findings using clinical, angiographic, and laboratory examinations. Moreover, one of the potential and so far untested reasons for the impaired reaction of endothelial cells to vasoactive drugs could be a genetic polymorphism in genes that play a role in endothelial-based vasodilatation. Endothelial nitric oxide synthase (ENOS) and heme oxygenase-1(HO-1) are enzymes that are crucial for vascular homeostasis, and alterations in their functions are implicated in endothelial dysfunction and development of atherosclerosis. Also, common variants in both genes have been shown to alter enzyme function. Because there are only limited data available concerning the genetic determinants of coronary artery response to hyperemic stimuli, we sought to investigate whether the Glu298Asp polymorphism—in exon 7 of the ENOS gene—and the (GT)n polymorphism in the HO-1 gene promoter influence coronary pressure-derived indexes and whether these variants contribute to the occurrence of iFR/FFR discordance.

Key words: fractional flow reserve, instantaneous wave-free ratio, coronary flow reserve