New Ischemic Index based on Combined Parameters of Coronary Angiography and Intracoronary Pressure Measurement Predicts the Severity of Ischemia on Myocardial Perfusion Scintigraphy

Zsolt Koszegi*, Bertalan Kracskó, Ildikó Garai, József Varga, István des, László Tímár and Zsuzsa Nagy

Jósa András Teaching Hospital
Nyíregyháza, Hungary

Background: According to the current guidelines the indication of percutaneous coronary interventions on coronary lesions with intermediate severity is based on the fractional flow reserve (FFR), independently of the localization of coronary stenosis.

Methods: The coronary angiograms of 28 patients were analyzed by a computer program called Holistic Coronary Care. The software registered 23 epicardial coronary segments using the modified Syntax segmentation system. The supplied left ventricular segments on the standard 17-segment polar map were rendered to each coronary branch. FFR measurements of 36 vessels were compared with the myocardial perfusion SPECT studies performed before the invasive procedure. We introduced a new ischemic index by combining the FFR with the number of the corresponding myocardial segments (N): left ventricular ischemic index (LVIi=N x (1-FFR)). This index was correlated with the regional myocardial perfusion defects identified on the scintigrams. Perfusion reversibility score of 2 or above was considered as indicative of active ischemia (regional Difference Score: rDSc).

Results: Close linear relationship was found between the LVIi and the rDSc ($P<0.001$) (y=-2.20+3.75x, r=0.88, $p<0.001$). Analyzing all the FFR values independently of the localization of the lesions, they also correlated significantly with the rDSc, but the relation was less tight (r=0.60). LVIi predicted active ischemia (>2 rDSc) on myocardial scintigraphy with 77.8% sensitivity and 94.4% specificity when the cut off value was set to 0.96. FFR alone predicted the ischemia on the scintigraphy with 72% sensitivity and 94% specificity at the best 0.8 cut off value. The area under the Receiver Operating Characteristic (ROC) curve was significantly higher for LVIi than FFR (0.92 vs. 0.78; p=0.03).

Conclusion: Our results shows that the LVIi >0.96 indicates clinically relevant stenotic lesion. In this concept the FFR value together with the number of corresponding left ventricular segments rather than alone predicts the severity of myocardial ischemia.