Diagnostic performance of ST-segment elevation in lead aVR during exercise stress test for the prediction of severe coronary artery disease: A meta-analysis

Tae-Min Rhee  
So-Ryoung Lee  
Myung-Jin Cha  
Eue-Keun Choi  
Seil Oh

Introduction: Stable coronary artery disease (CAD) patients with left main coronary artery (LMCA) or 3-vessel disease (3VD) are at high risk of poor prognosis. Several reports have shown the usefulness of exercise stress test (EST)-induced ST-segment elevation (STE) of lead aVR in discriminating severe CAD including LMCA or 3-vessel disease (3VD). We thus conducted a meta-analysis to investigate the diagnostic performance of EST in stable CAD patients, focusing on the role of STE in lead aVR.

Methods: PubMed, EMBASE, and Cochrane Database of Systematic Reviews were systematically searched up to June 2019. We included studies that reported the diagnostic accuracy of EST-induced STE in lead aVR for detecting LMCA disease or discriminating the extent of CAD. Two independent investigators assessed the quality and the risk of bias of each study using the Quality Assessment of Diagnostic Accuracy Studies-2 tool. Pooled sensitivity and specificity were calculated and plotted in a hierarchical summary receiver operating characteristic (sROC) plot. The pooled diagnostic accuracy of STE in lead aVR was evaluated in two groups: 1) for detecting LMCA disease only, and 2) for detecting LMCA disease or 3VD.

Result: Seven studies incorporating 1,685 patients were analyzed. Study period ranged between 2007 and 2017. The EST followed the standard Bruce protocol in all included studies. Two studies used nuclear myocardial perfusion imaging to define the extent of CAD, and five assessed the stenosis of epicardial coronary arteries by invasive coronary angiography. In terms of the detection of LMCA disease only, pooled sensitivity of aVR STE ≥1.0 mm was 0.72 (95% confidence interval [CI] 0.33-0.93), specificity was 0.77 (95% CI 0.59-0.89), with the area under the curve (AUC) for sROC was 0.81 (0.78-0.84). For the detection of LMCA disease or 3VD, pooled sensitivity of aVR STE ≥1.0 mm was 0.63 (95% CI 0.31-0.86), specificity was 0.79 (95% CI 0.64-0.89), with the AUC for sROC was 0.79 (0.76-0.83).

Conclusion: In addition to the standard role of EST as a simple non-invasive test in stable CAD, EST-induced STE ≥1.0 mm in lead aVR may provide significant diagnostic information for predicting high CAD burden as well as the presence of LMCA disease.