Clinical Investigation

Significance of exercise-induced ST changes in leads AVR, V5, and V1. Discrimination of patients with single- or multivessel coronary artery disease

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Abstract

Background: It is known that exercise-induced ST-segment elevation in lead V1 (V1-E) detects left anterior descending (LAD) stenosis. It was also postulated that ST elevation in aVR and simultaneous ST depression in V5 (aVR-E + V5-D) is a marker of ischemia due to significant stenosis of the LAD in patients with single-vessel disease.

Hypothesis: This study was undertaken to investigate the significance of the concomitant appearance of both electrocardiographic (ECG) ischemic markers, and of each of them alone during exercise, to detect either LAD stenosis as single-vessel coronary artery disease (CAD), or multivessel CAD involving LAD stenosis.

Methods: A total of 196 consecutive patients (152 men and 44 women, mean age 54 ± 7 years) with at least one of these ECG markers, who underwent treadmill exercise testing with the Bruce protocol and coronary arteriography, were studied.

Results: Patients were divided into three groups. In Group A (83 patients with V1-E + aVR-E & V5-D), 93% of patients with single-vessel disease had significant LAD stenosis (p < 0.001), whereas 75% of patients with double-vessel disease had significant stenoses of the LAD and the left circumflex (LCx) coronary arteries (p < 0.01). In Group B (97 patients with aVR-E & V5-D but without V1-E), 43% of patients with single-vessel disease had significant LAD stenosis (p < 0.08), whereas 85% of patients with double-vessel disease had significant stenoses of the LAD and the right coronary artery (RCA) (p < 0.01). In Group C (16 patients with only V1-E), 60% of patients with single-vessel disease had significant LAD stenosis (p < 0.05), whereas 75% of patients with double-vessel disease had significant LAD and LCx stenoses (p < 0.05).

Conclusions: The concomitant appearance of exercise-induced ST elevation in lead V1, ST elevation in lead aVR, and ST depression in lead V5, as well as the isolated appearance of ST elevation in lead V1 detect significant LAD stenosis as single-vessel disease, or significant stenoses of LAD and LCx arteries in patients with double-vessel disease, whereas the appearance of ST elevation in aVR & ST depression in V5 but without ST elevation in V1 correlates strongly with significant LAD and RCA stenoses and usually indicates double-vessel disease.