Editors

Standard 12-lead electrocardiographic diagnosis for identifying the culprit artery in inferior wall acute myocardial infarction showing ST segment elevation in the inferior leads

A. Tamura

From Second Department of Internal Medicine, Oita Medical University, Oita, Japan

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The early electrocardiographic changes in acute myocardial infarction, especially elevation and depression of the ST segment, have been extensively investigated for many decades. Obstruction of either the right or left circumflex coronary artery can cause transmural ischaemia in the left ventricular inferior wall, resulting in ST segment elevation in the inferior leads. Therefore, electrocardiographic differentiation of the culprit artery in inferior wall acute myocardial infarction showing ST segment elevation in the inferior leads at the time of admission is a clinically important subject for cardiologists.

Bairey et al. investigated 41 consecutive patients with inferior wall acute myocardial infarction showing ST segment elevation in at least one of the inferior leads. They reported that the presence of ST segment elevation $\geq 0.5$ mm in at least one of the lateral leads (aVL, V5 or V6) with an isoelectric or elevated ST segment in lead I identified left circumflex coronary artery occlusion with a sensitivity of 83%, a specificity of 96%, a positive predictive accuracy of 91% and a negative predictive accuracy of 93%. Furthermore, they applied the same criterion to an additional cohort of 19 consecutive patients with the same type of infarction and certified its usefulness. The criterion is a highly sensitive and specific marker for identifying left circumflex coronary artery occlusion as the cause of inferior wall acute myocardial infarction showing ST segment elevation in the inferior leads. However, in their study, the site of occlusion of the left circumflex coronary artery was not thoroughly considered.

In inferior wall acute myocardial infarction due to occlusion of the left circumflex coronary artery, whether or not the culprit lesion exists in the artery proximal to the obtuse marginal artery can greatly affect the ST segment deviation on a 12-lead standard electrocardiogram. If one takes into consideration the area perfused by the obtuse marginal branch, ischaemic involvement of the branch would cause ST segment elevation in the lateral leads, especially lead aVL. Indeed, Hasegawa found that proximal left circumflex occlusion is associated with ST segment elevation in lead aVL, whereas distal left circumflex artery occlusion is associated with ST segment elevation in the inferior leads.

In this issue, Hasdai et al. expand the observations of Hasegawa. They attempted to identify not only the infarct-related artery but also the site of occlusion in the artery in patients with inferior wall acute myocardial infarction showing ST segment elevation $\geq 1$ mm in at least two inferior leads, and found that the lack of ST segment depression $\geq 1$ mm in lead aVL indicated proximal circumflex coronary artery obstruction, with a sensitivity of 86% and a specificity of 100%. Their study is clinically important, but has some problems. First, their patient population is relatively small, especially in terms of the number of patients with left circumflex coronary artery disease as the infarct-related artery. As they seem to be planning to examine their criterion as part of a prospective multi-centre study, results of the prospective study are expected. Second, ST segment deviation in the right precordial leads ($V_{4-6}$) was not analysed in their study. Combined analysis of ST segment deviation in the inferior, lateral limb, and precordial leads may be useful for predicting the culprit artery in inferior wall acute myocardial infarction. Finally, it seems that they could not differentiate right coronary artery occlusion from distal left circumflex coronary artery occlusion in inferior wall acute myocardial infarction, although they did not fully discuss this. The differentiation of the above two conditions must be investigated in the future.

Future studies with a large population are needed to determine a useful criterion using a standard 12-lead electrocardiogram to identify not only the culprit artery but also the site of occlusion in inferior wall acute myocardial infarction showing ST segment elevation in the inferior leads.

References

