

Scintigraphic assessment of regional cardiac sympathetic nervous system in patients with single-vessel coronary artery disease

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In coronary artery disease, the cardiac sympathetic nervous system is closely associated with myocardial ischemia. I-123 metaiodobenzylguanidine (MIBG) imaging allows us to assess the cardiac sympathetic nervous system regionally. One-hundred and eleven patients with single-vessel disease underwent regional quantitative analysis of MIBG imaging before successful percutaneous transluminal coronary angioplasty (PTCA), and repeat angiography 6 months after PTCA. Based on the results of the follow-up left ventriculogram, patients were divided into 3 groups: 39 angina pectoris (AP), 48 prior myocardial infarction without asynergy (MI without asynergy) and 24 prior myocardial infarction with asynergy (MI with asynergy). AP and MI without asynergy had significant correlations between uptake parameters and regional washout in the territory of diseased vessels, among which the severity score in AP was the most closely correlated with regional washout ($r = 0.79$, $p < 0.0001$). These correlations disappeared in MI with asynergy. To compare regional MIBG parameters in the territory of the diseased vessel as well as in the territories of the other major coronary arteries among the 3 groups, we examined MIBG parameters in 57 patients with left anterior descending artery (LAD) disease selected from among the study patients. Regional washout in the territory of the LAD was significantly higher in the MI without asynergy group than in the other two groups. The left circumflex artery (LCX) region showed significantly reduced MIBG uptake and an increased extent score in the MI with asynergy group compared with the AP group, although only a difference in the extent score existed between the MI with asynergy group and the AP group in the right coronary artery (RCA) region. In addition, the global ejection fraction before PTCA showed a significant negative correlation with each regional washout rate. In this way, regional quantitative analysis of MIBG imaging can detect the regional differences in the cardiac sympathetic nervous system in coronary artery disease, which may be associated with the degree of regional left ventricular dysfunction due to myocardial ischemia.

Key words: myocardial ischemia, I-123 metaiodobenzylguanidine scintigraphy, myocardial viability