Prognostic value of hybrid cardiac perfusion SPECT/CT for patients with coronary artery disease after coronary artery bypass grafting

Y. Fukushima, Y. Ishii, T. Kiriyama, T. Nitta, S. Kumita

Nippon Medical School, Tokyo, Japan
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Introduction: Patients with coronary artery disease (CAD) undergoing coronary artery bypass grafting (CABG) occasionally experience recurrent myocardial ischemia. Because of their severe CAD and its complicated hemodynamics, conventional cardiac perfusion SPECT often cannot reveal the severity and prognosis solely. Hybrid cardiac SPECT/CT imaging simultaneously shows myocardial ischemia distribution, coronary artery lesion distribution, and their relationship, and this modality may enable detailed interpretation and risk stratification for such patients.

Aim: This study aimed to assess the prognostic value of hybrid cardiac SPECT/CT for patients with CAD and suspected myocardial ischemia after CABG.

Methods: A total of 201 consecutive patients, registered between April 2016 and September 2018, with suspected recurrent angina pectoris after CABG requiring examinations for myocardial ischemia were included in this study. Among these, 135 patients who underwent cardiac perfusion SPECT, cardiac CT, and hybrid cardiac SPECT/CT imaging were analyzed. In the SPECT-only analysis, SDS was calculated, and the patients were divided into none-to-mild (SDS <4) and moderate-to-severe ischemia (SDS ≥ 4) groups. In the SPECT/CT analysis, the patients were divided into a matched group (SPECT reversible accumulation defects [SDS ≥ 2] along coronary arteries with significant lesions) and an unmatched group (accumulation defects not coincided with coronary artery territories or no significant stenoses in the corresponding coronary arteries). All patients were observed from the time of these tests for the occurrence of major adverse cardiac events (MACE), and the prognostic performances of these analyses were compared.

Results: In the SPECT-only analysis, 62 were in the none-to-mild group and 73 were in the moderate-to-severe group. In the SPECT/CT analysis, 61 were in the matched group and 74 were in the unmatched group. Within the follow-up period of 29±8 months, 15 patients experienced MACE. The patients' prognoses were clearly stratified by hybrid SPECT/CT analysis (matched: 13/61, 21.3% vs. unmatched: 2/74, 2.7%) compared with SPECT-only analysis (moderate-to-severe: 11/73, 15.0% vs. none-to-mild: 4/62, 6.5%). The hybrid cardiac SPECT/CT analysis was more strongly associated with the occurrence of MACE compared with SPECT-only analysis (p=0.008 vs. p=0.04, respectively).

Conclusions: Hybrid cardiac SPECT/CT imaging can have higher prognostic value compared with stand-alone cardiac perfusion SPECT for patients with CAD after CABG.