Coronary arterial bypass graft patency evaluated by multi-detector computed tomography and magnetic resonance imaging

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The progression of atherosclerosis of the coronary artery does not stop after coronary arterial bypass grafting (CABG) surgery. In contrary, new stenotic lesions or even occlusions could develop more quickly in the native artery segment proximal to the insertion site of the graft. Other lesions could develop at the native arterial segment beyond the insertion site of the graft or on the graft itself, especially if this is a saphenous vein graft. New lesions on an arterial graft were less common. A few months, one year, or a few years after CABG, when the symptoms of coronary heart disease (CAD) re-occur, a thorough assessment of the patency of the grafts or native coronary arteries is indicated. Then, complete revascularization is needed in order to decrease short and long term morbidity and mortality.

In assessing the patency of native coronary artery and grafts, the 16-slice CT angiogram (CTA) showed a high accuracy in detecting patency or occlusion. A 64-slice CTA can give better visualization of coronary bypass grafts and their patency. However, both 16-slice and 64-slice CT still had limitations in evaluating lesions at the insertion site or at the distal run-off due to presence of clips or calcification. Recent publications indicated that the 64-slice CT is excellent in evaluating patency of both arterial and venous grafts. It can accurately exclude any lesion greater than 50% stenosis. However, detection of distal anastomotic stenosis is still limited.

In general, scan with persantine stress magnetic resonance imaging (MRI), first pass, and delay enhancement scans showed clearly the myocardial ischemia and infarction regions as reported in this issue. The MRI delay enhanced scan can outline in particular the scar area due to infarction with high accuracy; so it is not difficult to match the ischemic territory with coronary lesion on multi-detector computed tomography (MDCT), and the culprit vessel could be identified and confirmed. In this way, the feasibility, possibility, or necessity of revascularization could be decided immediately, on-line rather than off-line. In the work-up of cardiac problems, combination of both modalities probably is the ideal situation, i.e., one step examination for heart disease.

Except for the radiation exposure and iodinated-contrast renal toxicity of MDCT, some limitations of MRI should be considered, for example implanted mental devices such as a pacemaker, and particularly the intracranial brain clips indicated in the paper. Furthermore, the CT and MRI are quite expensive both in developing or developed countries, and it seems they cannot serve as screening tools to patients after CABG surgery. Further studies may be needed to clarify indications for the group of patients with CABG considering the symptoms and results of ECG and echocardiography.

References