

Multislice Spiral Computed Tomography for In-Stent Restenosis

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A 72-year-old man was admitted for recurrent episodes of chest pain 3 months after stent deployment in the left anterior descending (LAD) artery. The patient underwent a computerized tomographic (CT) examination of the thorax with a multislice spiral CT scanner (MSCT) (Somatom Volume Zoom, Siemens). A dynamic study was performed with acquisition of 20 scans at the level of the LAD distal to the stented segment during injection of 20 mL of nonionic contrast medium (370 mgI/mL); the resultant time-density curves were suggestive of high-grade stenosis (Figure 1A). Thereafter, a cardiac CT scan with retrospective electrocardiographic gating and injection of 110 mL of contrast medium was performed. Axial images were reconstructed with an absolute delay of 400 ms before the next R-wave. Three-dimensional volume-rendered images were also ob-

tained; 2 overlapping stents were identified in the mid LAD without lumen reduction at the margins (Figures 2A and 2B). Coronary angiography documented a subocclusive in-stent restenosis, with TIMI (thrombolysis in myocardial infarction) grade 2 flow in the LAD. Rotational atherectomy followed by adjunctive angioplasty was performed, without residual stenosis. Before discharge, the patient underwent a second MSCT scan, which showed good opacification of LAD distal to the stented segment, whereas the repeated time-density curves were consistent with the absence of stenosis in LAD (Figure 1B). Although an accurate evaluation of in-stent lumen remains problematic, MSCT is a promising noninvasive technique that may provide useful information on stent localization, functional relevance of in-stent restenosis, and the status of coronary lumen close to stent margins.

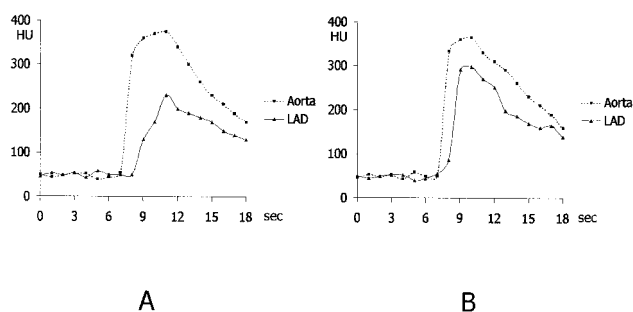


Figure 1. MSCT dynamic study. A, Compared with the ascending Aorta, distal LAD artery time-density curve showed a slower slope and a delayed peak density, suggestive of high-grade stenosis. HU indicates Hounsfield Units. B, After repeat percutaneous intervention, the two curves paralleled, documenting absence of residual stenosis.

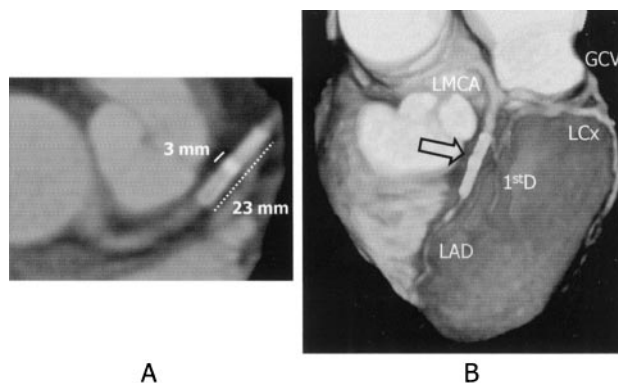


Figure 2. MSCT images. A, CT axial scan through the aortic root showed 2 stents in the mid left anterior descending (LAD); total length was 23 mm (dotted line) with a 3-mm overlapping segment (solid line). B, 3-D rendering of the heart and coronary arteries with manual segmentation of cross-sectional images. Left coronary system can be identified. LMCA indicates left main coronary artery; LCx, left circumflex; 1stD, 1st diagonal branch; and GCV, great cardiac vein. The stented segment (arrow) is localized in the mid LAD.

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