

CT angiography for coronary graft assessment

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We read with interest the article “CT angio for the evaluation of graft patency” by Di Lazzaro and Crusco (1) in the April 2017 issue of the Journal of Thoracic Disease. The authors describe technological advances of modern computed tomography (CT) systems as well as the high accuracy for coronary artery bypass graft (CABG) assessment, making CT angiography a noninvasive alternative of choice to catheter coronary angiography in patients with CABG, in clinical settings as nicely reviewed by the authors, but also in the context of research protocols.

As mentioned by Di Lazzaro and Crusco (1), catheter coronary angiography is the standard of reference and preferred method for CABG evaluation in acute clinical settings, with the immediate options to invasively evaluate or treat obstructive disease. Catheter angiography is still associated with a small risk of serious events, and assessment of CABG is technically slightly more challenging than for native vessels (2).

Recent technological developments in the field of CT imaging yield excellent sensitivity and specificity rates of $\geq 96\%$ for the detection of graft failure, as compared to catheter angiography (1). First, vendors developed CT systems with shorter gantry rotation times or with dual-source X-ray tubes, thus improving the temporal resolution, which is a critical parameter for native coronary artery or graft CT imaging. Second, CT imaging of CABG requires longer coverage than imaging of the native coronary arteries, in order to evaluate both mammary and venous grafts in the same acquisition as the native coronary beds. Studies showed the added benefit of using large coverage scanners in this setting, such as 256- (3), 320-slice single-source (4) or 192-slice dual-source (5) CT scanners. Third, latest technological advances such as prospective ECG-

gating and iterative image reconstruction drastically reduced patient radiation exposure with the latest generations of CT scanners. For example, studies using 128- and 192-slice dual-source CT scanners for imaging of CABG reported effective doses of 2.3 and 3.8 mSv, respectively (5,6), which is less than the 8.8 mSv reported for catheter angiography (7).

Finally, we would like to underscore that another significant asset of CT is its high relevance when graft imaging is needed for research applications, as shown by recent works by multidisciplinary groups, as well as ours. CT has been used with success in randomized trials assessing novel graft strategies (8), to compare off-pump versus on-pump CABG techniques (3,9) or to assess antiplatelet therapy or other drug strategies on graft patency (10). It can be considered as the option of choice when researchers want to systematically assess CABG patency in asymptomatic patients who are not acutely at risk for graft dysfunction.

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Footnote

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