



Inner Spaces

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Special points of interest:

- Cardiac CT as performed on a 64-slice CT, is an excellent modality for assessing the status of post-bypass grafts.
- Both arterial and venous grafts are accurately assessed.
- The proximal and distal anastomoses are well seen.
- There are situations, especially with venous grafts, where cardiac CT may in fact be superior in delineating the grafts.

More reading & viewing

- More references discussing and more cases showing the use of cardiac CT in post-CABG analysis at www.ctcardiac.com



64-Slice Cardiac CT for Post-CABG Graft Assessment

64-slice cardiac CT is an excellent technique for evaluating the coronary arteries. It has a predictive value for ruling out coronary artery disease, of approx. 97-99%. It is also an excellent tool for the evaluation of the status of bypass grafts, both arterial and venous (Figs. 1, 2).

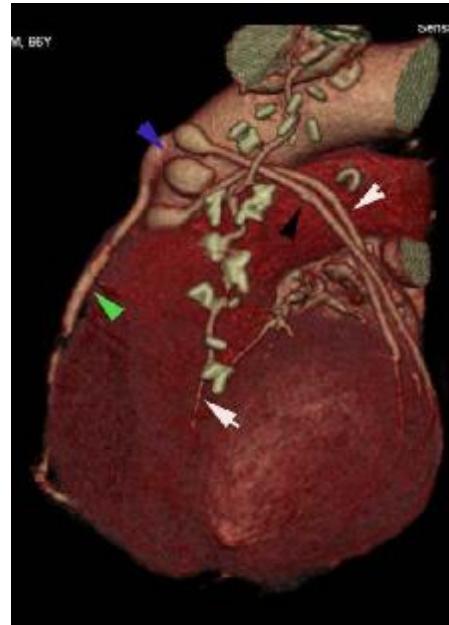


Fig. 1. Cardiac CT shows a normal LIMA-LAD graft (white arrow), with normal SVG-OM grafts (white and black arrowheads), an SVG-Dg graft occluded at its origin—(blue arrowhead) and a patent SVG-RCA graft (green arrowhead).



Fig. 2. Cardiac CT shows an occluded LIMA-LAD graft from its origin—the white arrows point to the suture clips and the arrowhead to the visualized LAD

Numerous studies [1-3] have now shown that cardiac CT can accurately evaluate the proximal and distal anastomoses as well as the presence of graft disease, such as stenoses, occlusions and plaque formation.

A post-graft CT scan is performed from the origin of the LIMA graft from the left subclavian artery to the base of the heart. If only venous grafts have been placed, then the coverage can be reduced. The technique requires a 14-19 secs. breath-hold and an injection of approx. 70-95cc of iodinated contrast medium. Color volume rendered images are obtained to depict the course and status of the grafts in detail. Beta blockers are used before the scan to reduce the heart rate to below 65 or to the lowest rate achievable.

Apart from the status of the grafts, a post-CABG CT allows assessment of the relationship of the LIMA or RIMA to the sternum, the depth of the aorta from the sternum and the presence of other vascular anomalies or variants.

Usually, the bypassed vessels are calcified and atrophied and cannot be further assessed. However, the non-bypassed vessels need to be closely looked at, so that new disease is not missed (representative case up at www.ctcardiac.com).

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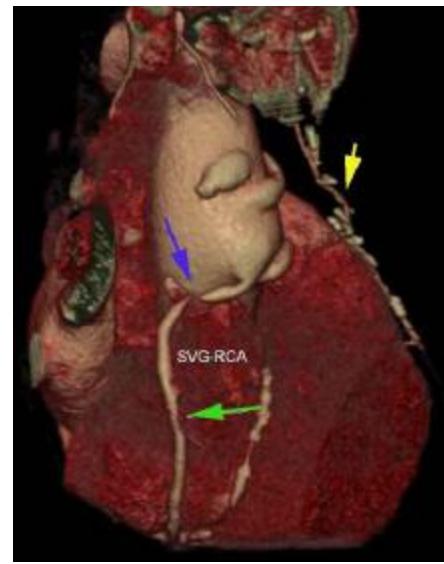
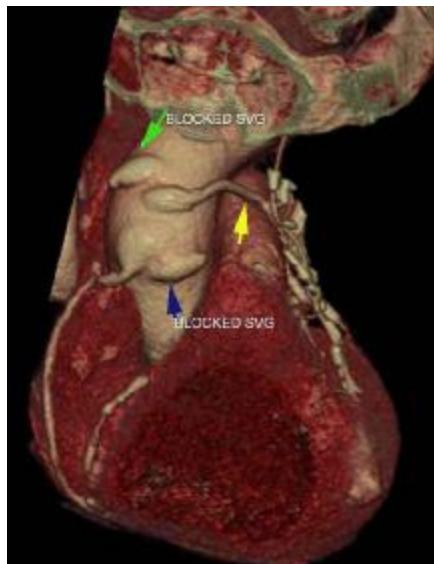


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Saphenous vein grafts are often difficult to engage during catheter angiography. In such situations, cardiac CT is actually superior to catheter angiography for the delineation of graft vessels (Figs. 3, 4).



Figs. 3 (A,B). This patient had a CABG done 15 years ago—five years back his SVG-OM graft was stented during an episode of chest pain and he was thought to have patent LIMA-LAD and SVG-OM grafts and two blocked SVG grafts. In 2005, he had chest pain again. The catheter angiogram revealed two occluded SVG grafts and a patent LIMA-LAD and SVG-OM, which was again stented in its mid-portion. When he came for a cardiac CT, the study showed patent SVG-OM (yellow arrow in A) and LIMA-LAD (yellow arrow in B) grafts and two occluded SVG grafts (green & blue arrows in A). However, he had one more graft, an SVG-RCA (B) with one severely stenotic (blue) and one moderately stenotic (green) lesions. A review of the operation notes finally confirmed these findings. The lesions were stented and the pain disappeared.

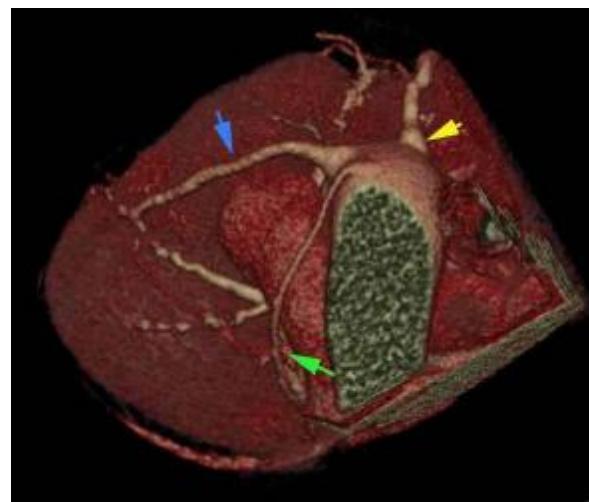


Fig. 4: This patient was to undergo hip surgery and had a history of a CABG 12 years ago, with no operative notes. He had mild chest pain and a catheter angiogram showed a normal SVG-RCA and SVG-OM, but no other graft could be found / engaged. The LIMA was not grafted to any artery and was normal. The LAD was occluded proximally. To confirm a grafted LAD, a cardiac CT was performed. It showed an SVG-LAD graft (blue arrow), which was normal and patent , along with the SVG-RCA (yellow arrow) and SVG-OM (green arrow) grafts.

REFERENCES:

1. Martuscelli et al. Circulation 2004; 110: 3234.
2. Aviram G. Annals Thoracic Surg 2005; 79: 589
3. Song MH. Annals Thoracic Surg 2005; 79: 585

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