

# One stop non-invasive imaging of coronary artery bypass graft occlusion and ischaemia with combined $^{82}\text{Rb}$ positron emission tomography/coronary computed tomography

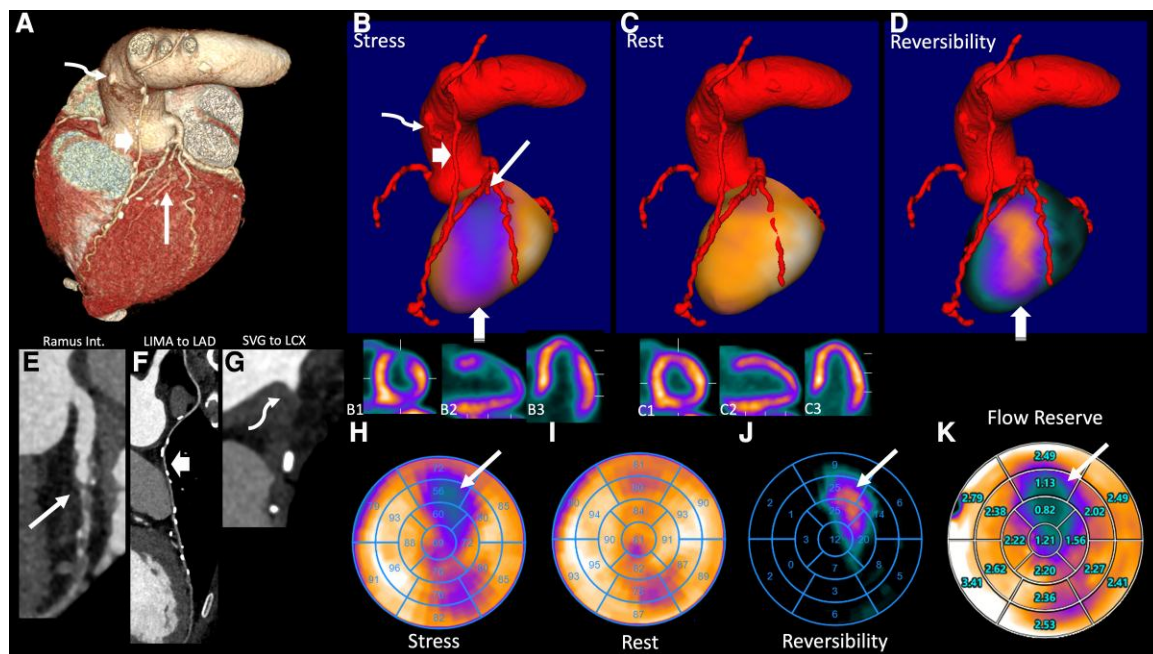
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A 61-year-old male patient with severe three-vessel coronary artery disease and coronary artery bypass graft (CABG) [left internal

mammary artery (LIMA) to left anterior descending artery (LAD), saphenous vein graft (SVG) to left circumflex artery (LCX), and jump



**Figure 1** Coronary computed tomography (cCT) (A) showed recurrent occlusion of the vein graft (curved arrow), patent LIMA–LAD graft (thick arrow), and severely stenosed ramus intermedius (RI) (thin arrow). Hybrid 3D positron emission tomography (PET)/cCT fusion images (B: 3D hybrid fused stress; B1–3: stress slices; thick arrow: LIMA–LAD graft, curved arrow: occluded vein graft, thin long arrow: RI, bottom arrow: anterior ischaemia; C: rest, C1–3: rest slices, D: reversibility) identify that the ischaemia matches to the territory of the RI. The PET (H: stress polar plot, I: rest, J: reversibility) showed significant anterior and minor inferolateral ischaemia and reduced myocardial stress flow and flow reserve (K: flow reserve polar plot) in the anterior wall. The cCT with severely stenosed RI (E), patent LIMA–LAD (F), and occluded vein graft (G).

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to ramus intermedius (RI)] nine months earlier was referred for evaluation of atypical chest pain. Seven months before vein bypass occlusion was treated with aspiration and stenting. Combined sequential  $^{82}\text{Rb}$  positron emission tomography/coronary computed tomography (PET/cCT) on a Biograph Vision 600 Edge (128 slice CT scanner, Siemens Healthcare) was performed with regadenoson stress. The PET showed significant anterior and minor inferolateral ischaemia and reduced myocardial stress flow and flow reserve in the anterior wall. The cCT showed recurrent occlusion of the vein graft, patent LIMA–LAD graft, and severely stenosed RI. Hybrid 3D PET/cCT fusion images identified that the ischaemia matches to the territory of the RI. Invasive coronary angiography with successful stenting of the RI was performed.

There is a considerable rate of ischaemia driven events potentially requiring recurrent interventions among CABG patients.<sup>1</sup> Non-invasive ischaemia testing in those patients remains challenging, and therefore often direct invasive angiography is performed.<sup>2,3</sup> Combined quantitative functional and anatomic imaging with PET/cCT provides important complementary information (extent of regional ischaemia, myocardial blood flow/flow reserve, detailed information about graft patency, and the native coronary anatomy). Furthermore, hybrid 3D visualization enables precise assignment of the ischaemic territory to the culprit vessel, helping to guide the treatment.<sup>4,5</sup> The PET/cCT represents a powerful, probably still underutilized, non-invasive imaging tool, which permits fast and rather precise assessment of CABG patients with suspected ischaemia (Figure 1).

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## Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

Informed general patient consent for publishing the data was obtained.

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