



Quantitative Myocardial Perfusion with PET

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Case 1

Patient history

A 76-year-old patient with known two-vessel CAD and severely impaired ejection fraction. History of PCI/stenting of the RCA and LAD. Referred for PET because of typical angina.

Acquisition

System: Discovery™ MI. PET MPI with 392 MBq $^{13}\text{N-NH}_3$ for stress (adenosine) and 250 MBq for rest and PET FDG for viability testing with 199 MBq $^{18}\text{F-FDG}$.

Findings

Semiquantitative PET MPI shows a fixed perfusion defect in the apical and anteroapical wall that is slightly larger during adenosine near the anterolaterobasal border. Quantitative PET findings match the regional findings nicely. FDG PET shows no, to minimal, uptake in the areas of the fixed perfusion defect.

Gated PET (NH_3 stress/rest as well as FDG) shows LVEF is 31% with severely hypokinetic/akinesia in all apical segments. A diagnosis was reported of an apical/anteroapical myocardial scar without viability with a minimal adjacent area of ischemia in the very anterolaterobasal wall.

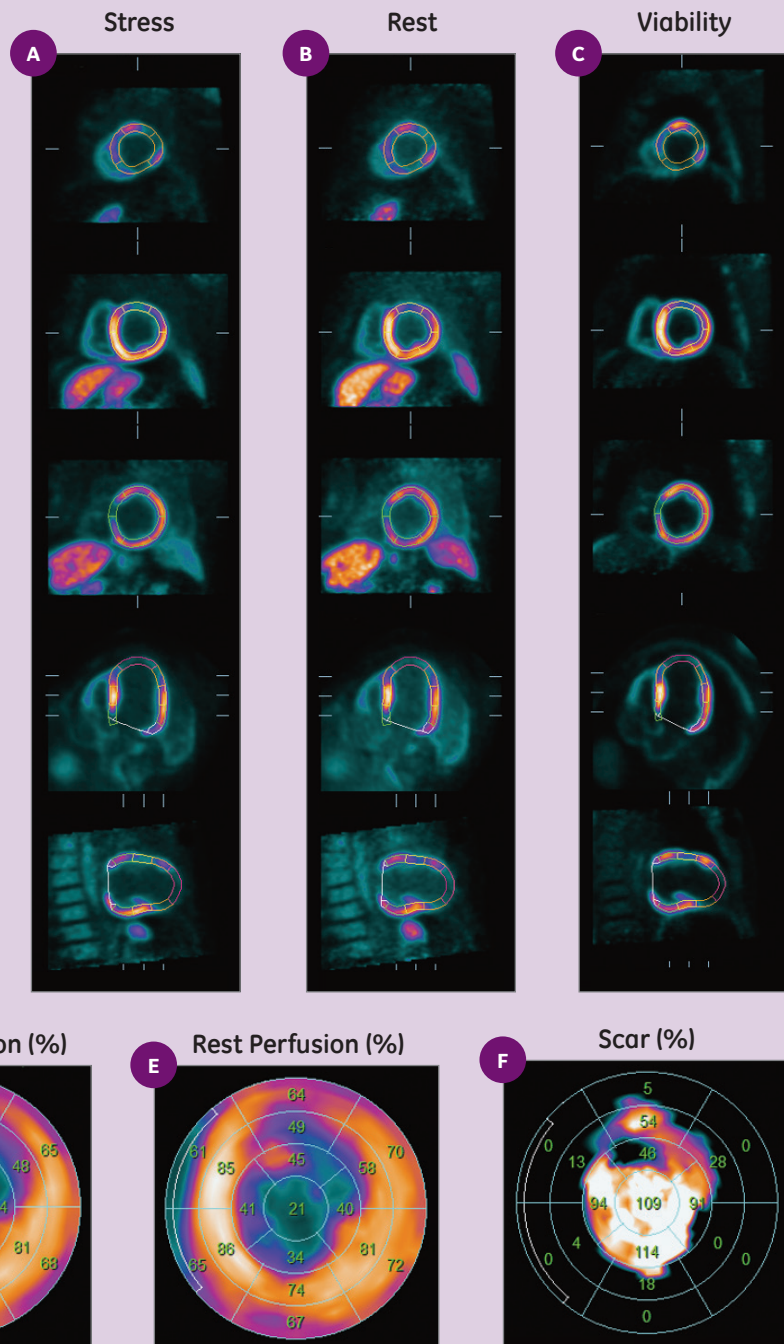


Figure 1. PET MPI demonstrates a fixed perfusion defect in the apical and anteroapical wall. There is no, to minimal, uptake in the areas of the fixed perfusion defect.



Case 2

Patient history

A 59-year-old male with known two-vessel CAD disease and chronic occlusion of the LAD and the RCA. Collaterals via LCX. Referred for hybrid PET/CCTA shortly after invasive coronary angiography for documentation of the length of the lesion and question for ischemia.

Acquisition

System: Discovery MI. PET MPI with 198 MBq $^{13}\text{N-NH}_3$ for stress (adenosine) and 305 MBq for rest (1.01 mSv). Coronary CT angiography on RevolutionTM CT with 60 ml Visipaque 320 at 0.95 mSv. BMI 34 kg/m².

Findings

PET MPI shows inhomogeneous perfusion at rest, but a massive perfusion defect during adenosine comprising the entire anterior, septal and inferior wall of the LV myocardium (>50% of the left ventricular myocardium). The MBF findings show a steal phenomenon, with the MBF being lower during maximal coronary dilation in the areas subtended by the LAD and RCA. Additionally, there may be some patchy areas of non-transmural scar in the inferior and anteroseptal wall. Normal LVEF and normal perfusion in the LCX territory. ■

	Str Flow	Rst Flow	CFR
LAD	0.68	0.72	0.95
LCX	1.78	0.84	2.11
RCA	0.85	0.58	1.46
TOT	0.99	0.72	1.35

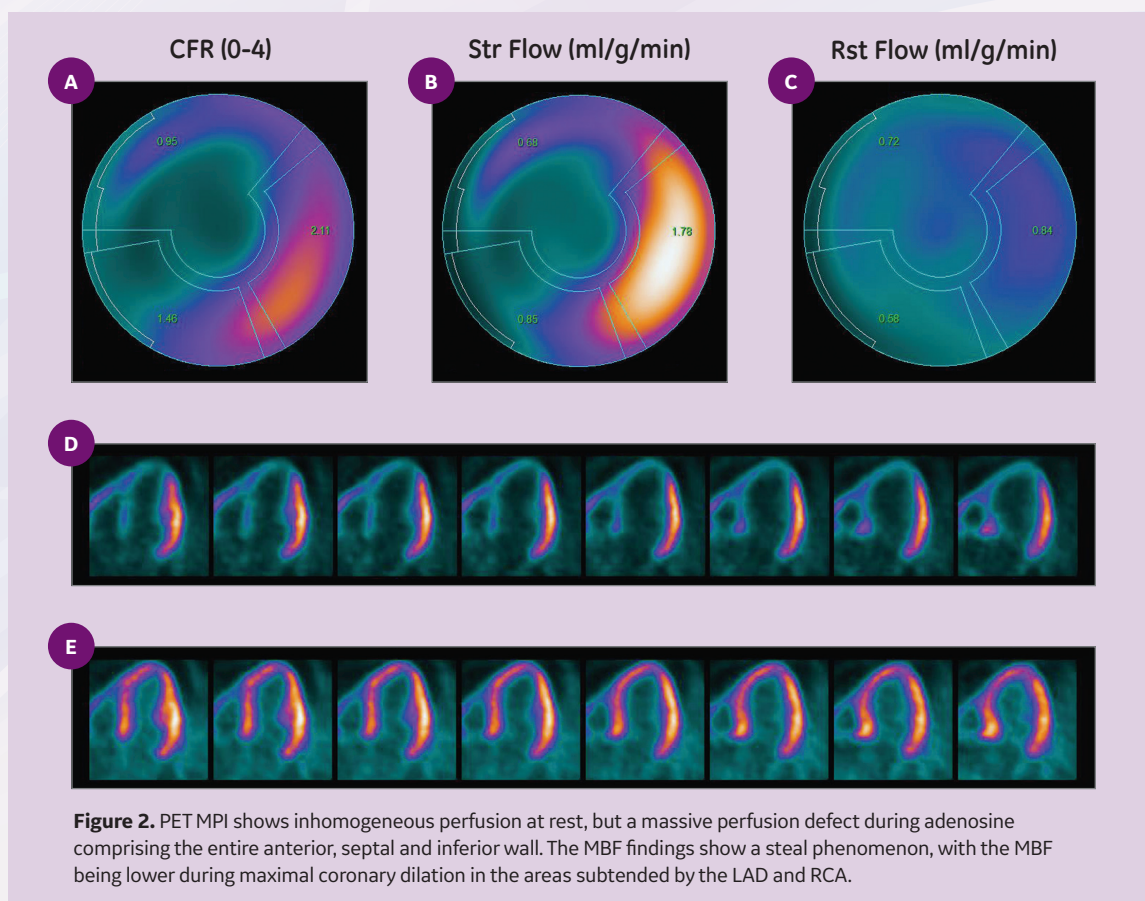


Figure 2. PET MPI shows inhomogeneous perfusion at rest, but a massive perfusion defect during adenosine comprising the entire anterior, septal and inferior wall. The MBF findings show a steal phenomenon, with the MBF being lower during maximal coronary dilation in the areas subtended by the LAD and RCA.