Study population

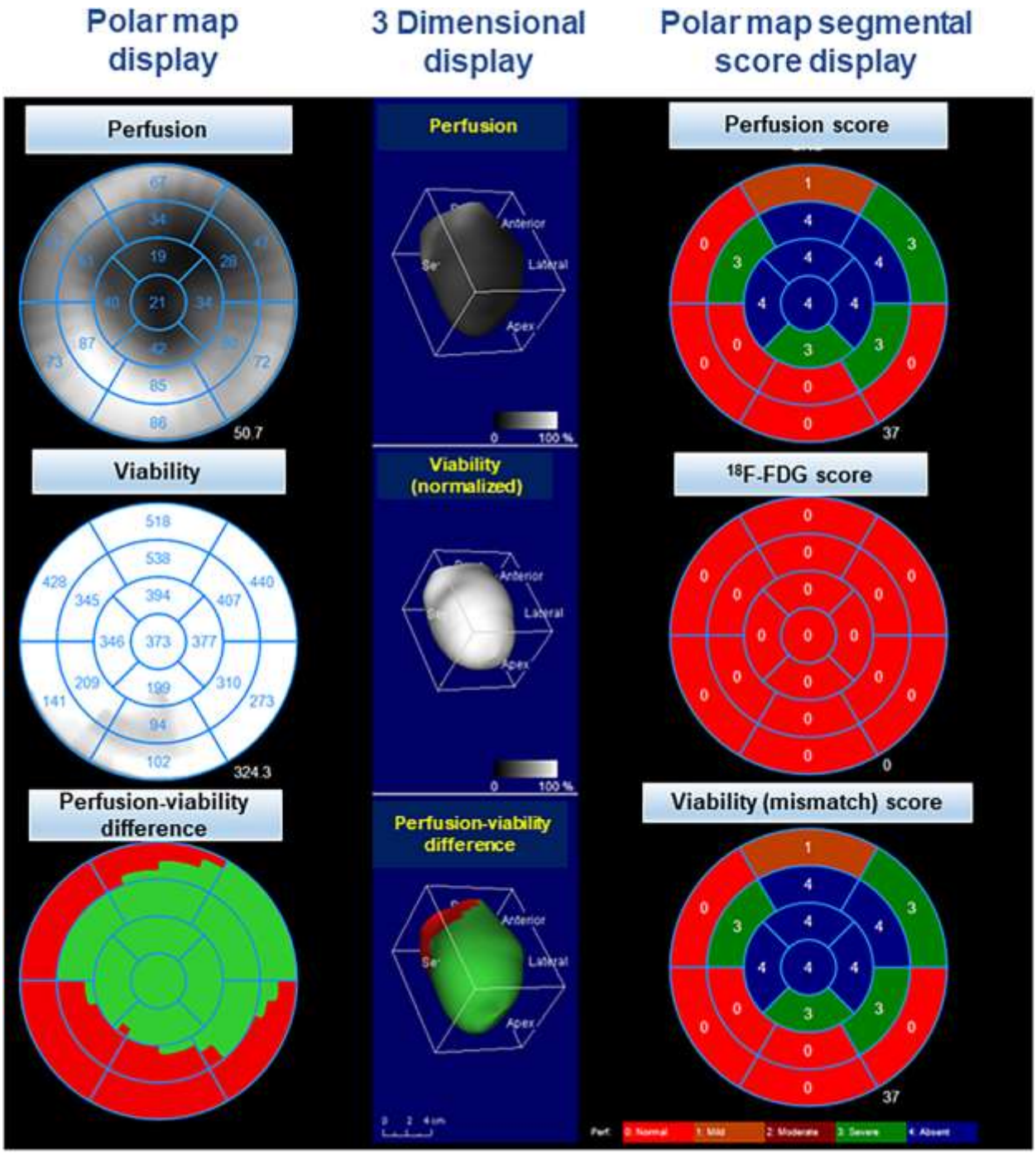
All patients had ICM documented angiographically with coronary artery stenosis defined as ≥50% narrowing in the left main and/or proximal epicardial coronary arteries or their major branches; reduced left ventricular ejection fraction, regional resting perfusion deficit on ^{99m}Tc-SPECT/CT; and/or a history of myocardial infarction. Left ventricular wall motion and ejection fraction (LVEF) were evaluated by standard 2-dimensional echocardiography

SPECT Perfusion Imaging

For myocardial perfusion assessment, patients underwent ^{99m}Tc-tetrofosmin SPECT/CT at rest either the day before or on the same day before the scheduled ^{18}F-FDG PET/CT study. ^{99m}Tc-tetrofosmin (20 mCi) was administered intravenously (1). Forty minutes later, each patient was positioned supine under a SPECT/CT camera (Discovery NM/CT 670CZT or 670 Pro; or Optima NM/CT 640; or GE Healthcare, Chicago, IL) and standard parameters were used. Using SPECT/CT for myocardial perfusion imaging allowed optimal attenuation correction, minimizing attenuation artifacts that could have led to false perfusion-metabolism mismatch interpretations. The projection data were then reconstructed with 2D-ordered-subset expectation maximization (2D-OSEM) with 4 iterations 6 subsets into transaxial views by applying a Butterworth filter with a cutoff frequency of 0.4/cm with order of 5.0. Subsequently, transaxial views were transferred to the HERMES software for analysis with ^{18}F-FDG PET data using Corridor 4DM (INVIA Medical Imaging Solutions, Ann Arbor, MI, USA).

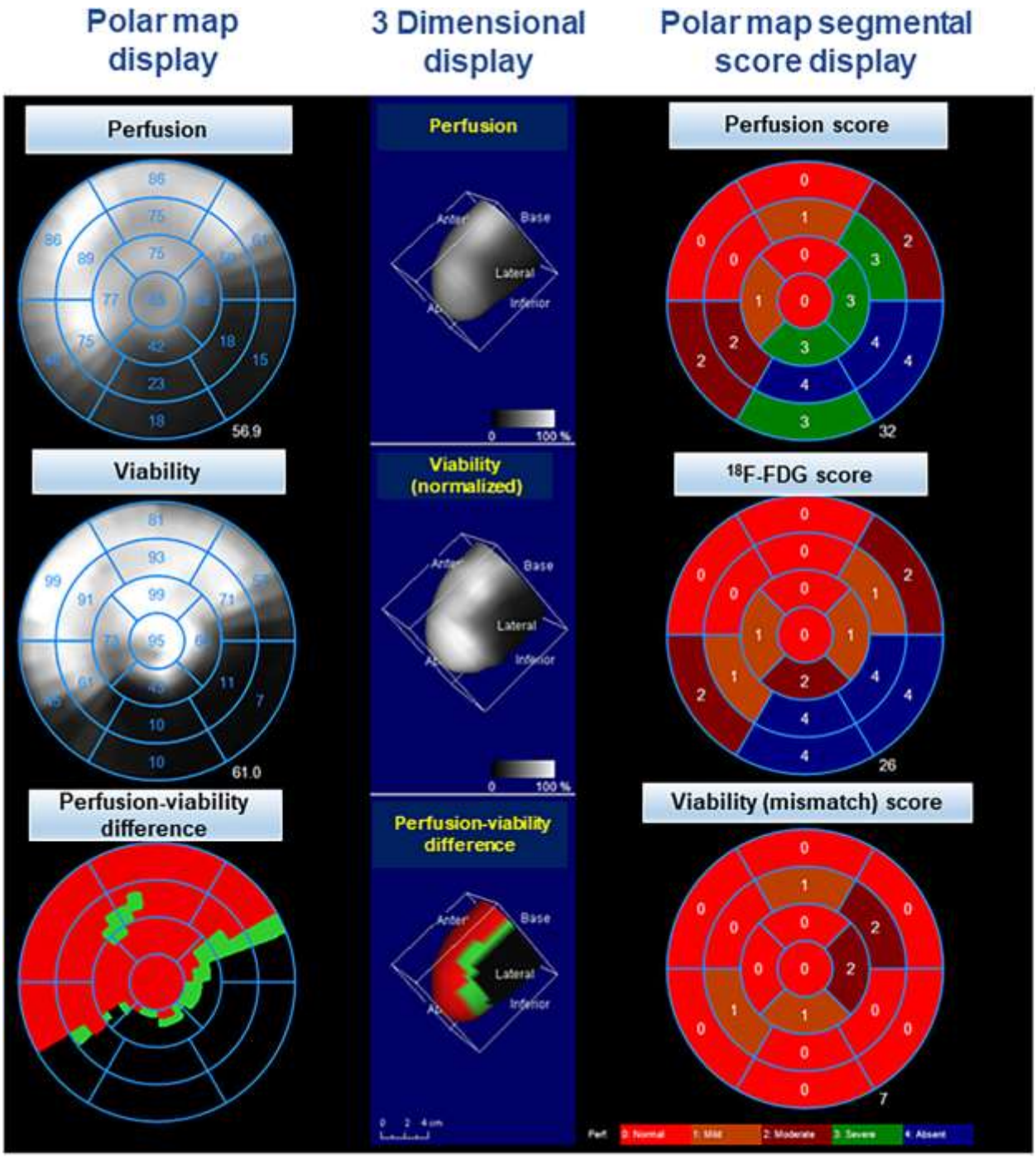
^{18}F-FDG PET Scan

^{18}F-FDG was used as radiotracer of myocardial glucose consumption to identify the viability state. PET/CT (either Biograph TruePoint/TrueView or Biograph mCT, Siemens, Knoxville, TN), which acquires 109 transaxial images simultaneously in one bed position of 21.6cm, was used to determine cardiac ^{18}F-FDG uptake. Images were reconstructed with and without attenuation correction with the 3D-ordered-subset expectation maximization (3D-OSEM 2 iterations – 21 subsets) algorithm with resolution recovery (PSF) and time of flight (TOF on mCT) in a 168x168 matrix (TrueoPoint/TrueView) or 200x200 matrix (mCT) with a zoom of 1 and a 1-mm Gaussian post-reconstruction filter. Following the metabolic preparation protocol, 10mCi of ^{18}F-FDG were injected i.v. and after an uptake period of at least ≈ 60 min in all patients and up to 90 min in diabetic patients, if PET scheduling allowed, a 10-min PET acquisition was performed. The CT for attenuation correction was performed with an effective tube current of 50 mAs, voltage of 120 kVp, 0.80 pitch, and 28.8mm collimation.



Supplemental Figure 1. Corresponding to the images shown in Figure 3, the polar map and three-dimensional display of the rest myocardial perfusion SPECT/CT images with ^{99m}Tc-tetrofosmin and ^{18}F-FDG PET/CT images in a patient with dilated ischemic cardiomyopathy, demonstrate a *"mismatch"*.

As can be appreciated, quantification of rest perfusion with ^{99m}Tc-tetrofosmin demonstrates a large (11- segments) and severe perfusion defect (summed rest score: 37) in the predominantly akinetic antero-septo-apical, apical, and anterolateral walls *(upper panel)* associated with normal or upregulated ^{18}F-FDG-uptake (score: 0) *(middle panel)* that signifies a large area of "mismatch" indicative of hibernating-stunned myocardium *(lower panel)*. The quantitative evaluation approach with the normalization of the ^{18}F-FDG-uptake to myocardial perfusion and the "mismatch" quantification affords an accurate evaluation of the extent and severity of ischemic compromised but viable myocardium likely to benefit from restoration of coronary flow both functionally and prognostically.



Supplemental Figure 2. Corresponding to the images shown in Figure 4, the polar map and three-dimensional display of the rest myocardial perfusion SPECT/CT images with ^{99m}Tc-tetrofosmin and ^{18}F-FDG-PET/CT images in a patient with ischemic cardiomyopathy, demonstrate a predominant *"match"*.

Quantification of rest perfusion with ^{99m}Tc-tetrofosmin demonstrates a large (12-segments) and severe perfusion defect (summed rest score: 32) in the predominantly akinetic inferior and inferolateral walls with mild extension inferoseptally and laterally *(upper panel).* This is paralleled by predominant absence of ^{18}F-FDG-uptake (score 26) *(middle panel)* that denotes a large area of "match" reflecting predominantly transmural necrosis (low residual mismatch score: 7) *(lower panel),* unlikely to benefit from coronary revascularization.