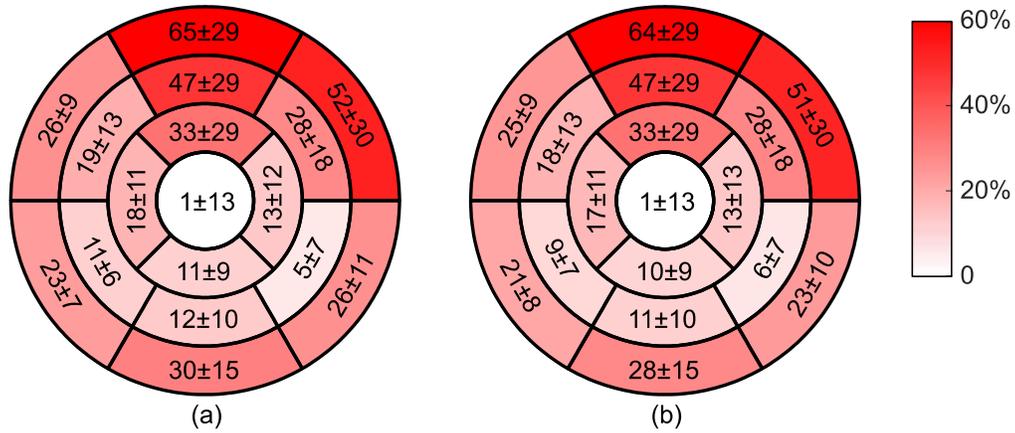


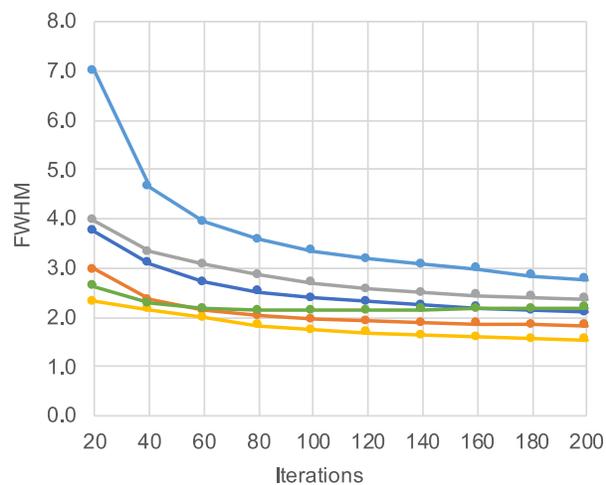
Supplemental Figure 1. Contrast recovery coefficient (CRC) and contrast-to-noise ratio (CNR) between healthy myocardium and transmural viability defects for five cardiac patients, for the NMC-MLEM-63, MC-MLEM-200- μ -reg-gated and proposed anatomically guided motion-compensated method (MC-guided-MAPEM- μ -reg-gated). The proposed method improves CRC by 18.6% on average and CNR by 47.7% compared to the conventional reconstruction (NMC-MLEM-63).



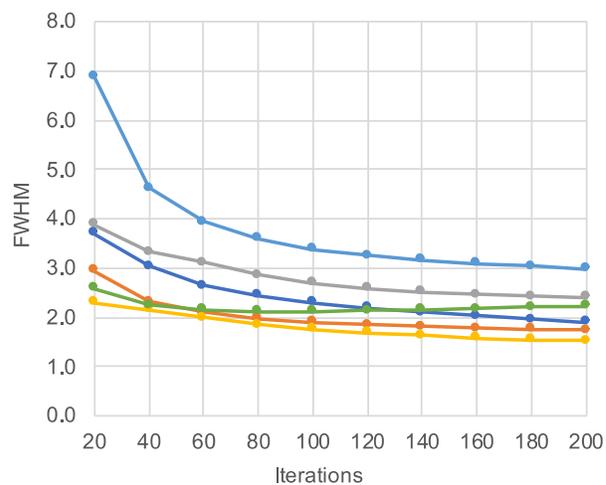
Supplemental Figure 2. 17 segment analysis showing the relative difference in PET uptake values between (a) MC-MLEM-200- μ -reg-gated and NMC-MLEM-63, and (b) the proposed MC-guided-MAPEM- μ -reg-gated method and NMC-MLEM-63. While an overall increase of $\sim 17\pm 9\%$ was observed for both MC-MLEM-200- μ -reg-gated and MC-guided-MAPEM- μ -reg-gated methods, some areas of the left ventricle myocardium show a significantly larger increase than others, with an $\sim 15\%$ increase at the apical segments to over 60% increase in the basal anterior segment.

	$\overline{\text{FWHM}}$	p -value
NMC-MLEM-63	3.81±0.95	-
NMC-MLEM-63- μ -reg	3.73±0.93	0.097 (↓)
NMC-MLEM-200- μ -reg	3.54±1.01	0.008 (↓)
MC-MLEM-200- μ -reg	3.35±0.90	0.064 (↓)
MC-MLEM-200- μ -reg-gated	2.74±0.73	1.44×10 ⁻⁵ (↓)
MC-guided-MAPEM- μ -reg-gated	2.81±0.60	0.268 (↑)
*	-	9.48×10 ⁻⁸ (↓)

Supplemental Table 1: Statistical analysis of the effect of the comparative methods in terms of myocardial sharpness. For each method, the mean FWHM ($\overline{\text{FWHM}}$) over three profiles selected for each oncology patient are listed, along with an uncertainty given by the standard deviation over all profiles. p -values from two-tailed paired t -tests are shown, along with the sign of the change (↑ for positive, ↓ for negative), comparing the method in each row with the previous row. Final row (*) shows p -values comparing the proposed method with the clinical standard NMC-MLEM-63.



(a) MC-MLEM-200- μ -reg-gated



(b) MC-guided-MAPEM- μ -reg-gated

Supplemental Figure 3. Myocardial sharpness measured as full-width at half-maximum (FWHM) for selected profiles through the left ventricle myocardium including apical, mid, and basal regions. in a representative patient for (a) MC-MLEM-200- μ -reg-gated and (b) the proposed MC-guided-MAPEM- μ -reg-gated method as a function of the number of iterations. In both cases, the FWHM consistently decreases with increasing number of iterations, suggesting that inconsistencies in the motion estimation step do not distort the resulting images.