MCAD: Multi-modal Conditioned Adversarial Diffusion Model for High-Quality PET Image Reconstruction (Supplementary Material)

A. Clinical Evaluation Metrics

In clinic, doctors often need to focus on the uptake of tracers in specific regions for diagnosis and treatment. Accordingly, to further prove the clinical quality of reconstructed images, we involve standard uptake value (SUV) as a reference indicator, utilizing biases of SUV_{mean} and SUV_{max} for quantitative evaluation of region recovery. Here, SUV_{mean} is calculated from the average value of all voxels in selected region of interest (ROI), whereas SUV_{max} is determined by the single voxel with the highest uptake. The formula for bias calculation is defined as:

$$Bias = (SUV_m^d - SUV_m^r)/SUV_m^r \times 100\%. \tag{S.1}$$

where the subscript m stands for either $mean$ or max value. SUV_m^d represents the SUV value of the predicted PET image and SUV_m^r represents that of the real SPET image. A smaller bias indicates a greater similarity between the ROI of the output PET image and that of the real SPET.

B. Clinical Evaluation Results

We compare the biases of SUV_{max} and SUV_{mean} on one ROIs located in the right frontal lobe. The comparative histograms are depicted in Fig. S1. Here, we present the absolute values of the biases for better comparison. It can be found that our method achieves the lowest biases in terms of both SUV_{max} and SUV_{mean}, indicating that the differences in specific regions between the predicted and real SPET images are minimal. This highlights the ability of our method to accurately recover small regions and showcases its potential in aiding clinical procedure.
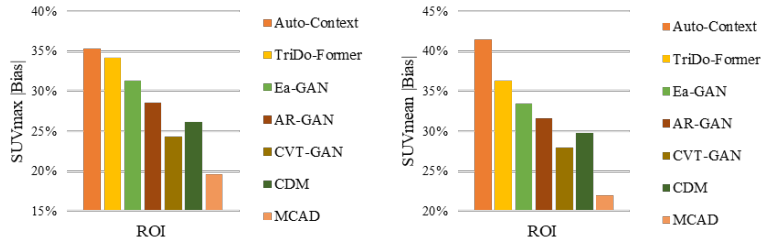

Fig. S1. Comparisons of the absolute values of SUV_{max} and SUV_{mean} biases between various leading PET reconstruction methods and our approach.