Iodine-123 metaiodobenzylguanidine imaging and carbon-11 hydroxyephedrine positron emission tomography compared in patients with left ventricular dysfunction.

Although both (123)I-metaiodobenzylguanidine ((123)I-MIBG) imaging and (11)C-hydroxyephedrine ((11)C-HED) positron emission tomography (PET) are used for assessing cardiac sympathetic innervation, their relationship remains unknown. The aims were to determine whether (123)I-MIBG parameters such as heart-to-mediastinum ratio (H/M) are associated with quantitative measures by (11)C-HED PET and to compare image quality, defect size, and location between (123)I-MIBG single-photon emission computed tomography (SPECT) and (11)C-HED PET. Twenty-one patients (mean left ventricular ejection fraction, 39 ± 15%) underwent (123)I-MIBG imaging and (11)C-HED PET. Early (15-minute), late (3-hour) H/M, and washout rate (WR) were calculated for (123)I-MIBG. Myocardial retention and WR was calculated for (11)C-HED. Using a polar map approach, defect was defined as the area with relative activity<60% of the maximum. Both the early (r=0.76) and late (r=0.84) (123)I-MIBG H/M were correlated with (11)C-HED retention. (123)I-MIBG WR was correlated with (11)C-HED WR (r=0.57). Defect size could not be measured in 3 patients because of poor quality (123)I-MIBG SPECT, whereas (11)C-HED defect was measurable in all patients. Although
defect size measured by early or late (123)I-MIBG SPECT was closely correlated with that by (11)C-HED PET (early: r=0.94; late: r=0.88), the late (123)I-MIBG overestimated defect size particularly in the inferior and septal regions. (123)I-MIBG H/M gives a reliable estimate of cardiac sympathetic innervation as measured by (11)C-HED PET. Furthermore, despite the close correlation in defect size, (11)C-HED PET appears to be more suitable for assessing regional abnormalities than does (123)I-MIBG SPECT.