ABNORMAL CORONARY BLOOD FLOW BY 82RUBIDIUM POSITRON EMISSION TOMOGRAPHY MYOCARDIAL PERFUSION IMAGING CORRELATES WITH LEFT VENTRICULAR DYSSYNCHRONY IDENTIFIED BY SPECKLE TRACKING ECHOCARDIOGRAPHY

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Background: LV dyssynchrony (DYS) is an important determinant of prognosis in heart failure and can be quantified by parameters derived from 2D speckle tracking echocardiography (STE). Positron emission tomography (PET) myocardial perfusion imaging with 82Rb is an accurate noninvasive method of determining myocardial blood flow (MBF) and coronary flow reserve (CFR). The pathophysiologic basis of DYS, as related to abnormalities in the distribution of MBF, have not been explored.

Methods: We analyzed data from 77 pts (38M; mean age 72±13 yrs) who had rest/regadenoson stress PET and STE for evaluation of known or suspected CAD and/or CHF. PET was performed on a 64 slice PET/CT system with data acquired in list mode and reconstructed by OSEM incorporating CT attenuation correction. Rest and stress MBF, CFR (rest MBF/stress MBF) were calculated using Emory Cardiac Toolbox algorithms for 17 standard LV segments, which were then averaged to obtain mean and standard deviation (SD) of segmental blood flows for each patient. 2D echo images acquired from parasternal mid short-axis, apical 2-, 3- and 4-chamber views that were sampled at appropriate frame rates were post-processed using 2DSTE software (TomTec CPA). Global and regional (16 segments) time to peak values for systolic strain were obtained. DYS was defined as a difference between latest and earliest segments of >65 ms. Patients with and without DYS were compared in terms of their global MBF’s, CFR, and the SDs segmental blood flow (SD).

Results: Global rest and stress MBF and CFR were 171±90 ml/min/100 g, 334±161 ml/min/100 g, and 2.06±0.71 for the group. Using the STE criteria of DYS there were only 5 patients categorized as normal, and 69 deemed DYS. Echocardiographic %SD among segments was significantly higher for DYS versus normal groups (11.2±6.5% versus 1.9±0.7%, p<0.0001), and was significantly correlated with reduced CFR (r=0.04). SD of resting MBF among the 17 LV segments, reflective of regional myocardial blood flow unbalance, was most strongly associated with abnormal versus normal wall motion by STE criteria (54±20 versus 31±11 ml/min/100 g, p=0.02).

Conclusions: LV dyssynchrony as measured by 2DSTE is associated with abnormal MBF and CFR by PET.