

Comparison of myocardial fatty acid metabolism with left ventricular function and perfusion in cardiomyopathies: by ^{123}I -BMIPP SPECT and $^{99\text{m}}\text{Tc}$ -tetrofosmin electrocardiographically gated SPECT

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Objective: To investigate myocardial fatty acid metabolism and its relationship with left ventricular (LV) function and perfusion in hypertrophic cardiomyopathy (HCM) and dilated cardiomyopathy (DCM). **Methods:** Thirty-nine patients with cardiomyopathies (58 ± 14 y), comprising 15 DCM and 24 HCM, and 9 age-matched healthy controls were studied with ^{123}I -15-(*p*-iodophenyl)-3-(*R,S*)-methylpentadecanoic acid (BMIPP) and $^{99\text{m}}\text{Tc}$ -tetrofosmin (TF) electrocardiographically gated SPECT. As parameters of myocardial fatty acid metabolism, the heart-to-mediastinum ratio (H/M) and global washout of BMIPP were calculated from early and delayed planar images, while regional BMIPP uptake and washout were calculated from SPECT. In TF study, the H/M (H/M-TF) and LV ejection fraction (LVEF) were calculated as global parameters of perfusion and function, while regional TF uptake and wall thickening index were calculated as regional parameters of perfusion and function using the Quantitative Gated SPECT software. The differences in the parameters and the correlations between the parameters from the 2 studies were investigated by one-way ANOVA and multiple linear regression analysis. **Results:** BMIPP uptake was decreased ($p < 0.05$), and its washout was increased ($p < 0.05$) in DCM and HCM. In multiple linear regression analysis, global BMIPP parameters showed no significant correlation with LVEF ($p > 0.05$), but showed a significant correlation with H/M-TF ($p < 0.05$) in DCM and HCM. According to the partial correlation coefficient, early H/M was the only significant factor ($p < 0.05$) for predicting H/M-TF in DCM and HCM. Multiple linear regression analysis on regional parameters showed regional BMIPP parameters had no correlation with regional function ($p > 0.05$) but had a significant correlation with regional perfusion ($p < 0.0001$) in DCM. In HCM, regional BMIPP parameters showed significant multiple linear correlations with both regional function ($p < 0.005$) and perfusion ($p < 0.0001$). According to the partial correlation coefficients, delayed regional BMIPP uptake was the most significant factor for predicting regional function in HCM, while early regional BMIPP uptake was the only or the most significant factor for predicting regional perfusion in DCM and HCM, respectively. **Conclusion:** In DCM, BMIPP uptake and washout could not reflect LV function. In HCM, regional delayed BMIPP uptake might be useful for evaluating regional function. In DCM and HCM, early BMIPP uptake might be largely determined by myocardial perfusion.

Key words: hypertrophic cardiomyopathy, dilated cardiomyopathy, ^{123}I -15-(*p*-iodophenyl)-3-(*R,S*)-methylpentadecanoic acid, $^{99\text{m}}\text{Tc}$ -tetrofosmin, gated myocardial SPECT