Characteristics FDG-PET/MR in apical HCM according to midventricular obstruction and apical aneurysm

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Background/Aims: Mid-ventricular obstruction(MVO) and left ventricular apical aneurysm (LVAA) are distinct pathophysiological phenomenon in patients with apical hypertrophic cardiomyopathy(ApHCM). The investigation of 18F-fluorodeoxyglucose positron emission tomography/cardiac magnetic resonance(18F-FDG PET/MR) characteristics in patients with ApHCM according to MVO and LVAA is limited. We sought to investigate the characteristics of 18F-FDG PET/MR in ApHCM patients, and compare the pattern of 18F-FDG uptake and late gadolinium enhancement(LGE) in ApHCM patients according to MVO and LVAA

Methods: 26 patients with ApHCM(61 ± 10 years, 22 male)who underwent echocardiography and 18F-FDG PET/MR from September 2015 to June 2020 were enrolled. Imaging analysis of quantitative 18F-FDG uptake using the maximum standardized uptake value(SUVmax) level and semi-quantitative late gadolinium enhancement (LGE) using scoring system was performed based on left ventricle (LV)17-segment model. SUVmax and LGE were compared among ApHCM patients according to MVO and LVAA.

Results: In 26 ApHCM patients, the extent of 18F-FDG uptake and LGE was observed mostly in LV apex (59.7% for 18F-FDG uptake and 83.0% for LGE). The prevalence of MVO in ApHCM patients was 57.7% (n = 15). ApHCM patients with MVO showed higher rate of LVAA, higher extent of apical LGE, and relatively lower level of apical SUVmax than those without MVO (46.7% vs. 9.1%, P=0.084 for LVAA; 12.4 ± 5.3% vs. 5.6 ± 6.2%,P = 0.006 for LGE;1.6±1.3 vs. 3.0±3.2,P=0.574 for SUVmax). After grouping ApHCM patients according to MVO and LVAA, apical LGE gradually increased in the order of MVO(-), MVO(+)/LVAA(-), and MVO(+)/LVAA(+) group, contrary to the decrease in SUVmax (5.6 ± 6.2% vs. 9.4 ± 4.3% vs. 15.8 ± 4.3%, P = 0.004 for LGE; 3.0 ± 3.2 vs. 1.9±1.2 vs. 1.2±1.3, P=0.427 for SUVmax). MVO(+)/LVAA(+) group is more likely to have high apical LGE and low apical SUVmax than MVO(-) group or MVO(+)/LVAA(-) group(Table)

Conclusions: Increased extent of 18F-FDG uptake and LGE at LV apex was frequently found in ApHCM patient. ApHCM patients with MVO and LVAA have higher LGE and relatively lower 18F-FDG uptake in LV apex compared to patients without MVO or those with MVO and no LVAA

Table. Changes of apical ^{18}F-FDG uptake and LGE in ApHCM patients according to MVO and LVAA

Apical SUV_{max}/LGE	MVO(-) (n=11)	MVO(+)LVAA(-) (n=8)	MVO(+)LVAA(+) (n=7)	P
low/low	4 (36.4%)	1 (12.5%)	0	
high/low	4 (36.4%)	3 (37.5%)	0	0.015
high/high	2 (18.2%)	3 (37.5%)	2 (28.6%)	
low/high	1 (9.1%)	1 (12.5%)	5 (71.4%)	

high, values above the median; low, value below the median