**ADVANCES IN MYOCARDIAL RECEPTOR IMAGING WITH PET: THE ANGIOTENSIN AND ENDOCANNABINOID SYSTEM**

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**Objective:** Activation of the myocardial angiotensin II type 1 receptor (AT1-R) and cannabinoid type 1 receptor (CB1-R) by an activated renin-angiotensin system (RAS) and endocannabinoids may play a central role in heart failure development We aimed to evaluate the regional distribution of myocardial AT1-R and CB1-R with the novel radiotracers 11C-KR31173, 11C-OMAR and PET/CT in patients with hypertrophic obstructive cardiomyopathy (HCM) and patients with advanced obesity (AOB) in comparison to healthy volunteers as controls (CON).

**Method:** Static images were obtained for 11C-KR31173 and 11C-OMAR from a 40 min PET/CT scan. From the last image, static PET data were volumetrically sampled, and myocardial polar maps were generated. For quantitative analysis, myocardial segments defined from static KR31173 and OMAR images were applied to dynamic series, and time-activity curves were obtained. Subsequently, the regional or segmental retention index (%/min) of the AT1R ligand 11C-KR31173 and 11C-OMAR were determined from dynamic images acquired with 27 frames.

**Results:** Quantified KR31173 retention index of the whole left ventricle was higher in HCM patients than in CON [1.91 (1.49, 3.27) vs. 43 (0.24, 0.44) %/min; p≤0.05]. In HCM patients, regional evaluation of the KR31173 retention index was significantly higher in the thickened septum than in the remote regions [(3.97 (3.03, 8.97) vs. 0.78 (0.74, 2.16) %/min; p=0.0001]. When compared to CON, KR31173 retention was significantly higher in the thickened septum [(43 (0.24, 0.44) vs. 3.97 (3.03, 8.97) %/min; p≤0.005] and not significantly in the remote region [(43 (0.24, 0.44) vs. 0.78 (0.74, 2.16) %/min; p<0.02]. As regards the assessment of myocardial CB1-R, left ventricular retention of OMAR was significantly higher in AOB than in CON (5.68%/min [1.88%/min to 6.89%/min] vs. 0.47%/ min [0.13%/min to 1.31%/min]; p < 0.01), indicative of an upregulation of myocardial CB1-R in AOB patients.

**Conclusion:** Noninvasivein-vivo imaging of abnormal increases in myocardial AT1-R in HCM and CB1-R in AOB with the radiotracer 11C-KR31173, 11C-OMAR and dynamic PET/CT is feasible and may open new avenues to non-invasively monitor and guide treatment options.