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## Association of left ventricular global longitudinal strain with myocardial perfusion evaluated by <sup>13</sup>N-ammonia positron emission tomography in hemodialysis patients with preserved ejection fraction

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**Background:** Global longitudinal strain (GLS) is an echocardiographic marker to detect subclinical left ventricular systolic dysfunction prior to the appearance of reduced left ventricular ejection fraction (LVEF). Reduced GLS identified in patients with maintenance hemodialysis (HD) has been reported to be a predictor of their higher mortality and cardiovascular events. On the other hand, pharmacological stress <sup>13</sup>N-ammonia positron emission tomography (<sup>13</sup>N-NH<sub>3</sub>-PET) has been an established and reliable imaging modality to evaluate myocardial perfusion expressed as coronary flow reserve (CFR) or maximal stress myocardial blood flow (MBF). CFR and MBF are powerful parameters to detect coronary artery disease and to predict cardiovascular events and mortality. However, association between GLS and those myocardial perfusion parameters are not fully understood.

**Purpose :** The aim of this study was to evaluate the relationship between GLS and the myocardial perfusion parameters of <sup>13</sup>N-NH<sub>3</sub>-PET in HD patients with preserved LVEF.

**Methods:** We studied 24 HD patients (mean age 67 years, 67% male) who underwent ATP stress <sup>13</sup>N-NH<sub>3</sub>-PET as well as transthoracic echocardiography including 2-dimensional speckle tracking imaging for suspected ischemic heart disease. Exclusion criteria were as follows: LVEF <50%, moderate to severe valvular diseases, and atrial fibrillation. Myocardial perfusion abnormality (MPA) was defined as CFR <2.0 and/or stress MBF <2.0.

**Results:** Mean GLS in all patients was  $-16.2 \pm 3.6\%$ . The patients were divided into 2 groups based on GLS: patients with reduced GLS (<-16%) (Group A, N = 11) and those with preserved GLS ( $\geq -16\%$ ) (Group B, N = 14). There were no significant differences between 2 groups in age, gender, body mass index, left ventricular mass index, and average E/e'. Nevertheless, Group A had significantly lower stress MBF than Group B ( $1.7 \pm 0.41$  vs  $2.0 \pm 0.33$ ,  $p = 0.031$ ). In addition, Group A showed more frequent MPA compared with Group B (81.8% vs 42.9%,  $p = 0.043$ ). There was a moderate correlation between GLS and stress MBF ( $r = 0.62$ ,  $p = 0.0012$ ), whereas no significant correlation was noted between GLS and CFR ( $r = 0.079$ ,  $p = 0.71$ ).

**Conclusion:** Reduced GLS was significantly associated MPA. MPA may be one of the major contributors to the reduction in GLS in HD patients with preserved LVEF.