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Abstract 47: Ct Based Assessment Of Global Longitudinal Strain

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Introduction: Longitudinal strain measured by speckle tracking echocardiography has emerged as an early sensitive marker of subtle left ventricular (LV) dysfunction, as well as an important differential diagnostic tool in various cardiomyopathies. By today it has become part of the routine evaluation, however, it is limited by image quality. Cardiac CT angiography, due to its high spatial resolution, allows for reliable evaluation of the left ventricular morphology. Recently, quantification of myocardial strain became also feasible based on functional CT datasets. Data on myocardial deformation imaging using CT angiography are scarce. We aimed to compare 2-D echocardiographic and CT derived LV longitudinal strain parameters obtained by using feature tracking algorithm in patients after transcatheter aortic valve implantation (TAVI).

Methods: We included a total of twenty-eight post-TAVI patients (mean age: 78.2 ± 9.4 years, women: 60.7 %) who underwent retrospectively gated cardiac 256- slice CT angiography and two-dimensional echocardiography on the same day. Images were analyzed retrospectively. CT datasets in 10% increments were reconstructed throughout the entire cardiac cycle. We measured LV functional parameters, including ejection fraction (EF) and global longitudinal strain (GLS) on 2-chamber and 4-chamber images. Endocardial borders were traced to measure GLS by a single reader blinded to echocardiographic results. LV GLS was measured on 2-chamber and 4-chamber images and EF was determined from speckle tracking based volumetric data. Mean differences between the two modalities were determined on Bland-Altman plots, and inter-modality correlations for EF and GLS were tested using Spearman correlation test. We calculated intra-class correlation coefficients to assess reproducibility of the readers.

Results: Median EF was 58.1 [47.6 - 65.2] % on CT vs. 62.5 [50.3 - 68.3] % on echocardiography. Median GLS was 19.9 [14.8 - 22.4] on CT vs. 19.9 [16.8 - 24.7] on echocardiography. We found good agreement between CT and echocardiography for the measurement of GLS with a mean bias of -9.1 % (see Fig1.). Correlation coefficients between the two imaging modalities were rho = 0.78 and rho = 0.70 for GLS and EF, respectively, $p < 0.001$ in both cases Reproducibility measures were excellent for both modalities: ICCct = 0.96 for GLS and 0.98 for EF; ICCecho = 0.97 for GLS and 0.96 for EF.

Conclusions: In our study we detected good agreement in quantifying left ventricular strain using CT angiography as compared to echocardiography. CT angiography provides accurate strain measurements with high reproducibility, making it a favorable alternative to echocardiography. Thus, CT could improve non- invasive phenotyping of patients despite lower temporal resolution. CT derived strain - as a novel biomarker - may be applied as an important surrogate of LV dysfunction in clinical practice.

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