wall (FW) in apical 4-chamber view. RV systolic function was also assessed by the RV fractional area change (FAC) measured in apical 4-chamber view.

Results.— Prevalence of RV involvement in TTC was 35% and NYHA class was significantly higher ($P < 0.05$) and LVEF was lower ($P = 0.03$) as compared to pts with TTC but without RV involvement. Values of V, S and SR in basal, mid and apical right ventricular FW were significantly lower in group 1 as compared to groups 2 and 3 ($P < 0.02$ for basal FW and $P < 0.01$ for mid and apical FW). Strong correlation was found between RVEF and global values of V ($r = 0.88$, $P < 0.0001$), whereas correlation between RVEF and FAC was weak ($r = 0.47$, $P = 0.04$). In TTC, RV dysfunction was found in all pts ($n = 30$ using VVI versus only 14 pts using the FAC method, $P < 0.0001$).

Conclusion.— Our study suggests that VVI could be of interest for the assessment of RV involvement in TTC, allowing to individualize high-risk pts.

Myocardial area and longitudinal strain by 3D speckle-tracking echocardiography: Normal values and comparison with 2D strain

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Background.— Speckle analysis of 3D echocardiography improves information on LV segmental and global deformation by avoiding loss of speckles as it is the case in monoplane 2D speckle analysis.

Aims.— To define normal values of 3D area and longitudinal strain and analyze relationships between longitudinal myocardial strain derived from both 2D and 3D speckle tracking.

Methods.— A complete echocardiography (GE Vivid 7 and E9) was performed in 63 healthy adults (33 M, mean age 42.3 ± 16.6 years). 2D global LV longitudinal strain (2D GLS, %) was derived from 2D speckle analysis by an automated software (Automated Function Imaging [AFI]) from the apical 4, 2 and 3 chambers views. A 3D determination of 3D LV ejection fraction (3D LVEF). Analysis of 3D strain was performed with an automated software allowing manual adjustment for myocardial borders detection. Values of 3D global LV area strain (3D GAS) and of 3D global LV longitudinal strain (3D GLS) were obtained from all patients. Peak systolic strain values from each of the 17 LV myocardial segments were also recorded from 2D and 3D analysis, and we calculated the mean values of the 5 apical (ap), the 6 median (med) and the 6 basal (bas) segments for area and longitudinal strain. Pearson correlation and Bland Altman were used to study correlation and concordance between 2D GLS and 3D GLS. Inter-observer reproducibility was analyzed among 15 pts.

Results.— A good tracking quality for 3D GAS was obtained in 934 segments (87.2%). Inter-observer reproducibility was good with an intra class correlation coefficient of 0.824 for 3D GLS and 0.945 for 3D GAS. Mean 3D GAS was -35.6 ± 2.9, range $[-28.9; -43.4]$ and was significantly different between bas, med and ap segments (bas: -33.5 ± 3.8; med: -37.9 ± 4.0; ap: -35.7 ± 4.0). Among our patients with a narrow range of normal LVEF, there were poor correlations between 3DEF and 3DGAS ($r = -0.461$, $P = 0.001$), 3DGLS ($r = -0.372$, $P = 0.006$) and 2DGLS (ns). 3D GAS correlated well with 3D GLS ($r = 0.689$, $P < 0.001$) and 2D GLS ($r = 0.531$, $P < 0.001$). Correlations and concordance between 2D GLS (-19.9 ± 2.3) and 3D GLS (-21.2 ± 2.3) were poor ($r = 0.308$, $P = 0.003$), and correlations were better for mean strain values of med ($r = 0.441$, $P = 0.001$) and ap segments ($r = 0.306$, $P = 0.03$) than for bas ones (ns).

Conclusions.— The newly developed 3D strain tools is an interesting tool to assess LV regional and global deformation and function with good feasibility, reliability and reproducibility. Among normal patients, concordance and correlations between 2D and 3D GLS were relatively poor. The relative clinical value of those parameters should be further analyzed among patients with a wide range of cardiac function and diseases.