

**Conclusion** The left ventricular noncompaction may involve the mitral papillary muscles. Transthoracic echocardiography provides definitive images of the abnormal mitral papillary muscles.

**e0690 CLINICAL STUDY ON LEFT VENTRICULAR VOLUME AND EJECTION FRACTION IN NORMAL SUBJECT BY 4-DIMENSIONAL AUTO LEFT VENTRICULAR QUANTIFICATION**

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**Objective** To initial explore the clinical feasibility, accuracy and reproducibility of evaluation of left ventricular (LV) volume and ejection fraction (EF) by 4-Dimensional Auto Left Ventricular Quantification (4D AUTO LVQ) in three-dimensional echocardiography.

**Method** Single heartbeat (SB) and multi-heartbeat (MB) mode three-dimensional echocardiography (3DE) examinations were performed in 20 volunteers, Left Ventricular end-diastolic volume (LVEDV), end-systolic volume (LVESV), and EF were measured by 4D AUTO LVQ. Meanwhile, LV volume and EF were also calculated by 2DE Simpson's method and M-modeTeichholtz method. The measurement value of LV volume and EF by 4D AUTO LVQ in SB and MB mode was separately compared with every measurement value by other methods.

**Results** 1. The values of LVEDV were statistically significant between M-mode method and other three methods ( $p < 0.05$ ). LVEDV measured by 4D AUTO LVQ in SB mode correlated and agreed well with MB mode ( $r = 0.769$ ). 2. There were significant difference in LVESV between M-mode method and other three methods. The correlation and agreement between SB and MB was well. ( $r = 0.86$ ). 3. Significant difference was found between 3DE and 2DE for EF, and also between 3DE and M-mode. Correlation between SB and MB3DE was poor ( $r = 0.428$ ), but the agreement was good. 4. There were no statistically significant difference between average store time of the 4D AUTO LVQ and 2DE Simpson's method. 5. Intra-observer variability of SB and MB 3DE for EF measured by 4D AUTO LVQ was 8.50% and 6.50%, and the inter-observer variability was 7.75% and 6.50%.

**Conclusions** 4D AUTO LVQ in three-dimensional echocardiography gives accurate, rapid and reproducible measurements of LV volumes and EF.

**e0691 FEASIBILITY AND REPRODUCIBILITY OF A NEW SEMIAUTOMATED QUANTIFICATION OF LEFT VENTRICULAR VOLUMES AND EJECTION FRACTION IN NORMAL ADULTS USING REAL TIME 3-DIMENSIONAL ECHOCARDIOGRAPHY**

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**Objective** We sought to investigate the feasibility and reproducibility of the new semi-automated tool (4DLVQ) quantification of left ventricular (LV) volumes and ejection fraction (EF) compared to standard 3D echo tool (TomTec 4D LV-Analysis) using real time 3-dimensional echocardiography.

**Methods** Real time 3D echocardiography examinations were performed in 24 volunteers. In the apical 3D full-volumetric images, LV end-diastolic volumes (EDV), end-systolic volumes (ESV) and EF

were measured using 4DLVQ and TomTec. The repeatability and agreement of the new method were evaluated compared to TomTec.

**Results** 1. The analysis time of 4DLVQ was significantly shorter than for TomTec ( $156.63 \pm 33.72$  s vs  $275.55 \pm 50.64$  s,  $p < 0.05$ ). 2. There were no significant difference in LVEDV ( $75.40 \pm 16.72$  ml vs  $71.65 \pm 14.81$  ml), LVESV ( $30.25 \pm 6.69$  ml vs  $28.30 \pm 6.71$  ml) and LVEF ( $59.65 \pm 4.96\%$  vs  $60.70 \pm 3.51\%$ ) between the two methods ( $p > 0.05$ ). 3. LVEDV, LVESV and LVEF measured by 4DLVQ had good correlation with those by TomTec. ( $r_1 = 0.715$ ,  $r_2 = 0.618$ ,  $r_3 = 0.532$ , respectively,  $p < 0.05$  for all). 4. Bland-Altman analysis revealed high agreement in LV volume and EF between 4DLVQ and TomTec, with 95% limits of agreement of  $-19.8 \sim 27.3$  ml,  $-9.5 \sim 13.4$  ml and  $-9.4 \sim 7.3\%$  for EDV, ESV, and EF respectively. Comparison with TomTec, 4DLVQ showed lower intraobserver and interobserver variabilities, Intra-observer variability of 4DLVQ versus TomTec was 12.29% versus 21.96% for EDV, 16.92% versus 34.35% for ESV, and 6.50% versus 7.24% for EF. Inter-observer variability of 4DLVQ versus TomTec was 9.84% versus 18.13% for EDV, 10.47% versus 25.12% for ESV, and 6.50% versus 6.72% for EF. In comparison with TomTec, 4DLVQ showed higher intra-class correlation coefficient.

**Conclusions** 4DLVQ is a novel, simple, feasible and reproducible tool for LV volumes and EF.

**e0692 ASSESSMENT OF LEFT VENTRICULAR TWISTING AND UNTWISTING IN PATIENTS WITH MYOCARDIAL INFARCTION AND ISCHAEMIA**

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**Objective** To assess LV twisting and untwisting in patients with myocardial ischaemia at rest and myocardial infarction (MI) with different sites, searching for the value and characteristics of left ventricular twisting and untwisting in patients with CAD by speckle tracking imaging (STI).

**Methods** Echocardiography were performed in 60 patients with MI (consisting of anteroseptal MI, infer-posterior MI and extensive infarction of the anterior wall), 31 patients with myocardial ischaemia and 26 control individuals who were all received coronary arteriography. It was demonstrated by coronary arteriography that stenosis of one main branch at least of coronary artery was significant ( $\geq 70\%$ ) in patient groups while it was slight ( $< 50\%$ ) or none in control group. Twisting and untwisting were measured by STI, and the parameters of them were torsion, torsion rate and untwisting rate.

**Results** The two patient groups, especially in patients with MI, had much lower parameters in torsion ( $6.92 \pm 3.28$  vs  $11.65 \pm 2.70$  vs  $17.16 \pm 5.42$ ), torsion rate ( $45.78 \pm 19.36$  vs  $72.68 \pm 20.77$  vs  $99.51 \pm 32.13$ ) and untwisting rate ( $-49.88 \pm 24.67$  vs  $-82.91 \pm 16.37$  vs  $-102.03 \pm 30.97$ ) than that of control group ( $p < 0.001$ ). When comparing with the patients of anteroseptal and infer-posterior MI, torsion ( $7.82 \pm 2.03$  vs  $9.08 \pm 3.42$  vs  $4.23 \pm 2.62$ ), torsion rate ( $53.76 \pm 14.85$  vs  $54.38 \pm 18.80$  vs  $30.30 \pm 19.51$ ) and untwisting rate ( $-56.94 \pm 21.96$  vs  $-59.11 \pm 25.76$  vs  $-36.39 \pm 20.40$ ) were significantly reduced in patients with extensive infarction of the anterior wall ( $p < 0.05$ ), while the differences between anteroseptal and infer-posterior MI were small. There were good correlations between torsion and LVEF, untwisting rate ( $r_1 = 0.618$ ,  $r_2 = -0.731$ ,  $p < 0.001$  for both).

**Conclusion** Torsion, torsion rate and untwisting rate derived by STI were decreased not only in patients with MI but also in patients with myocardial ischaemia at rest. Besides it is the infarction extent and size rather than the site to influence the twisting and untwisting in patients with MI.