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Automatic left ventricular volume measurements from simultaneously acquired triplane echocardiograms
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We report the results from a feasibility study where a new algorithm for automatic volume measurements in the left ventricle (LV) based on simultaneously acquired triplane echocardiograms has been evaluated.

The accuracy and robustness of LV volume measurements based on automatically detected myocardial boundaries is expected to improve by making use of triplane ultrasound (US) image sequences made available through the latest generation of 3D scanners.

As a myocardial boundary detector we used an extension of the Active Appearance Model, which is a dynamic deformable template model that exploits spatial coherence between the views for handling imaging artifacts such as drop outs. This model was trained on a set of 20 manually outlined triplane image sequences of full cardiac cycles from a group of 12 healthy persons and 8 persons suffering from heart disease. The standard apical four chamber (A4C) view and the views rotated 60° and 120° relative to the A4C view were recorded simultaneously using a Vivid 7 scanner (GE Vingmed Ultrasound, Horten, Norway). Patient cases with asynchrony were not included. We evaluated the detection algorithm on the 20 cases using a leave one out approach. The point distance was defined as the average of the Euclidian distances between corresponding pairs of 40 uniformly distributed points on the contours. Table 1 shows the mean and standard deviation of the point distance, volume error, and volume fractional error, and the regression line for computer determined volumes (VolC) as a function of manually determined volumes (VolM).

The detected volumes at ED, mid systole and ES showed excellent correlation with the manually determined volumes (R²=0.97). The correlation between detected ejection fractions (EF) and manually determined EFs was poor (R²=0.29). However, this is probably caused by the method's tendency to identify an average motion pattern. Adding more samples to the training database may improve the performance in such cases.

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Wave intensity analysis is an additional tool for the quantification of left ventricular systolic function

Background: Conventional markers of left ventricular systolic function such as ejection fraction and longitudinal systolic shortening velocity (tissue Doppler velocities) are limited in the presence of cardiac dysfunction and adverse cardiac remodeling. Wave intensity analysis (WIA), which is less sensitive to local myocardial motion, has been evaluated in such cases.

The purpose of this study was to compare in echocardiographic and global and segmental function of LV with CARTO bipolar voltage segmental electrical activity in patients with LV dysfunction and ventricular tachycardia after myocardial infarction (MI). To find cut off points for bipolar voltage (BVP) and segmental function.

Methods: A comparative analysis was performed in 32 patients (20men, 64±9 yrs) qualified to radiofrequency catheter ablation with CARTO system. Global LV function and 12 segmental wall motion score index (WMSI) were assessed by echocardiography 24-48 hours before the procedure. The bipolar voltage (BP) map of LV was made during electroanatomical mapping. We analyzed contraction of 334 segments in echo and bipolar voltage of 2656 points of electroanatomical maps. The segments with less than 3 points measured during CARTO were excluded.

Results: The LV ejection fraction (LVEF) was 33%±10%, WMSI 1,8±0,3. There was a significant difference in BP between all groups of segments (table). The receiver operator curve (ROC) was computed to find the cut off point for BP distinguishing dys- and akinetic segments from hyper- and normokinetic ones. Accuracy (ACC), positive (PPV) and negative (NPV) predictive value of this method were assessed (table).

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Echocardiographic and electrophysiological definitions of regional wall function after myocardial infarction

Background: Noninvasive 3-dimensional electroanatomical mapping system CARTO is a novel method used to evaluate electrical activation patterns in regions of the heart muscle. Transmural echocardiography estimates global and regional function of this left ventricle (LV).

Aim of study: To compare in echocardiographic global and segmental function of LV with CARTO bipolar voltage segmental electrical activity in patients with LV dysfunction and ventricular tachycardia after myocardial infarction (MI).

Methods: A comparative analysis was performed in 32 patients (20men, 64±9 yrs) qualified to radiofrequency catheter ablation with CARTO system. Global LV function and 12 segmental wall motion score index (WMSI) were assessed by echocardiography 24-48 hours before the procedure. The bipolar voltage (BP) map of LV was made during electroanatomical mapping. We analyzed contraction of 334 segments in echo and bipolar voltage of 2656 points of electroanatomical maps. The segments with less than 3 points measured during CARTO were excluded.

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Conclusions: Enhanced platelet reactivity estimated by rapid, point-of-care platelet function analyzer (PFA-100®) is a strong and early predictor of impaired

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Impact of enhanced platelet reactivity on left ventricular remodeling and functional recovery in ST-segment elevation myocardial infarction
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Purpose: Platelet reactivity is believed to play an important role in both ischemic and repair phase of myocardial infarction. We tried to determine whether platelet reactivity measured at the moment of admission allows identifying patients with increased risk of impaired left ventricular functional recovery and remodeling in ST-segment elevation myocardial infarction (STEMI) treated with primary angioplasty (PTCA).

Methods: Venous blood samples were collected on admission from 110 patients presenting with STEMI and platelet reactivity (adhesion and aggregation) was estimated with the use of PFA-100® platelet function analyzer (Dade Behring, Neerkr, DE) as the time for flowing whole blood to occlude a collagen-adenosine diphosphate ring, with shorter closure times (CADP-CT) indicating greater reactivity. A 2-D echocardiogram was performed at baseline (within 12 h after PCI) and 1 month and 6 months thereafter. An increase of more than 20% in end diastolic volume index (EDVI) at 6 months relative to the baseline value was considered as left ventricular remodeling. Significant early (at 1 month) and late (at 6 months) functional recovery were considered to be present when the functional improvement involved at least 2 segments or 1 segment when only 2 were basally asynergic.

Results: Study population was divided according to median CADP-CT (86 sec. or less). Left ventricular remodeling was present in 32% patients of the intramural (n=56) vs. 11.8% of the supramedian group (n=54, P<0.001). Supramedian group patients showed better early and late functional recovery (73.1% and 80.3%, respectively) than intramedian group patients (37.2%, P<0.001 and 50%, respectively in multivariate logistic regression model). The performance of logistic regression model was higher when incorporated into CARTO showed improvement with the concordance (C) index increase from 0.63 to 0.8 for early functional recovery, and 0.73 to 0.82 for late functional recovery.

Conclusions: Enhanced platelet reactivity estimated by rapid, point-of-care platelet function analyzer (PFA-100®) is a strong and early predictor of impaired