Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

THREE-DIMENSIONAL ECHOCARDIOGRAPHIC AUTOMATED QUANTIFICATION OF LEFT VENTRICULAR AND ATRIAL VOLUMES USING ADAPTIVE ANALYTICS ALGORITHM: FEASIBILITY IN NON-SELECTED PATIENTS

Poster Contributions
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Background: Although 3D echo (3DE) quantifies LV and LA volumes accurately and reproducibly, it has not been embraced in clinical practice because it relies on manual input, affecting the workflow. We recently tested a new, fast, automated algorithm based on an adaptive analytics algorithm for simultaneous LV and LA quantification, which was found to be accurate and reproducible in patients with excellent image quality. We sought to test the feasibility of this algorithm in consecutive patients in a busy echo lab and its image quality related accuracy

Methods: 100 consecutive patients (age 63±17, males 46%, BSA 1.9±0.2) had 3DE (frame rate 18±2). Image quality was graded as: poor (>3 contiguous segments not visualized in any view or 2 contiguous in at least 2 different views), adequate (not >2 contiguous in 1 view and ≤1 in the other view) and good (better than adequate). Images were analyzed using the software to measure LV end-diastolic and end-systolic, and LA volume (EDV, ESV, LAV), and LV EF. Automatically detected LV and LA endocardial boundaries were optimized by minimal manual editing, as needed (HeartModel, Philips). These measurements were compared to the conventional 3DE software (QLAB, Philips) which relies on manual tracing

Results: The automated software failed in 10/100 patients. Comparing images of different qualities, the poor quality group (N=24, 27%) showed inaccurate results, large biases and poor correlation with the reference technique (r-values: 0.86 for EDV, 0.80 for ESV, 0.48 for LV EF and 0.78 for LAV). The adequate (N=24, 27%) and good (N=42, 47%) groups showed narrow biases and similar excellent correlations (r-values: 0.98 and 0.99 for EDV, 0.99 and 0.98 for ESV, 0.90 and 0.90 for LV EF, and 0.97 and 0.98 for LAV), reflecting only minimal differences in accuracy. Combining these two groups together resulted in accurate measurements in 62% of consecutive non-selected patients

Conclusions: The new automated 3DE software measures accurately LV and LA volumes in nearly 2/3 of consecutive non-selected patients, while in the remaining 1/3 of patients with poor images, its performance is limited. It has the potential to overcome the workflow limitations of 3DE analysis in clinical practice