ABSTRACTS

03 — Echocardiography and imaging

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Accuracy of new transthoracic 3D-echocardiographic automated software for left heart chamber quantification in children

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Background A new three-dimensional echocardiographic (3DE) automated software (HeartModel) is now available to quantify left heart chamber. Our aims were to assess the feasibility of this software in children and its correlation with manual 3DE and cardiac magnetic resonance (CMR).

Methods Ninety-two children were prospectively included in 2 separate protocols. In protocol 1, 73 healthy children (8.8 ± 3.0 years) underwent 2D and 3D transthoracic echocardiography (EPIQ 7 C). LV end-diastolic volume (LVEDV), LV end-systolic volume (LVESV), LVEF and LA volume at ventricular end-systole (LAV) obtained with automated 3DE were compared with the manual 3DE measurements. In protocol 2, automated 3DE measurements from 19 children with cardiopathy (12.8 ± 2.9 years) were compared with CMR values. Intra and inter-observer variability were assessed.

Results Automated 3DE was feasible in 77% of datasets and reduced significantly time required for indices analysis compared with manual 3DE (20 vs. 125 seconds). There was excellent correlation for LVEDV, LVESV and LAV between automated and manual 3DE ($R = 0.95$) but less for LVEF ($R = 0.57$). Compared with manual 3DE, automated 3DE slightly overestimated LVEDV, LVEF and LAV and slightly underestimated LVESV. There were excellent correlation for LV volumes between automated 3DE and CMR ($R = 0.94$) but the correlation for LVEF was moderate ($R = 0.46$). Compared with CMR, automated 3DE slightly underestimated LVEDV and LVESV (biase-7.5%), underestimated LAV (-31.6%), and had a negligible bias for LVEF (1.0%). Intraobserver and interobserver variability for automated 3DE measurements were low (< 12% (Fig. 1)).

Conclusions HeartModel is promising software for fast assessment of left heart chamber volume and function. Its feasibility in children aged more than 5 years is good, with high reproducibility. The automated 3DE measurements were comparable to manual 3DE. Compared with CMR, LVEDV and LVEF measured by automated 3DE seem interesting in clinical practice.

Fig. 1 Automatic 3DE analysis of LV volumes and EF using HeartModel software.

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Multimodality imaging guidance for percutaneous paravalvular leak closure: Insights from the multicenter FFPP register

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