Right ventricular quantification using 3D echo: a comparison with CMR

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PURPOSE

Analyses of the right ventricle (RV) in 3D echocardiography (3DE) have been less extensively studied compared to those for the left ventricle (LV). We sought to quantify discrepancies in RV indices derived from 3DE and CMR.

METHODS

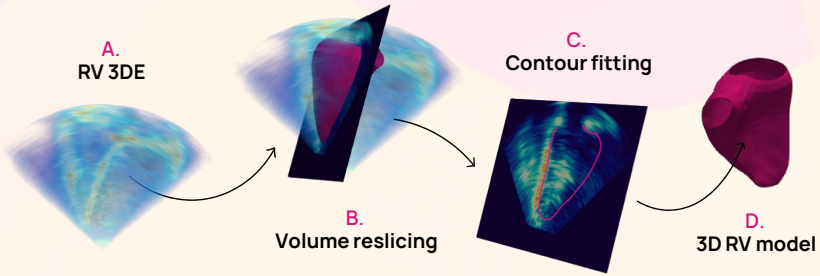
N = 20 | 12 × PATIENTS, 8 × CONTROLS | 9 × F, 11 × M

AGE: 21–79 I BSA: 1.46–2.15 m^2

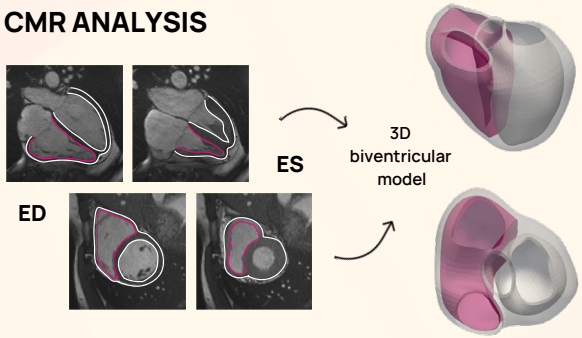
3D TTE — <1 hr apart — Cine CMR

3D geometric modelling of RV → Extraction of RV indices

3DE ANALYSIS



CMR ANALYSIS



RESULTS

ICC = intraclass correlation coefficient

Asterisks (*) indicate statistically significant differences ($p < 0.05$)

Biases calculated as 3DE value – CMR value

Tab I. Comparison of RV indices between 3DE and CMR.

RV indices	CMR	3DE bias	*p*-value	ICC
EDV (ml)	157 ± 39	-33 ± 25	<0.001*	0.702
ESV (ml)	101 ± 30	-30 ± 20	<0.001*	0.601
EF (%)	36 ± 8	6 ± 10	0.020*	0.627
GLS (%)	-11 ± 5	-3 ± 6	0.033*	0.597
GCS (%)	-14 ± 4	-3 ± 8	0.121	0.218

CONCLUSIONS

- Volume underestimation in RV indices by 3DE were found to be larger than those previously reported for the LV.
- 3DE tends to overestimate RV function in terms of EF and GLS, which may impact treatment pathways if used in a clinical setting.
- Systematic differences between modalities reinforces the need to further develop 3DE technologies for more accurate RV quantification.

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