

Minimal detectable change in FetalHQ fetal cardiac indices: end-diastolic area robust; strain and fractional area change variable

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1 OBJECTIVES

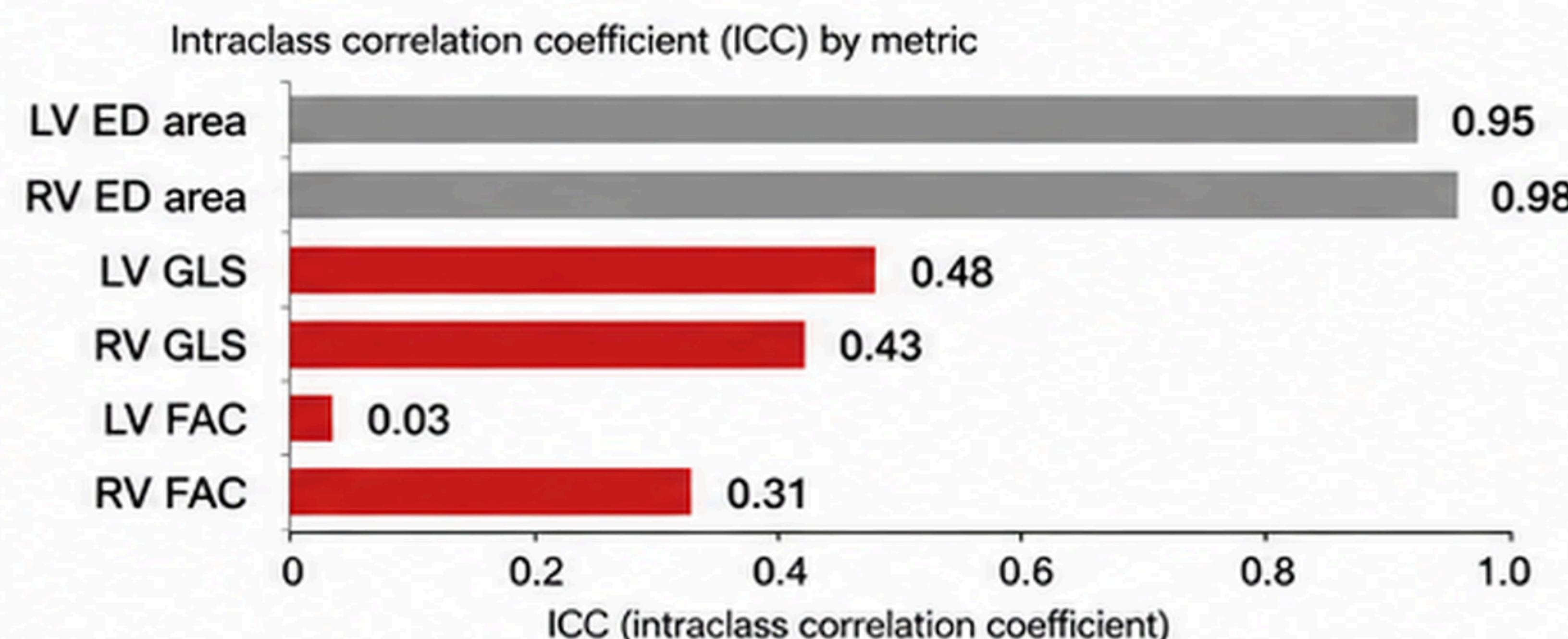
To quantify repeatability and the minimal detectable change at the 95% confidence level (MDC95) for common FetalHQ indices.

2 METHODS

- Retrospective dataset of 37 examinations with paired exports (export 1 versus export 2).
- Intraclass correlation coefficient: ICC model 2,1 (two-way random effects, absolute agreement, single measurement).
- Bland-Altman analysis: bias and limits of agreement (LoA).
- Quality-control windows were applied for deformation and FAC metrics:
 - GLS: -45% to -5%
 - FAC: 5% to 70%
- MDC95 defined as $1.96 \times$ standard deviation of paired differences.
- Metrics assessed: LV ED area, RV ED area, LV GLS, RV GLS, LV FAC, RV FAC.

3 RESULTS

Repeatability across FetalHQ indices



Repeatability and minimal detectable change

Metric	n	ICC	Bias	LoA	MDC95
LV ED area	36	0.95	-0.042 cm ²	-0.475 to 0.391 cm ²	0.433 cm ²
RV ED area	36	0.98	-0.056 cm ²	-0.444 to 0.332 cm ²	0.388 cm ²
LV GLS	21	0.48	0.06%	-19.53 to 19.65%	19.59%
RV GLS	23	0.43	-0.77%	-19.34 to 17.80%	18.57%
LV FAC	22	0.03	-0.58%	-34.06 to 32.90%	33.48%
RV FAC	25	0.31	4.32%	-22.21 to 30.85%	26.53%



Best repeatability

End-diastolic area showed high agreement: LV ICC 0.95 and RV ICC 0.98, with small MDC95 values.



GLS metrics

Strain repeatability was moderate, with wide limits of agreement and MDC95 around 19%.



FAC metrics

Fractional area change showed the widest variability, particularly LV FAC (ICC 0.03).



Clinical interpretation

MDC95 may help determine whether observed longitudinal change exceeds measurement noise.

4 CONCLUSIONS

- Geometric measures (end-diastolic area) are highly repeatable.
- Global longitudinal strain shows only moderate repeatability.
- Fractional area change shows substantial variability even after quality control.
- MDC95 values can guide interpretation of whether serial changes are likely to be real.



TAKE-HOME MESSAGE

In this dataset, end-diastolic area measurements were robust, whereas GLS and especially FAC required larger changes to exceed measurement noise. MDC95 thresholds can support more cautious interpretation of longitudinal FetalHQ follow-up.



Keywords: Echocardiography, Second trimester, STIC, Third trimester.



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