

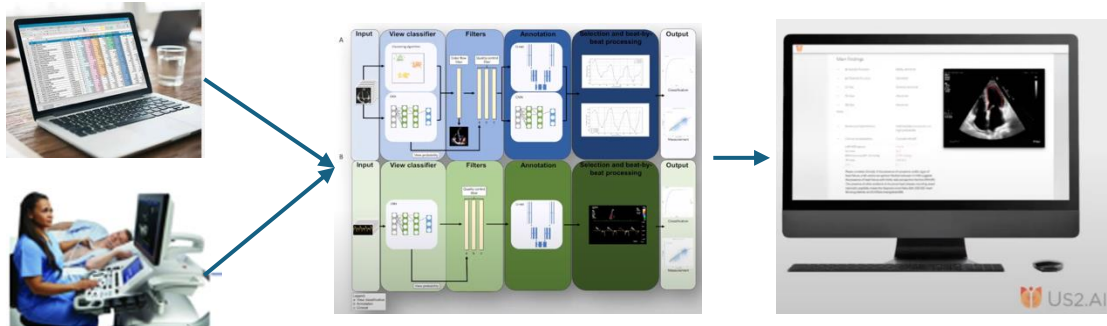
Validation of a deep learning-based workflow for the interpretation of the echocardiogram in a cardio-oncology population

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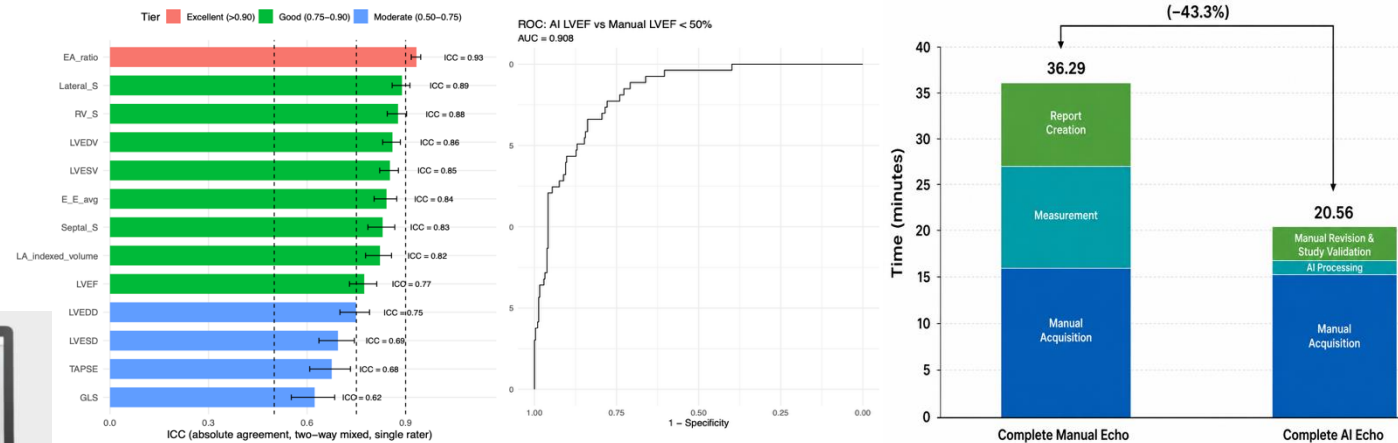
Echocardiography is central to risk stratification, diagnosis, and monitoring of CTRCD (1). AI-echo, which has shown high accuracy in diverse cardiac populations and may reduce variability while improving workflow efficiency(2, 3), has not yet been validated in a **dedicated cohort of patients with cancer**.

Aim: To evaluate the accuracy of AI-guided echocardiography in assessing LVEF and additional parameters, compared with conventional echo, in a cardio-oncology population.

Methods: Retrospective and prospective cohorts from the cardio-oncology centre. Echocardiographic studies were analysed using a validated DL platform (FDA/CE cleared), with standard sonographer-derived measurements as reference.



Parameter	n	ICC	95% CI	Bias	LoA low	LoA high	Spearman rho
LVEF	369	0.774	0.729 - 0.812	0.092	-10.9	11.0	0.729



- Primary outcome:** level of agreement (LoA) for 2D LVEF.
- Secondary outcomes:** LoA for additional echocardiographic parameters and LoA between AI- LVEF and 3D LVEF, temporal variability, interstudy repeatability, discrimination of LVEF <50%, time to study completion.

Results:

- 384 patients included (Retrospective: 282, prospective: 102)
- Mean age: 62 ± 16 years, 61% women. Breast cancer 28.2%, haematology 19.2%, GI 10.1%
- Mean Manual LVEF: 58.15 (8.2)
- Mean AI-LVEF: 58.11 (8.15)

- 3D LVEF vs AI-derived 2D LVEF (n=85) showed narrower limits (bias: 0.04, ICC: 0.8, 95% LoA: -9.97 to 10.0).
- Interstudy variability** was lower for DL repeated measurements compared to manual (SEM 0.21 vs 3.14, p < 0.01)
- Temporal variability** was comparable between methods (manual SEM 3.97 vs DL-SEM 5.93; p = 0.112)

Conclusions:

In a large real-world cardio-oncology cohort, AI-guided echocardiography demonstrated **strong agreement** with conventional echocardiography for LVEF, reliable discrimination of reduced systolic function, comparable longitudinal variability, improved interstudy repeatability, alongside a significant reduction of the time invested in performing the study.