

Pushing the limits of cardiac MRI: deep-learning based real-time cine imaging in free breathing vs. breath hold

ELECTRONIC SUPPLEMENTARY MATERIAL

Table S1 MRI scanning parameter

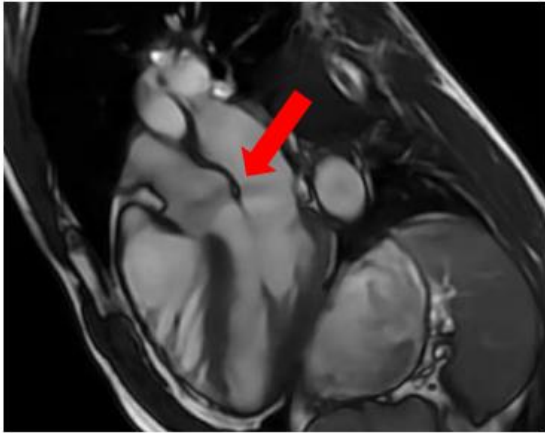
MRI parameter	3RR SonicDL (Reference)	1RR SonicDL (breath hold/free breathing)
Field of view [mm]	34x34	34x34
In-plane resolution [mm²]	1.7x1.5	1.9x1.9
Image pixel matrix	200x224	180x160
Slice thickness [mm]	8	8
Frames / cardiac cycle	30	30
TR [ms]	3.3	3.2
TE [ms]	1.2	1.2
Acceleration factor	6	12

Bland-Altman Analysis	Reference vs. 1RR BH			Reference vs. 1RR FB			1RR BH vs. 1RR FB		
Parameter	<i>Bias</i>	<i>SD of bias</i>	<i>95% Limits of Agreement</i>	<i>Bias</i>	<i>SD of bias</i>	<i>95% Limits of Agreement</i>	<i>Bias</i>	<i>SD of bias</i>	<i>95% Limits of Agreement</i>
<i>LV EDV (ml)</i>	3.1	5.9	-8.6 – 14.75	2.2	9.1	-15.6 – 19.9	-0.9	9.9	-20.3 - 18.5
<i>LV ESV (ml)</i>	1.2	4.3	-7.1 – 9.6	-1.1	7.2	-15.3 – 13.1	-2.3	7.5	-17.1 – 12.4
<i>LV SV (ml)</i>	1.9	4.5	-6.9 – 10.6	3.3	7.7	-11.9 – 18.4	1.4	6.8	-11.9 – 14.8
<i>LV EF (%)</i>	-0.04	1.9	-3.8 – 3.7	-1.2	3.6	-8.3 – 5.9	1.2	3.4	-5.4 – 7.9
<i>RV EDV (ml)</i>	0.3	9.9	-19.2 – 19.7	-2.1	10.6	-22.8 – 18.6	-2.3	11.6	-25.0 – 20.3
<i>RV ESV (ml)</i>	-1.6	7.7	-16.6 – 13.4	-4.7	8.1	-20.7 – 11.3	-3.1	9.4	-21.5 – 15.2
<i>RV SV (ml)</i>	1.8	6.6	-11.0 – 14.7	2.6	8.4	-13.8 – 19.1	0.8	7.5	-13.9 – 15.5
<i>RV EF (%)</i>	1.1	3.0	-4.7 – 6	2.2	3.6	-4.8 – 9.1	1.1	3.2	-5.1 – 7.3

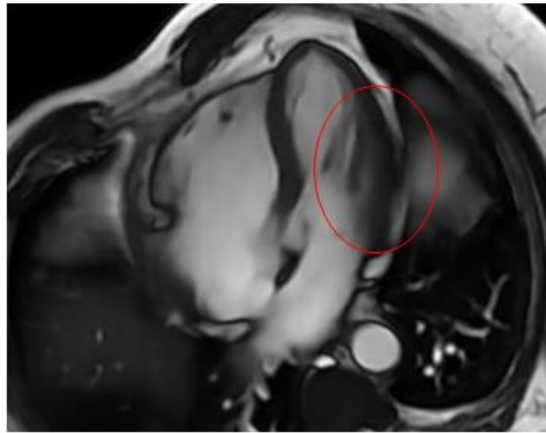
Supplemental Table

Table S2: Bland-Altman Analysis of all left ventricular (LV) and right ventricular (RV) volumetric parameter. Analysis of 1RR_BH vs. Reference, 1RR_FB vs Reference and 1RR_BH vs 1RR_FB of left ventricular volumetric parameter. EDV = end- diastolic volume, ESV = end-systolic volume, SV = stroke volume, EF = ejection fraction. FB= Free Breathing, BH = Breath Hold

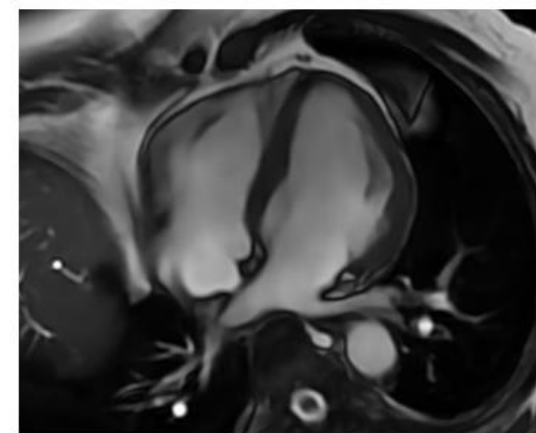
Figure S1: Examples of different subjective images quality ratings.



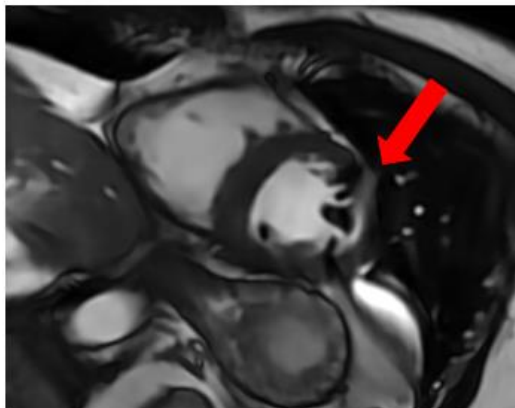
Mild artifacts (artifact score 4)



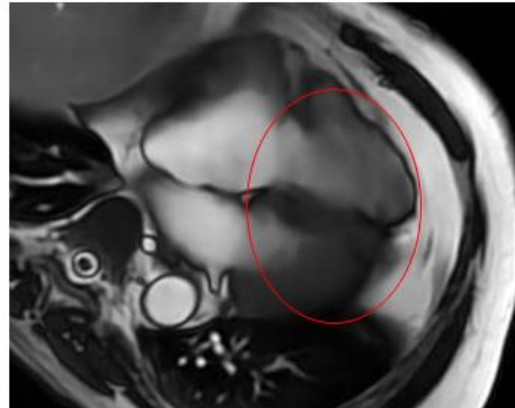
Mild blurring (sharpness score 4)



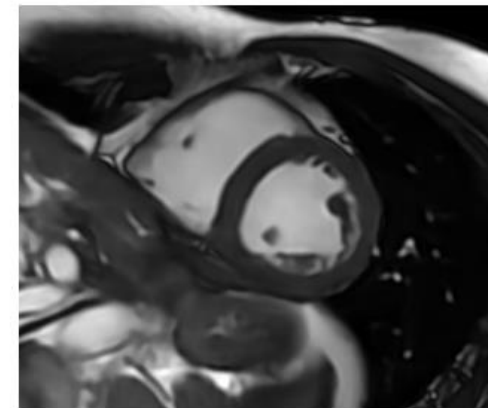
Good contrast (contrast score 4)



Moderate artifacts (artifact score 3)



Severe blurring (sharpness score 2)



Excellent contrast (contrast score 5)

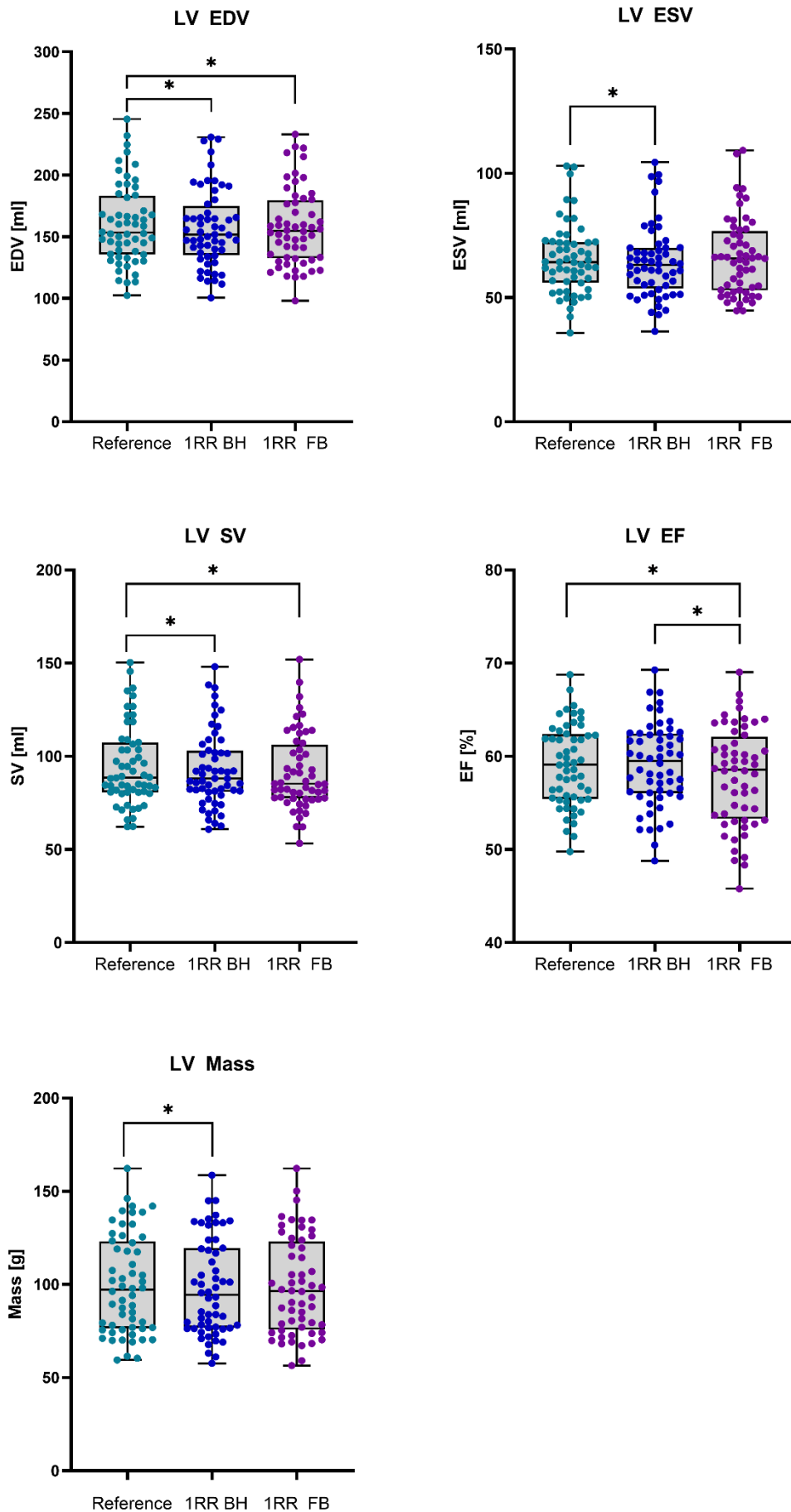


Figure S2: Boxplots of volumetric parameter of the left ventricle acquired for the reference, the 1rr breath hold (BH) and the 1RR free breathing (FB) sequence with * $p < 0.001$ from Wilcoxon paired signed rank sum test. EDV = end-diastolic volume, ESV = end-systolic volume, SV = stroke volume, EF = ejection fraction

Figure S3: Boxplots of volumetric parameter of the right ventricle acquired for the reference, the 1rr breath hold (BH) and the 1RR free breathing (FB) sequence with * $p < 0.001$ from Wilcoxon paired signed rank sum test. EDV = end- diastolic volume, ESV = end-systolic volume, SV = stroke volume, EF = ejection fraction

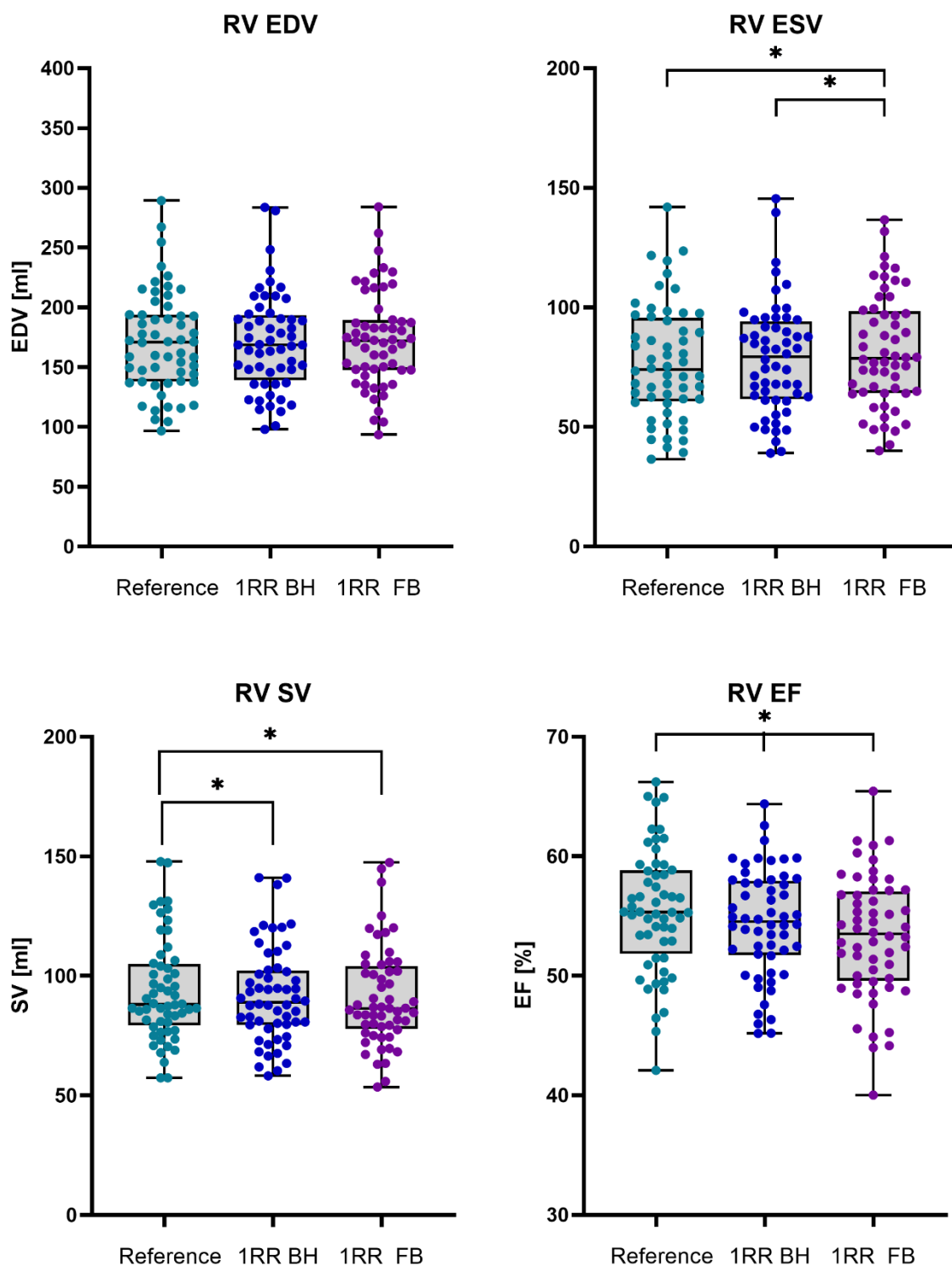


Figure S4: Bland-Altman Plots of all LV volumetric parameter. Analysis of 1RR_BH vs. Reference, 1RR_FB vs Reference and 1RR_BH vs 1RR_FB of left ventricular volumetric parameter. EDV = end- diastolic volume, ESV = end-systolic volume, SV = stroke volume, EF = ejection fraction. FB= Free Breathing, BH = Breath Hold

