

[Supplementary material](#)

Breath-hold vs. free-breathing sequences

Peak velocities

Overall the peak velocities measured in FB sequences were similar to BH sequences measured in aorta (valve 129.7 (18.4) vs. 131.9 (17.7) cm/s, $p=0.2$, ST-junction 114.4 (17.6) vs. 115.1 (17.0) cm/s, $p=0.6$, mid-ascending 95.2 (18.9) vs. 93.8 (18.1) cm/s, $p=0.2$) but significantly higher in FB compared to BH in the pulmonary artery (92.7 (18.1) vs. 88.2 (17.1) cm/s, $p=0.003$).

Heart rate

Participants tended to have slightly higher heart rates during FB sequences compared to BH sequences (valve 71.1 (10.0) vs. 68.1 (10.9) bpm, $p<0.001$, ST-junction 69.7 (10.3) vs. 68.3 (11.1) bpm, $p<0.001$, mid-ascending 68.6 (11.2) vs. 68.3 (11.2) bpm, $p=0.4$, pulmonary artery 67.5 (10.4) vs. 66.4 (10.2) bpm, $p=0.002$). Even though some of these heart rate differences were statistically different they were not considered clinically significant.

Artefacts

FB sequences displayed more artefacts including peri-vessel flow artefacts and overlapping flow artefacts, which could be seen when adding colour overlay to the images (Supplementary Figure S2), as well as blurring. These artefacts were most often seen in sequences at valve level and in the pulmonary artery. BH sequences did not display these artefacts to the same extent.

CMR systematically overestimates mitral regurgitations by the indirect method

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Supplementary Table S1 Mean stroke volumes <u>without</u> background correction measured in aorta and in the main pulmonary artery and corresponding Q_p/Q_s-ratios			
n=39	FB	BH	p-value FB vs. BH
Valve level			
Stroke volume, mL (SD)	105.1 (22.0)	103.7 (20.6)	0.13
Q _p /Q _s , mean (range)	0.95 (0.68 – 1.15)	1.00 (0.82 – 1.19)	
ST-junction level			
Stroke volume, mL (SD)	94.1 (19.8)	97.7 (19.8)	<0.001
Q _p /Q _s , mean (range)	1.06 (0.83 – 1.24)	1.06 (0.95 – 1.20)	
Mid-ascending aorta level			
Stroke volume, mL (SD)	91.5 (19.7)	94.5 (20.2)	0.001
Q _p /Q _s , mean (range)	1.09 (0.88 – 1.23)	1.10 (0.95 – 1.27)	
Pulmonary artery			
Stroke volume, mL (SD)	99.0 (20.6)	103.3 (20.4)	<0.001
p-values for flow vs. flow			
Valve vs. pulmonary	0.002	0.8	
ST-junction vs. mid-ascending	0.01	0.001	
p-values for paired t-tests.			
Abbreviations: FB = Free-breathing, BH= breath-hold, SV = stroke volume, ST-junction = sinotubular junction.			

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Supplementary Table S2 Stroke volumes of patients with no visible mitral and tricuspid regurgitations		
	FB	BH
No visible mitral regurgitation (n=30)		
Valve, mL (SD)	108.4 (19.4)	105.1 (18.7)
ST-junction, mL (SD)	100.2 (19.8)	101.4 (20.2)
Mid-ascending, mL (SD)	97.1 (21.2)	97.4 (21.2)
Volumetric LVSV, mL (SD)	114.6 (21.1)	
No visible tricuspid regurgitation (n=26)		
Pulmonary, mL (SD)	103.1 (21.9)	104.9 (20.7)
Volumetric RVSV, mL (SD)	109.6 (22.8)	
<p>These numbers included only patients with no visible mitral regurgitation for left sided comparisons or tricuspid regurgitation for right sided comparisons. All flow measurements are background corrected.</p> <p>All pairwise comparisons with paired t-tests between flow SV measurement and corresponding volumetric SV measurement were statistically significant ($p < 0.05$), see figure 4.</p> <p>FB = Free-breathing, BH = breath-hold, SV = stroke volume, ST-junction = sinotubular junction, LVSV = left ventricular stroke volume, RVSV = right ventricular stroke volume</p>		

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