

CMR 'standard left' protocol on 1.5 Tesla (Philips scanner)

Cardiovascular Magnetic Resonance (CMR) *Standard Left protocol*

Scanned Sequences

1. Survey for determination of the cardiac position – Balanced Fast Field Echo (BFFE) – expiration
2. t T1 weighted Black Blood SS
Only indicated when pericarditis, tumor (extracardial) or tuberous sclerosis is suspected
Plan on coronal plane
3. Balanced Turbo Field Echo (BTFE/RETR) 2 chamber left
Cine images of the 2 chamber view
4. BTFE/RETR short axis
Plan perpendicular to the 2 chamber left view, about 1/3 to the apex
5. BTFE/RETR 4 chamber
Cine images of the 4 chamber view: plan on the short axis
6. T2 mapping mGrase
Only indicated when acute infarction, myocarditis, pericarditis, sarcoid or a tumor is suspected.
Three slices of the short axis: between mitral valve and apex. Three times in one breath hold.
7. T2* Breath Hold short axis
Only indicated when suspected of hemochromatosis or amyloidosis
8. Native T1 mapping in short axis (3 slices) (MOLLI sequence)
Three slices of the short axis: between mitral valve and apex. Three times in one breath hold.

Administer a double dose of contrast (0.2 cc gadovist/kg) for the late enhancement images

9. BTFE/RETR short axis view
Functional images of the short axis, parallel to mitral valve
Between mitral valve and apex \pm 12-15 slices
10. BTFE/RETR 2 chamber left view
11. BTFE/RETR left ventricular outflow tract (LVOT) view
Cine images of the LVOT, angulate through the mitral- and aortic valve

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12. QFLOW/aortic valve

In case of obstructive hypertrophic cardiomyopathy: repeat this flow measurement 1 cm before the valve.

Make sure that at least 10 minutes have past between contrast injection and the Look Locker sequence

13. Look Locker

Determine the optimal inversion time (=highest blood/muscle contrast)

Use the inversion delay table and use these values for the 3D short axis views

Add +85 and use this value for the 2D Phase-Sensitive Inversion Recovery (PSIR) images.

14. Viability 3D short axis view

15. Viability 3D 4 chamber view

16. Multiple 2D slices (M2D)/ 4 chamber PSIR

Viability of 4 chamber

17. M2D/2 chamber left PSIR

Viability of 2 chamber left

18. M2D/LVOT PSIR

Viability of LVOT

Make sure that at least 15 minutes have past between contrast injection and T1 mapping sequence

19. T1 mapping enhanced short axis, 3 slices

Three slices of the short axis view conform native T1 mapping.

20. Real time triggered short axis images

Only indicated when suspected of pericarditis, restrictive cardiomyopathy and amyloidosis

Sequences 21-25 are only applicable in case of specific questions about the flow

21. QFLOW mitral valve

Plan on the 4 chamber cine and the 2 chamber cine left

22. BTFE/RETR 2 chamber right

Cines of the 2 chamber right are planned on the 4 chamber view (through the tricuspid valve and parallel to the septum).

It is important that the tricuspid valve is clearly visible.

23. QFLOW tricuspid valve

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Plan on the 4 chamber cine and the 2 chamber cine right view

24. BFFE/RETR right ventricular outflow tract (RVOT)

Cines of the RVOT, this is a sagittal view through the RVOT

25. QFLOW pulmonic valve (velocity=150 m/s)

Plan on the RVOT

Sequences 26-28 are only applicable in case of suspected thrombus. Make viability images with double inversion time (or as long as possible when a double inversion time is too long for the cardiac cycle)

26. Viability/3D 4 chamber, 2x inversion time

Plan conform the 4 chamber view

27. Viability/3D 2 chamber left, 2x inversion time

28. Viability/3D LVOT, 2x inversion time

Important notes

It is important that the blood draw for determination of the hematocrit value will be performed on the same day of the CMR. Hematocrit is necessary for the calculation of the extracellular volume from the T1 mapping sequence.