

MRI Protocol for MS study for 1.5T Siemens Sonata

CP Head coil and a Neck coil	Head			Neck		
	3D SWI	2D MRV	Flow Quantification*	2D MRV	3D MRV (Dynamic)	Hi-res MRA
					<i>Inject Contrast after 1st measurement for the 3D MRV</i>	
Sequence	swiIPAT	fl_tof	fl_fq_shphs	fl_tof	fl3d_ce	fl_tof
Orientation	Axial	Axial	Axial*	Axial	Coronal	Coronal
TR (ms)	50	26	32	26	3.66	15
TE (ms)	40	7.2	4.2	7.2	1.36	3.77
FA (degree)	15	70	30	70	30	30
FOV (mm ²)	256x192	256x192	256x192	256x192	340x255	400x400
Matrix size	512x256	512x256	448x448	512x256	384x384	640x640
Nz/TH (mm)	80/2	128/2.5	1/3	128/2.5	96/0.9	80/1.25
Voxel size (mm ³)	0.5x1x2	0.5x1x2.5	0.6x0.6x3	0.5x1x2.5	0.9x0.9x0.9	0.6x0.6x1.3
Ave./Meas.	1	1	1	1	1/15	1
Slice oversmpl						10.0%
Dist. factor		-33.0%	20.0%	-33.0%	20.0%	-11.25%
Phase Enc. Dir	R>>L	R>>L	A>>P	R>>L	R>>L	R>>L
iPAT					3/24	2/24
BW (Hz/pixel)	80	81	385	81	420	100
Flow Comp	Yes	Yes	No	Yes	Yes	Yes
Special Sat.		Tracking F	No	Tracking F		
Pre Saturation		Gap10mm; TH 40mm		Gap10mm; TH 40mm		
Flow Mode			Single Dir.			
Venc. (cm/s)			50			
1 st Signal/Mode			Pulse/Trigger			
Coils	Head	Head	Head	Head+Neck + SP1	Head+Neck + SP1	Head+Neck + SP1
Time	12:50	8:47	1:23 (x7)**	8:47	4:02	7:20
Total Time	12:50	21:37	31:18	40:05	44:07	51:27

Note: For MS patient, please add your institutional MS protocol.

* Should put pulse trigger on the patient's finger.

**Flow quantification will be done through and parallel the straight sinus, two trans, sag, the jugular vein on its upper and lower part, which leads to a total of 7 acquisitions.(Please use venc. of 35 for parallel to the straight sinus.)

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8CH Head coil and a Neck coil	Head			Neck		
	3D SWI	2D MRV	Flow Quantification*	2D MRV	3D MRV (Dynamic)	Hi-res MRA
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Orientation	Axial	Axial	Axial*	Axial	Coronal	Coronal
TR (ms)	50	26	32	26	3.66	15
TE (ms)	40	7.2	4.2	7.2	1.36	3.77
FA (degree)	15	70	30	70	30	30
FOV (mm ²)	256x192	256x192	256x192	256x192	340x255	400x400
Matrix size	512x256	512x256	448x448	512x256	384x384	640x640
Nz/TH (mm)	128/2	128/2.5	1/4	128/2.5	96/0.9	80/1.25
Voxel size (mm ³)	0.5x1x2	0.5x1x2.5	0.6x0.6x4	0.5x1x2.5	0.9x0.9x0.9	0.6x0.6x1.3
Ave./Meas.	1	1	1	1	1/15	1
Slice oversmpl						10.0%
Dist. factor		-33.0%	20.0%	-33.0%	20.0%	-11.25%
Phase Enc. Dir	R>>L	R>>L	A>>P	R>>L	R>>L	R>>L
iPAT	2/24	2/24		2/24	2/24	2/24
BW (Hz/pixel)	80	81	385	81	420	100
Flow Comp	Yes	Yes	No	Yes	Yes	Yes
Special Sat.		Tracking F	No	Tracking F		
Pre Saturation		Gap10mm; TH 40mm		Gap10mm; TH 40mm		
Flow Mode			Single Dir.			
Venc. (cm/s)			50			
¹ Signal/Mode			Pulse/Trigger			
Coils	Head	Head	Head	Head+Neck + SP1	Head+Neck + SP1	Head+Neck + SP1
Time	11:33	5:11	1:23 (x7)**	5:11	5:28	7:20
Total Time	11:33	16:44	26:25	31:36	37:04	44:24

Note: For MS patient, please add your institutional MS protocol.

* Should put pulse trigger on the patient's finger.

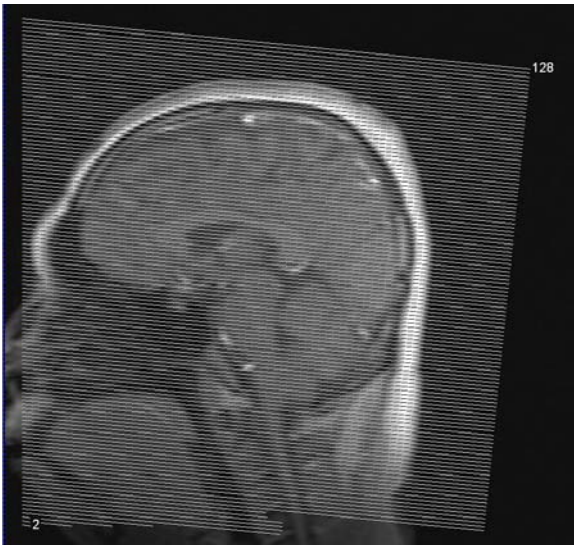
**Flow quantification will be done through and parallel the straight sinus, two trans, sag, the jugular vein on its upper and lower part, which leads to a total of 7 acquisitions.(Please use venc. of 35 for parallel to the straight sinus.)

Scanning Procedure:

- While registering the subject, include their height and weight. This plays an important role in flow quantification.
- Use both Head and Neck coil for all the sequences.
- Also put a Pulse trigger on the subject's (left / right) index finger before starting the scan.

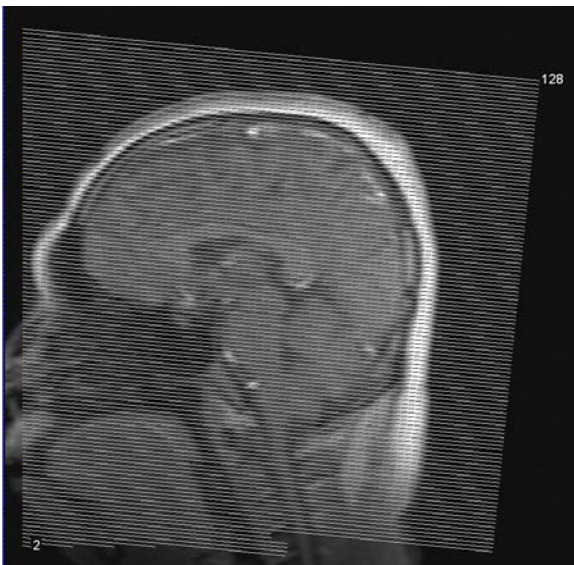
Here some images showing the positioning for different sequences.

SWI Axial:



Note: Cover the whole brain including neck.

2D TOF MRV Axial:



Same as SWI Axial.

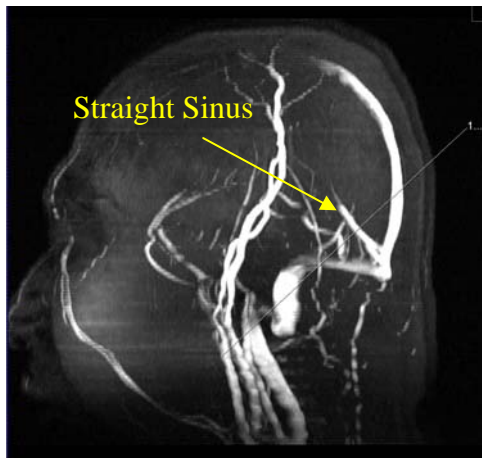
Note: Copy the slice positioning from the SWI Axial.

Flow Compensated sequence with Venc = 50 cm/sec:

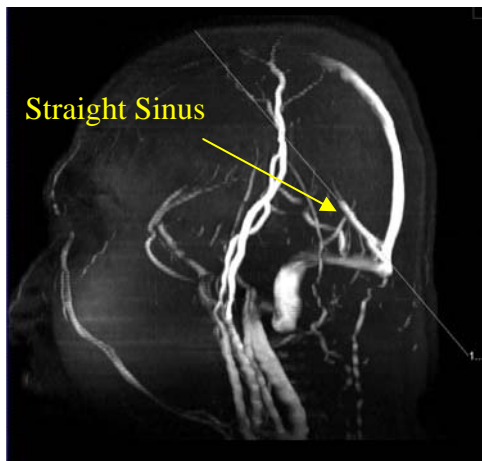
Make sure to put the pulse trigger on the subject's (left / right) index finger.

This sequence need to be repeated for different parts of the brain. See below:

- Perpendicular to Straight sinus:

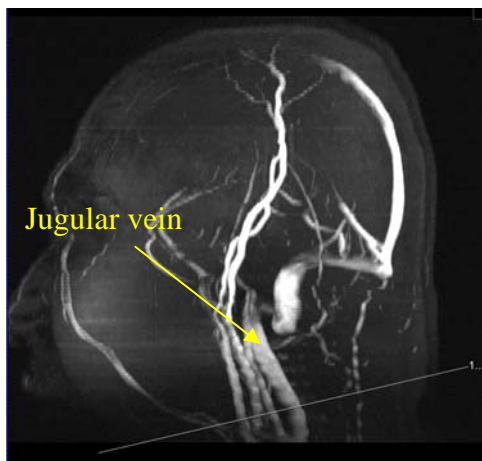


- In-Plane to Straight sinus:

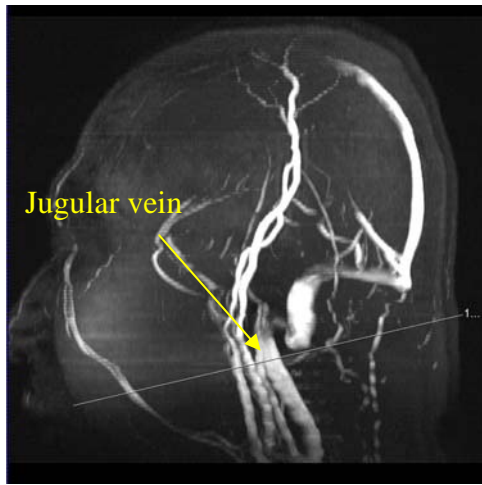


(Please use **venc. of 35** for parallel to the straight sinus.)

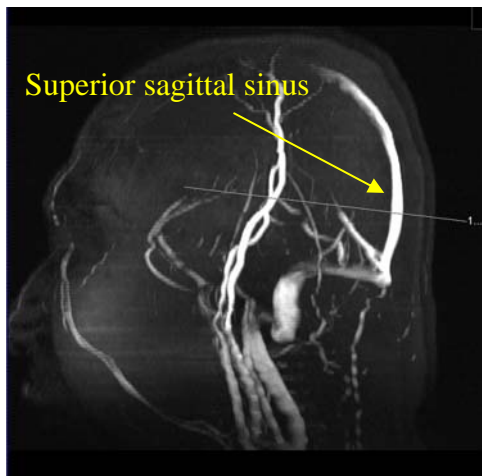
- Perpendicular to Jugular vein (lower part of the neck):



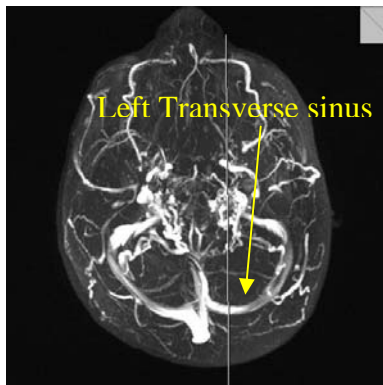
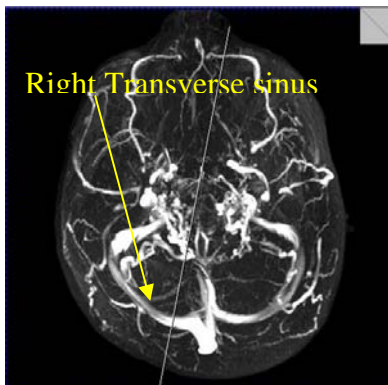
- Perpendicular to Jugular vein (upper part of the neck):



- Perpendicular to Superior sagittal sinus:

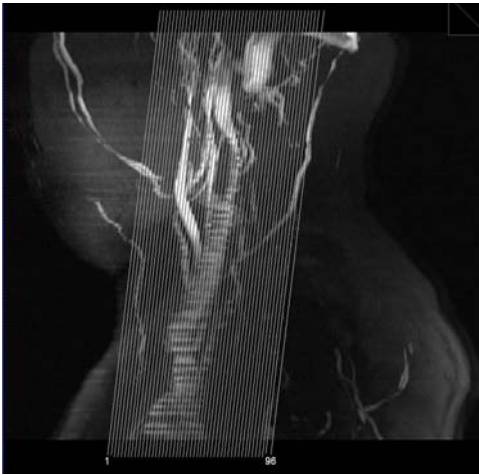


- Perpendicular to Transverse sinus:



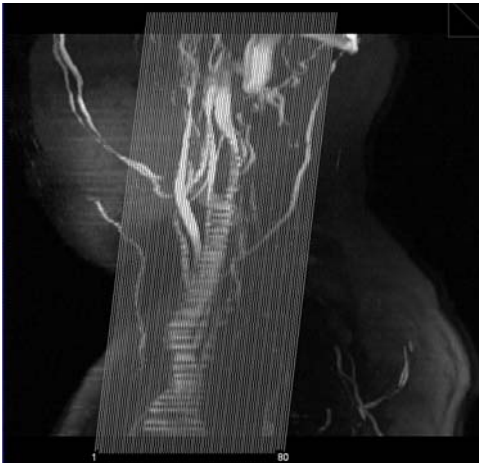
Note: This sequence should be repeated twice for left and right transverse sinuses. In some subjects you might observe either left / right transverse sinus only (which is normal). In such cases, just scan that transverse sinus that you observe.

- 3D MRV Dynamic:



Note: Make sure to be parallel to jugular veins. Also, Inject Contrast after 1st measurement for the 3D MRV.

- Hi-Res MRA:



Note: Same as 3D MRV Dynamic