

Multiple Sclerosis (MS)

Alternate Protocol Training

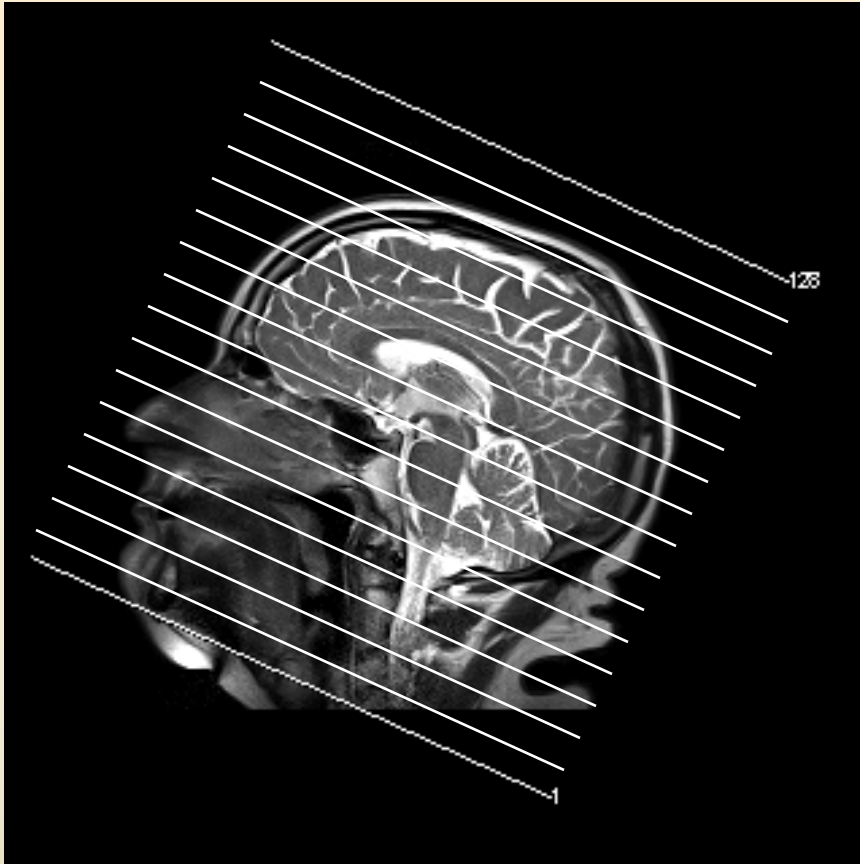
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Wayne State University
June 23, 2010

Scanning Procedure

- While registering the subject, include their height and weight. This plays an important role in flow quantification.
- Also put a Pulse trigger on the subject's (left / right) index finger before starting the scan.
- Position the subject at the orbital ridge.

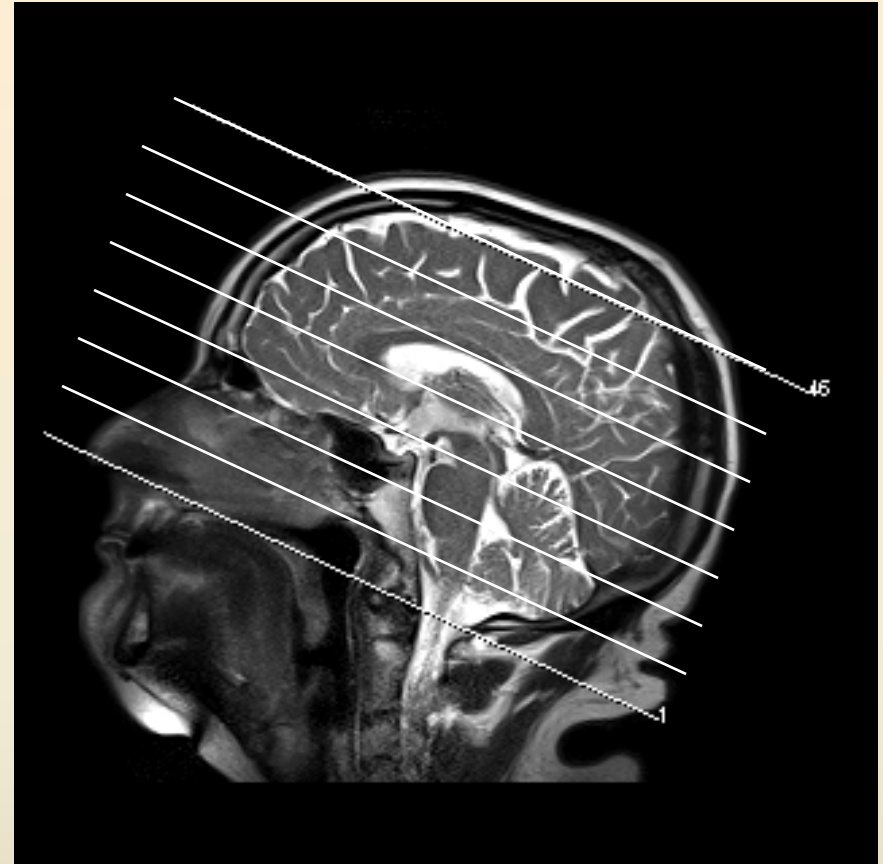
Slice Positioning for different sequences

3D SWI 1X0.5X2 - Axial



Note: Activate HEA;HEP;NE1,2 coils

2D FLAIR - Axial

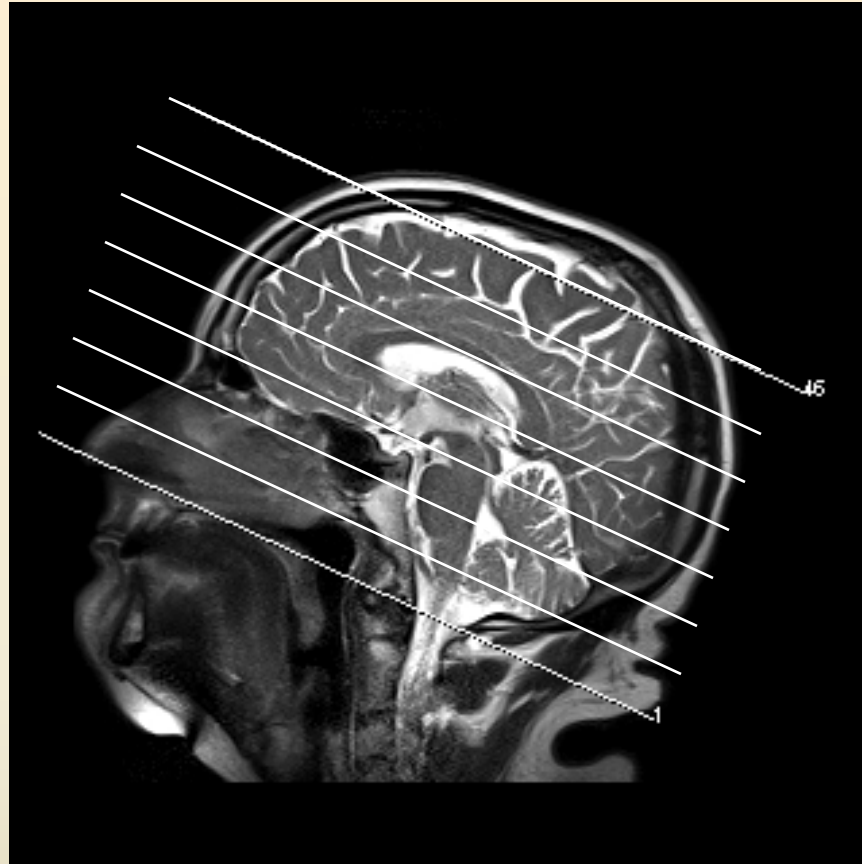


Note: Activate HEA;HEP;NE1,2 coils

Note:

- Slice position for the above SWI, FLAIR sequence should be parallel to subcallosal plane.

T1 Pre GAD

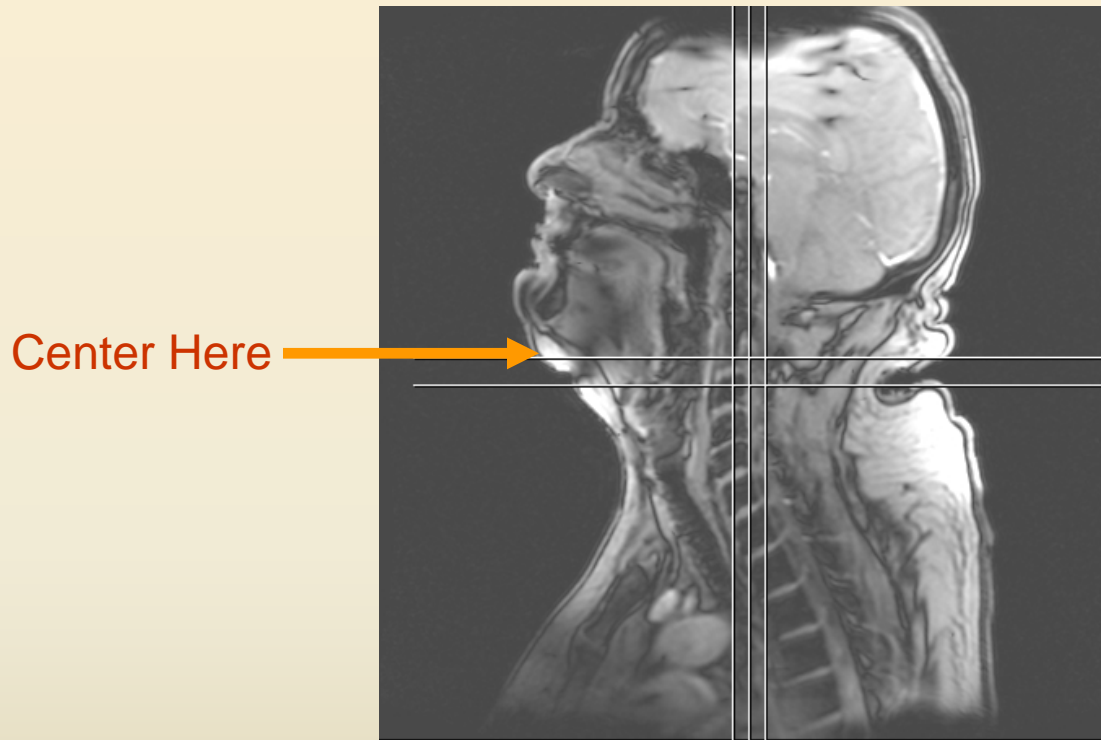


Note: Activate HEA;HEP;NE1,2 coils

Note:

- Copy the slice position from the 3D SWI sequence.

Now move the table position to center at the chin

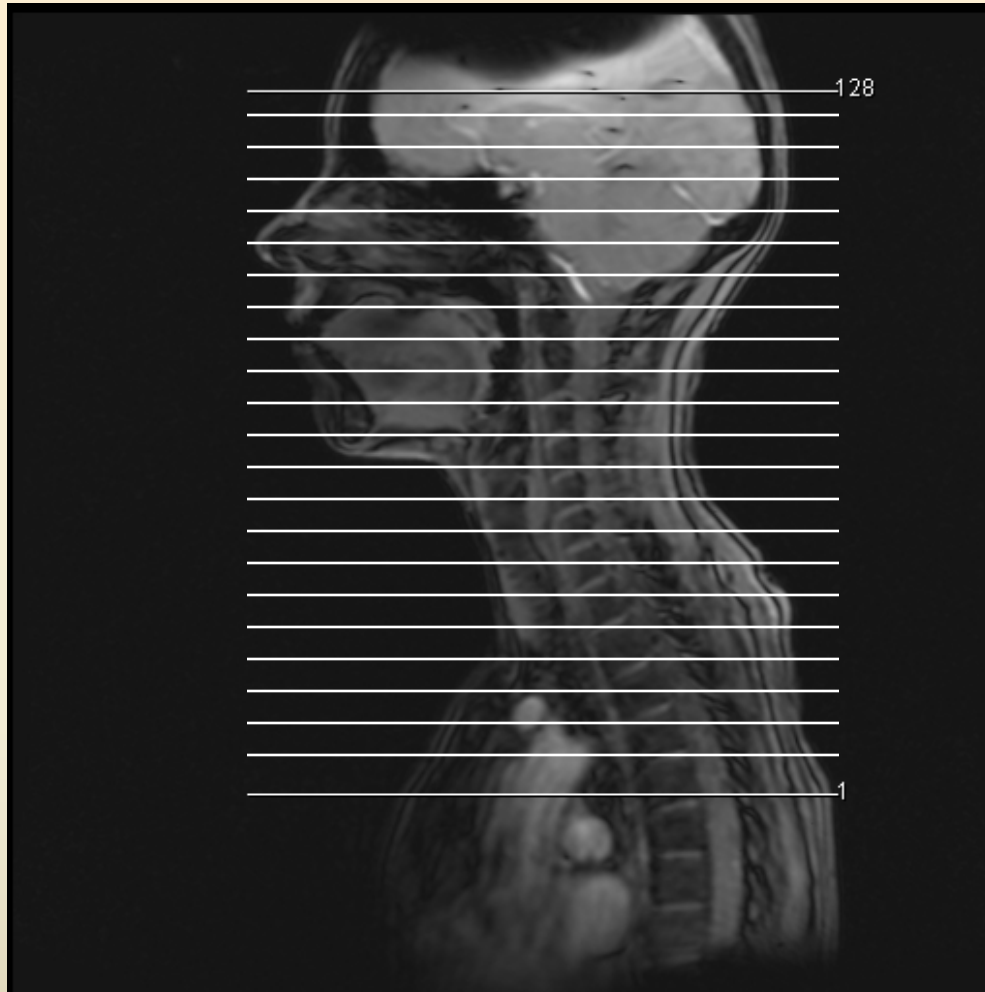


Neck Localizer

Note:

When the table position is centered at the chin, make sure to use HEA;HEP;NE1,2;SP1,2 coils are activated for all the sequences (Neck Localizer, 2DMRV, Flow Quantification, 3D VIBE, 3D MRV).

2D MRV (neck)

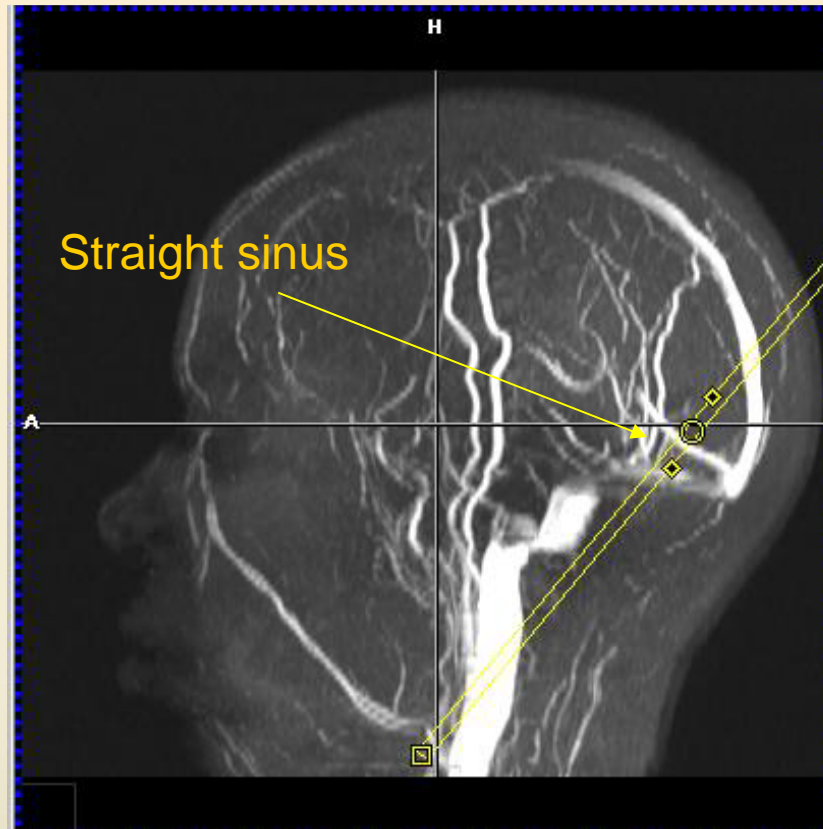


Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Flow Quantification

- Make sure to **put the pulse trigger** on the subject's (left / right) index finger.
- Flow quantification will be done perpendicular to the straight sinus, the internal jugular veins (IJV's) at the upper and lower level, the azygus vein, also coronal to get both IJV's in the neck, which leads to a total of 7 flow quantifications (three slices are collected coronally at the same time). Please use venc of 50cm/s for all the venc sequences.
- This sequence need to be repeated for different parts of the brain. See the next slides.

Perpendicular to Straight sinus

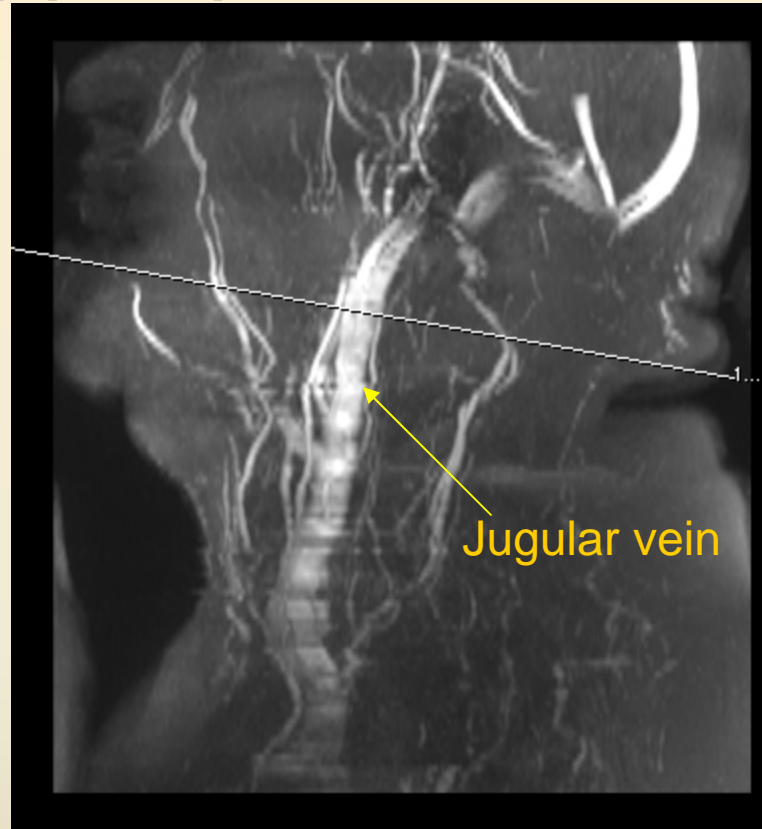


Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Note:

- 1) Position the slice slab perpendicular to Straight sinus as shown above.
- 2) Make sure to use $venc = 50$ cm/sec.

Perpendicular to Internal Jugular vein (Upper part of the neck)

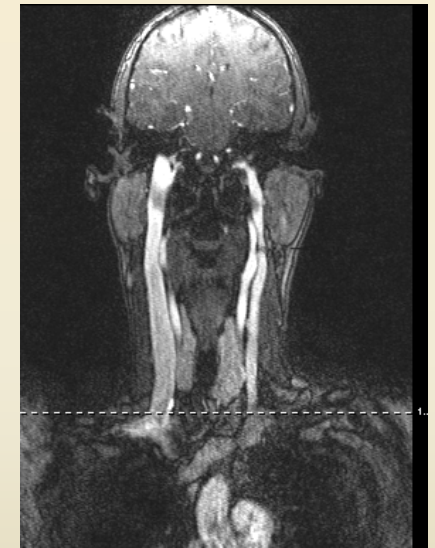
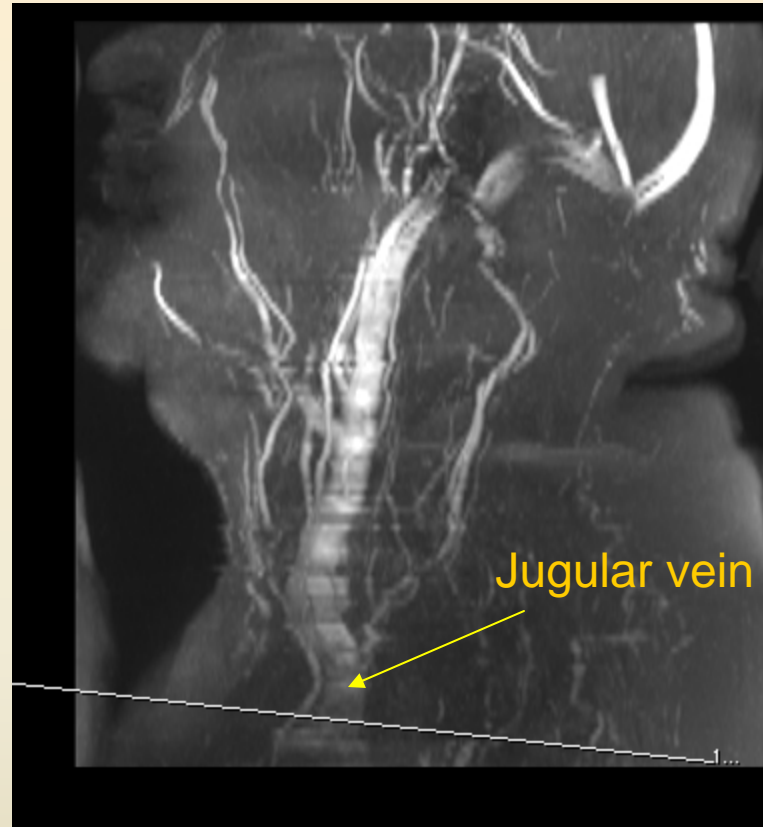


Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Note:

- 1) Position the slice slab perpendicular to Jugular vein in the upper part of the neck.
- 2) Make sure to use $venc = 50$ cm/sec.

Perpendicular to Internal Jugular vein (Lower part of the neck)



Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Note:

- 1) Position the slice slab perpendicular to Jugular vein at the confluence of the jugulars.
- 2) Make sure to use $venc = 50$ cm/sec.

3D VIBE (Pre/Post GAD)

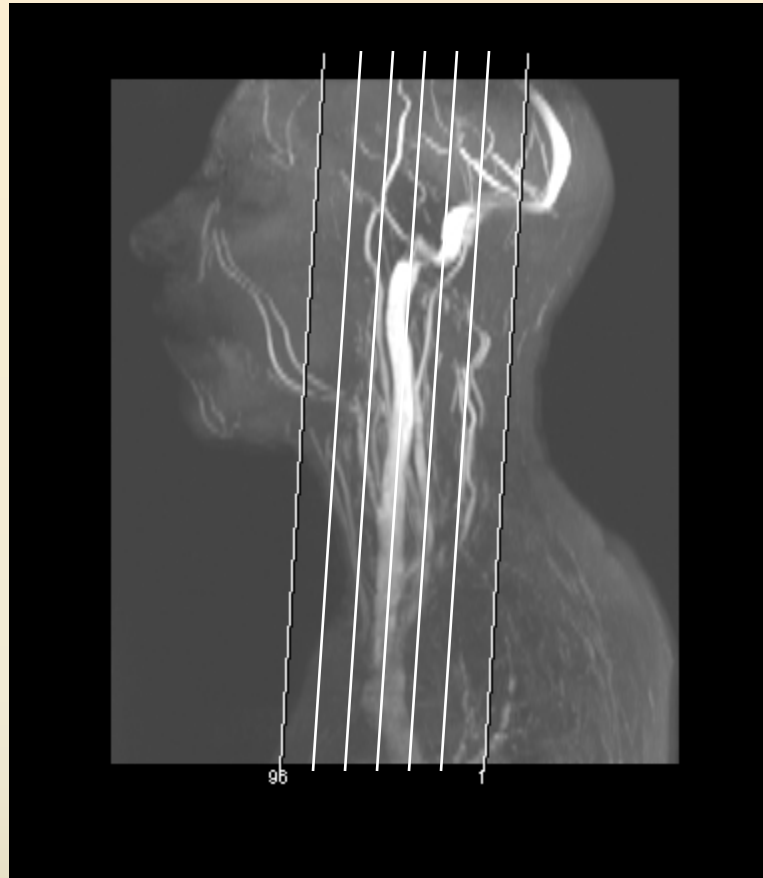


Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Note:

- Copy the slice position from the 2D MRV sequence.
- Do the POST GAD after the 3D MRV sequence.

3D MRV (Dynamic)

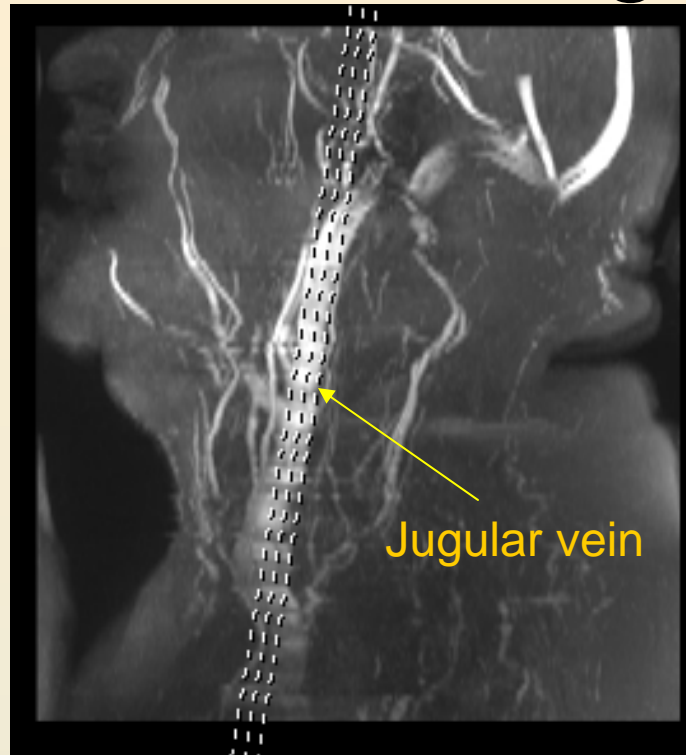


Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Note:

- Use the MIPed sagittal slice from the 2D MRV sequence and position the slice slab parallel to the Jugular veins.
- Inject contrast after 1st measurement.

Coronal to Internal Jugular veins



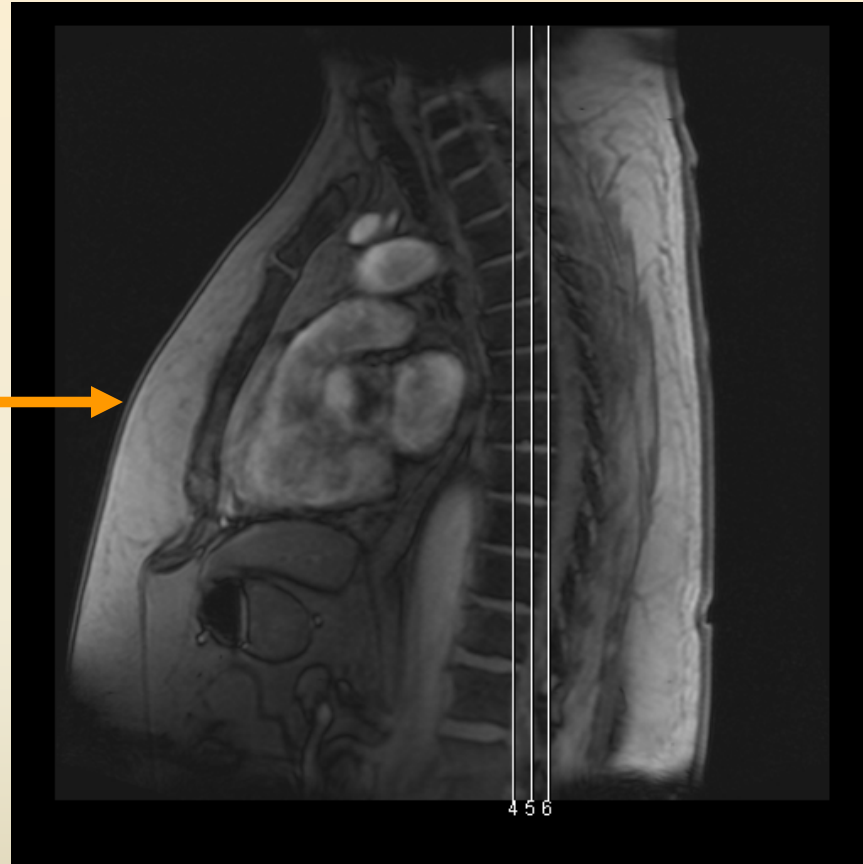
Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Note:

- 1) Position the coronal slice slab parallel to the jugulars. To do this, please use a MIPed sagittal slice from the time resolved 3D coronal data and use transverse slice in the lower neck and again in the higher neck to make sure you have covered the base of each jugular and the upper part of each jugular. This way you will be able to obtain a true coronal of IJV's.
- 2) Make sure to use $venc = 50 \text{ cm/sec}$.

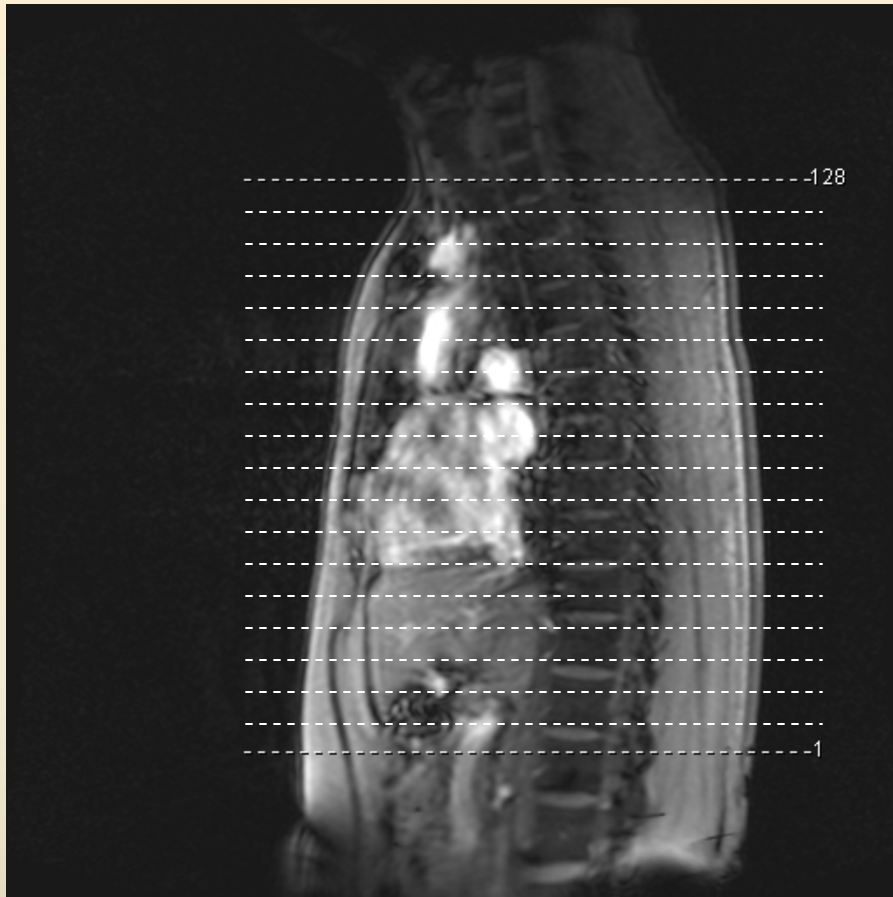
Now move the table position to center at mid sternum

Center Here →



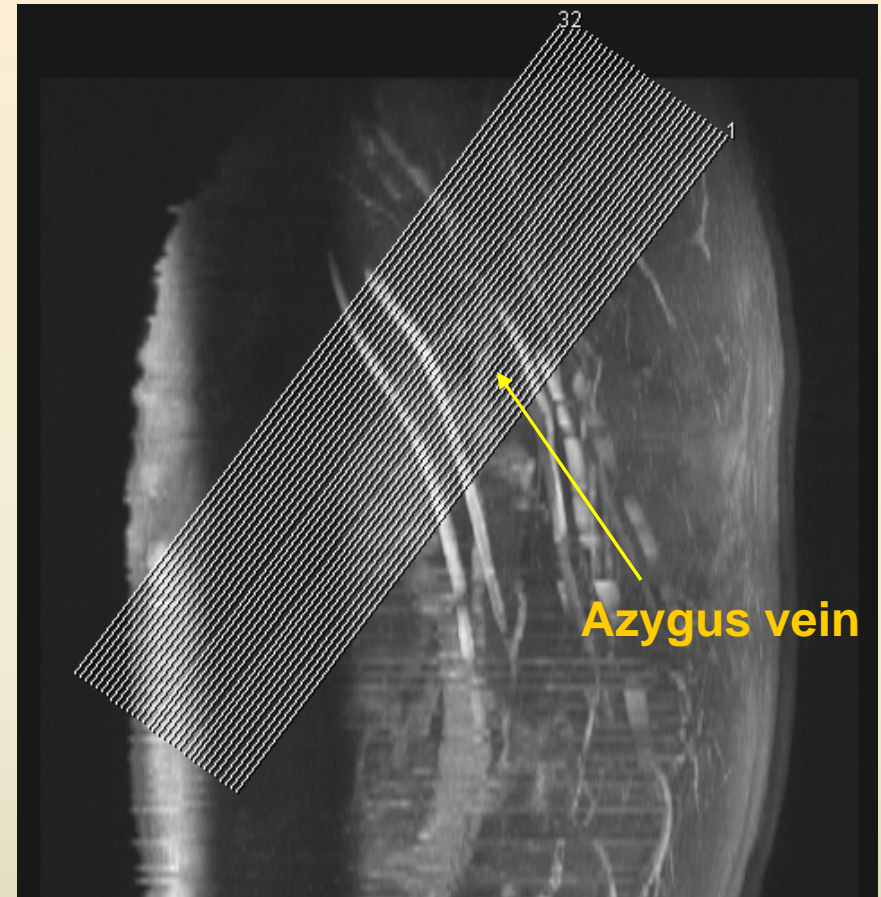
Azygus Localizer

2D MRV (azygus) Axial



Note: Activate NE1,2; SP1,2,3,4 coils

2D MRV (azygus) Para Coronal

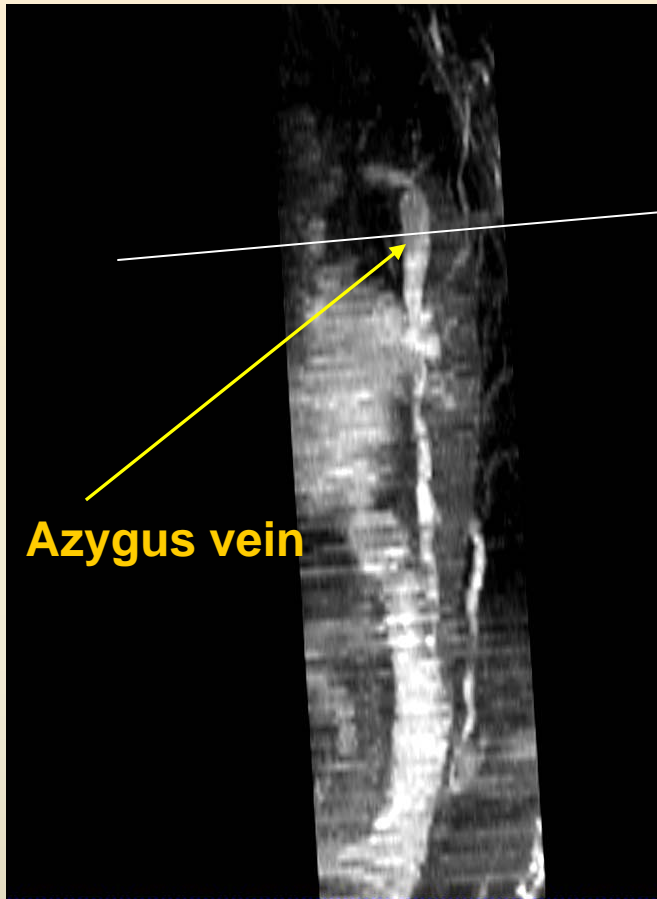


Note: Activate NE1,2; SP1,2,3,4 coils

Note:

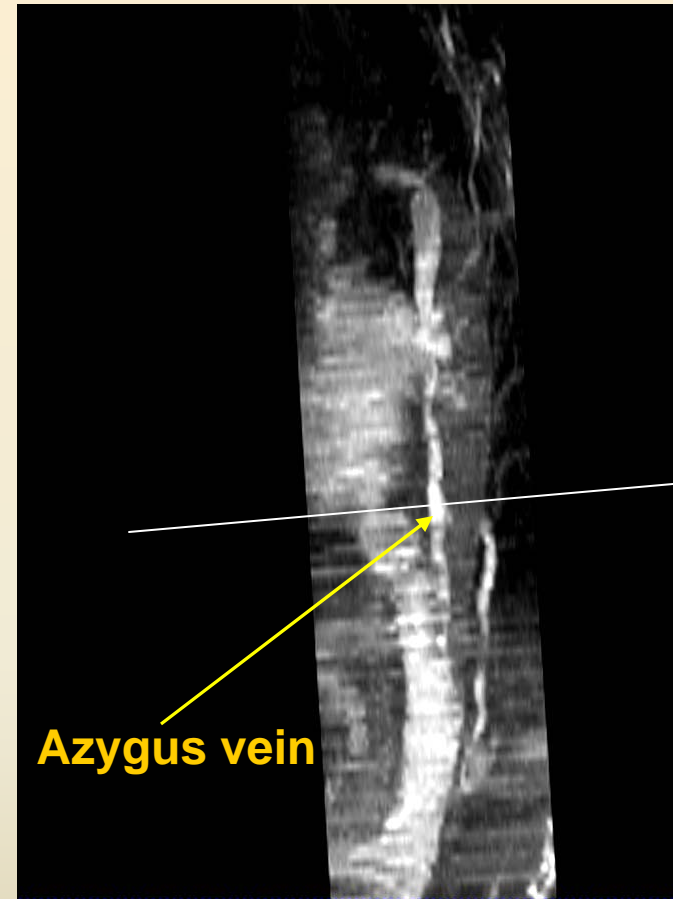
- This is an option if you have time.
- Position the slice slab para coronal to the arch of the azygus.

Upper level - Azygus vein



Note: Activate NE1,2; SP1,2,3,4 coils

Lower level - Azygus vein



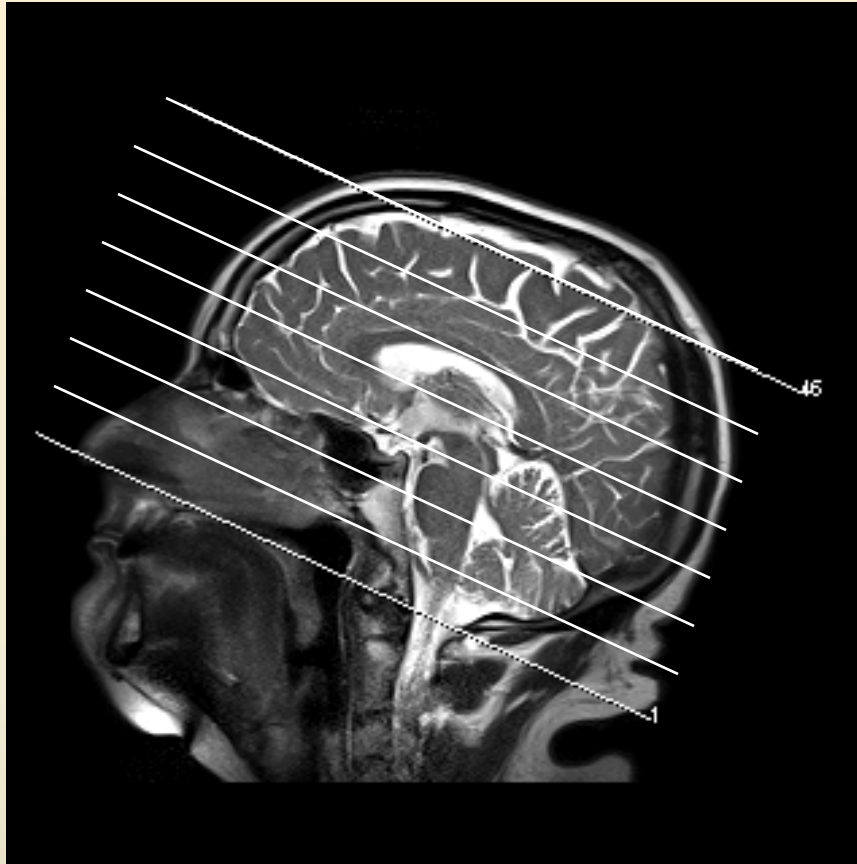
Note: Activate NE1,2; SP1,2,3,4 coils

Note:

- Make sure to use $venc = 40$ cm/sec.

Now again move the table position to center at the orbital ridge to do POST
GAD Brain

T1 Post GAD

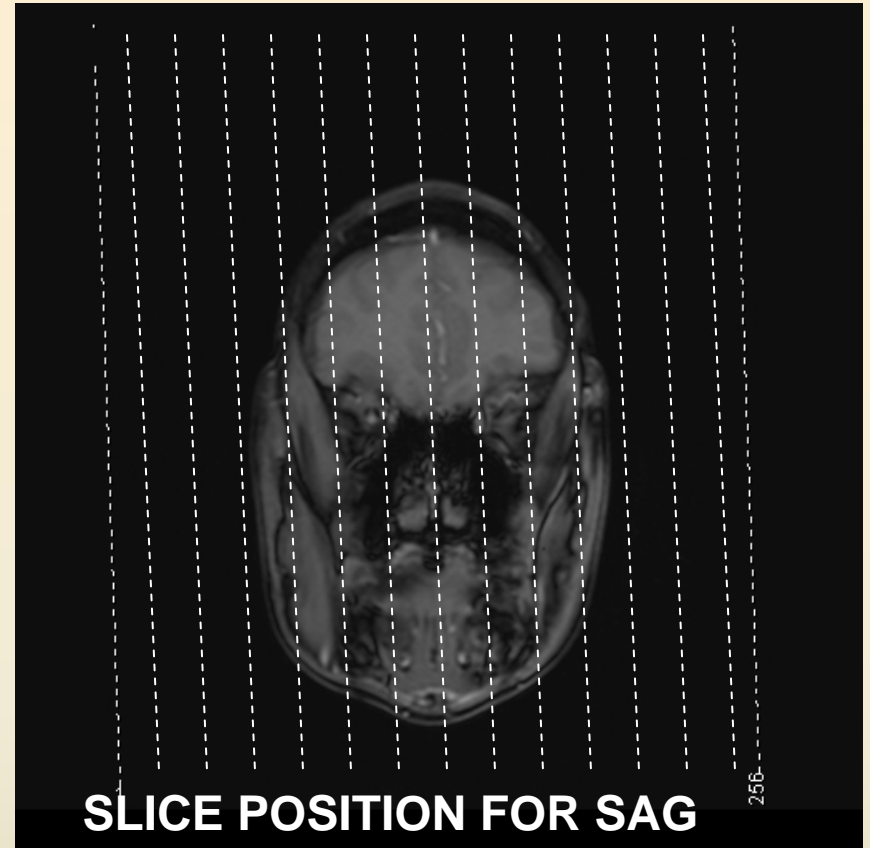


Note: Activate HEA;HEP;NE1,2 coils

Note:

- Copy the slice position from the 3D SWI sequence.

3D VIBE (Post GAD)

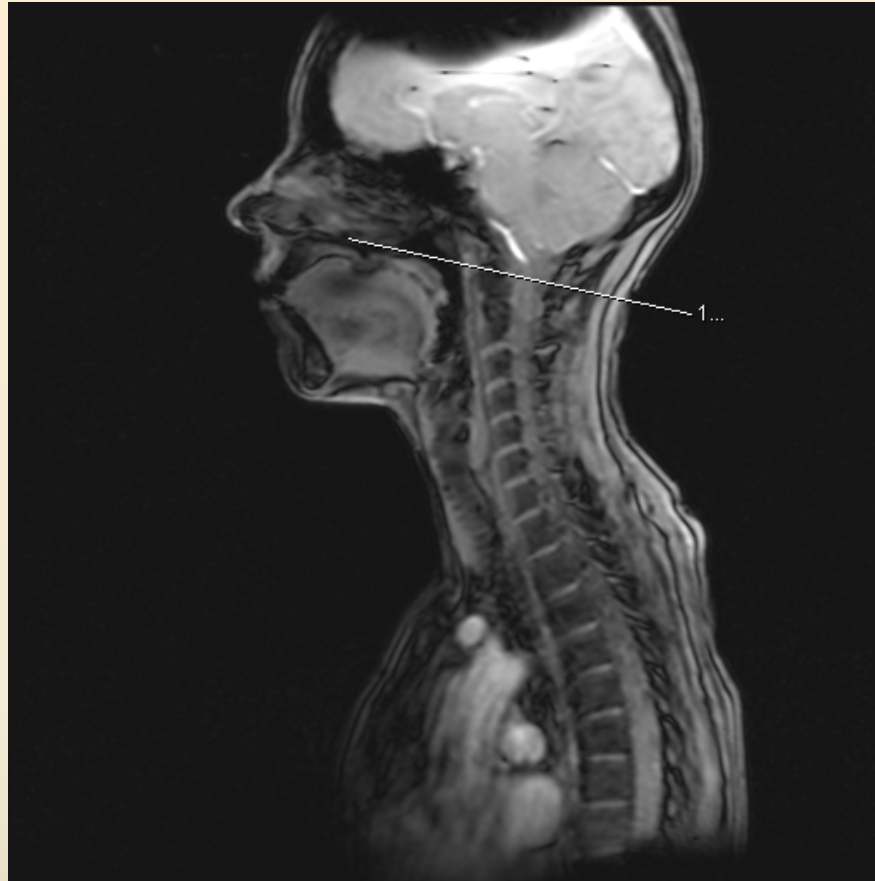


Note: Activate HEA;HEP;NE1,2;SP1,2 coils

Note:

- Copy the slice position from the 3D FLAIR sequence.

CSF FLOW



Note: Activate HEA;HEP;NE1,2;SP1 coils

Note:

- Position the slice slab at the base of the skull.