

SMRT Student Scope Submission

Title and Author(s)



Title: "MRI Evaluation of the Thorax for Venous Mapping"

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Introduction or Patient History



A 28-year-old male with Hodgkin's Disease presents with known lymphoma and venous thrombosis. A vein mapping study is requested to evaluate for catheter placement. The patient already has an existing portacath placed in the left jugular vein with the tip at the cavoatrial junction.

Patient Preparation and Scan Set up



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The patient was interviewed on arrival and a MRI screening form was completed. The patient was changed into a hospital gown and an angiocatheter was placed for the purpose of contrast injection during the exam. After being screened a second time by a technologist according to MR safety guidelines, the patient was brought into the scan room. The MR table had been previously set up with the spine array coil and the patient was positioned supine. A phased array coil was then placed over the patients' chest.. and hearing protection was offered in the form of either a headset for music or earplugs. The patient chose to use earplugs. The filled contrast injector was then connected to the patients placed angiocatheter. At this time the exam was again explained to the patient. He was informed that all of the scans would be breath-holding scans. He was instructed to only do the best he could and if he were unable to hold his breath he should let his breath out as slowly as possible. This technique would also help to reduce phase ghosting artifact. The patient was then given a squeeze ball to notify the technologist if he needed attention. The patient was then centered, land marked and advanced into the scanner.

MR Imaging Parameters

Scan sequences were acquired on a 1.5T Siemens system. This imaging system is a symphony system 2004A/25A software level.

Images	Sequence	Type	TR	TE	FOV	Slice Thickness	Matrix	NSA	BW
Not shown	3 Plan Loc	gre	4.3	2.15	500mm	10mm	238x256	1	780
Not shown	Ax ss	haste	1530	88	360mm	7mm	256x256	1	650
Shown as image 1	Cor ss	haste	1150	96	400mm	7mm	179x256	1	650
Not shown	Sag ss	haste	1000	94	460mm	7mm	141x256	1	650
Shown as images 2,3,4,	In & out phase	T1 gre	2.72	2.4	360mm	7mm	256x512	1	545
Not shown	Cor 3d pre	3D gr vol	4.9	1.6	500mm	3mm	229x512	1	360
Not shown	Care bolus	Tfl	500	1.76	440mm	20mm	112x256	2	400
Shown as image 5	Cor 3d post arterial	3D gr vol	4.8	1.8	400mm	3mm	256x512	2	390
Shown as image 6	Cor 3d post venous	3D gr vol	4.8	1.8	400mm	3mm	256x512	2	390
Not shown	Cor 3d post	3D gr vol	4.8	1.8	400mm	3mm	256x512	2	390
Not shown	2d axial delayed x 2	Spgr	239	2.8	360mm	7mm	232x512	1	300
Not shown	2d sag delayed	Spgr	239	2.8	360mm	7.5mm	232x512	1	300
Shown as image 7	MIP1								
Not shown	MIP 2								
Not shown	MIP 3								
Shown as image 8	MIP4								
Not shown	MIP 5								

Findings and Discussions

This examination demonstrated several enlarged lymph nodes throughout the right supraclavical region, the posterior left upper chest wall, and a mass in the right periaortic region. This mass likely represents a cluster of lymphadenoma. This large region of lymphadenoma suggests that the patients disease has spread. Typically the way Hodgkin's disease spreads is, if originating in the neck it will spread to the supraclavical area then to the axillary region and move on to invade the lymph nodes in the chest and abdomen. Hodgkin's can also affect the spleen and the bone marrow, which are also part of the lymphatic system. A Radiologist report from a previous CT of the abdomen reports a "surgically absent spleen". One might conclude that this patient's affliction with this disease has been rather involved.

Previous Radiology reports indicate that this patient already has had a "tunnel catheter" placed and subsequently removed and now has a portacath placed in the left internal jugular vein. The indication for this vein mapping examination may signify that problems have arisen with the portacath and a new site for catheter placement without complications is the goal.

On the left side there is a 40% stenosis of the internal jugular at its junction with the subclavian vein. The images also reveal an occluded internal jugular vein with an enlarged external jugular vein on the right. All other relative veins in these images according to the Radiology report are patent.

Six days after this MR examination a peripherally inserted central catheter was placed using the patients right basilic vein. A 5 French 40 cm double lumen PICC was used. The tip was advanced to the junction of the superior vena cava and the right atrium.

This type of catheter could be used for chemotherapy, intravenous fluids, or even blood draws. The use of a long term type of catheter such as this one will save the patient numerous and difficult needle sticks due to hardening of the veins which in turn are due to chemotherapy.

Conclusions

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This type of exam is advantageous to the patient because unlike CT and Angiography, MRI doesn't use ionizing radiation to produce images. In addition the gadolinium based contrast used with MRI has a much lower rate of incidence than the contrast used with CT and Angiography. The images in this exam were reformatted using multiplanar reformation (MPR). As evidenced by the resulting MIP images some of the occlusions and/or stenosis were better visualized on the reformations than on the actual images. The quickness of this examination helped the patient with his comfort and put him at ease which in turn resulted in good images. This examination gave the Radiologist all the information they needed to answer the questions for the clinician and it only lasted approximately 30 minutes. Because of the above-mentioned conditions I would believe that MRI of the Thorax for venous mapping would be the modality and exam of choice for this type of indication.

References

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Hodgkin's Disease Causes, Symptoms, and Treatments- Fact Book
http://www.healthnewsflash.com/conditions/hodgkins_cancer.htm#6

Cancer Back Up
<http://www.cancerbackup.org.uk/Treatments/Chemotherapy/ Linesports/PICCline>

Images



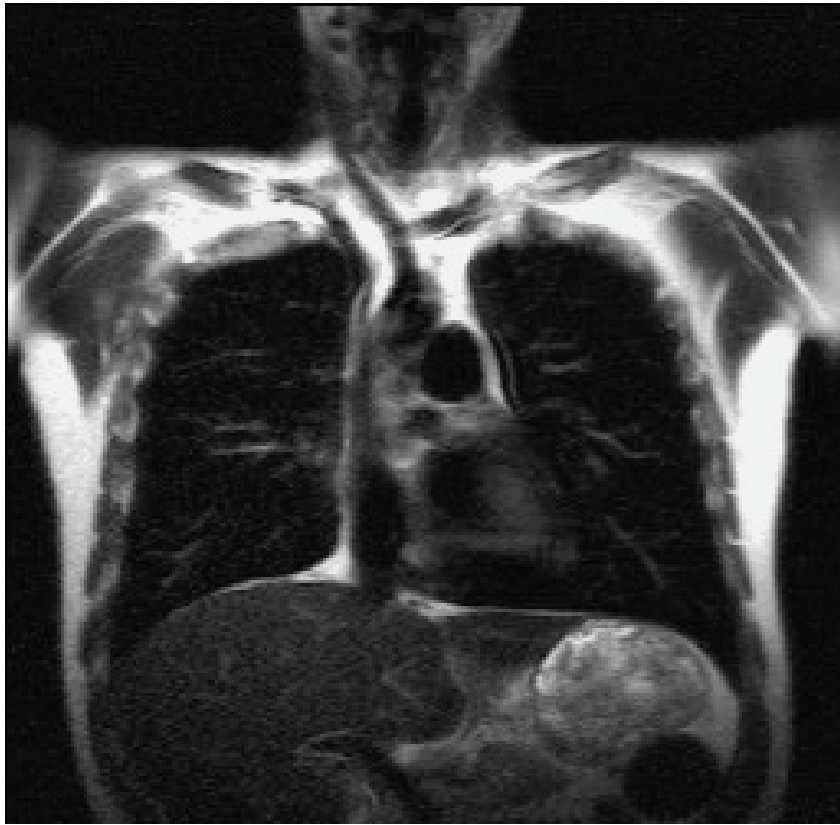


Image #1- Coronal single shot - demonstrates the anatomy of the patient

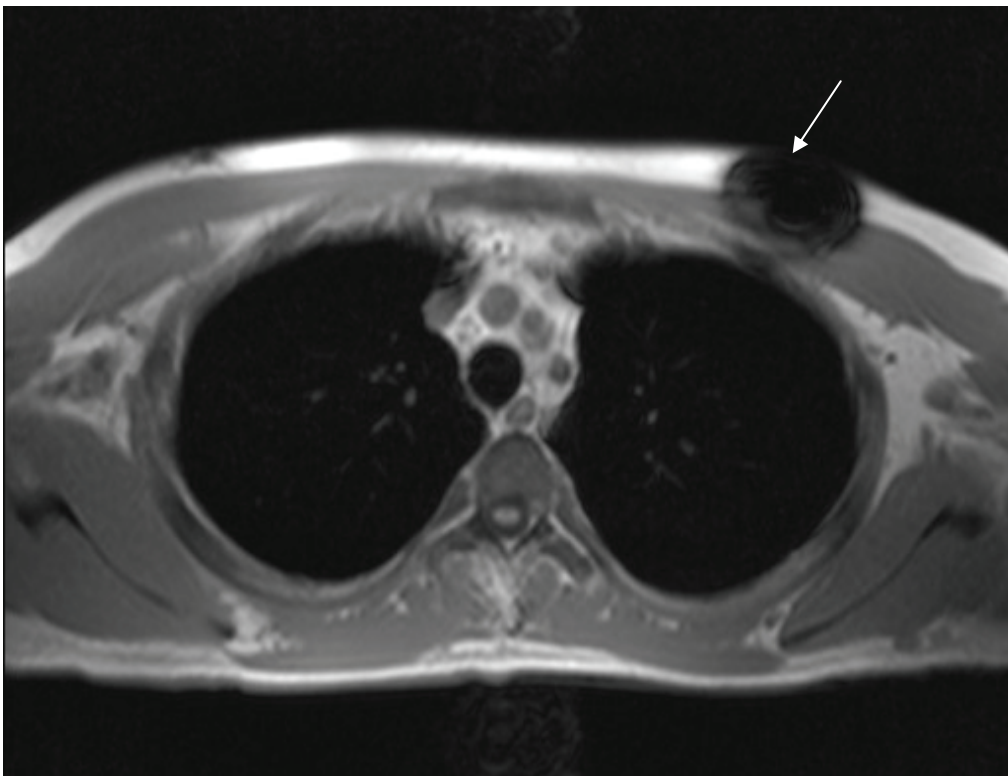


Image #2- Axial in phase image shows artifact that is the placed portacath(arrow)

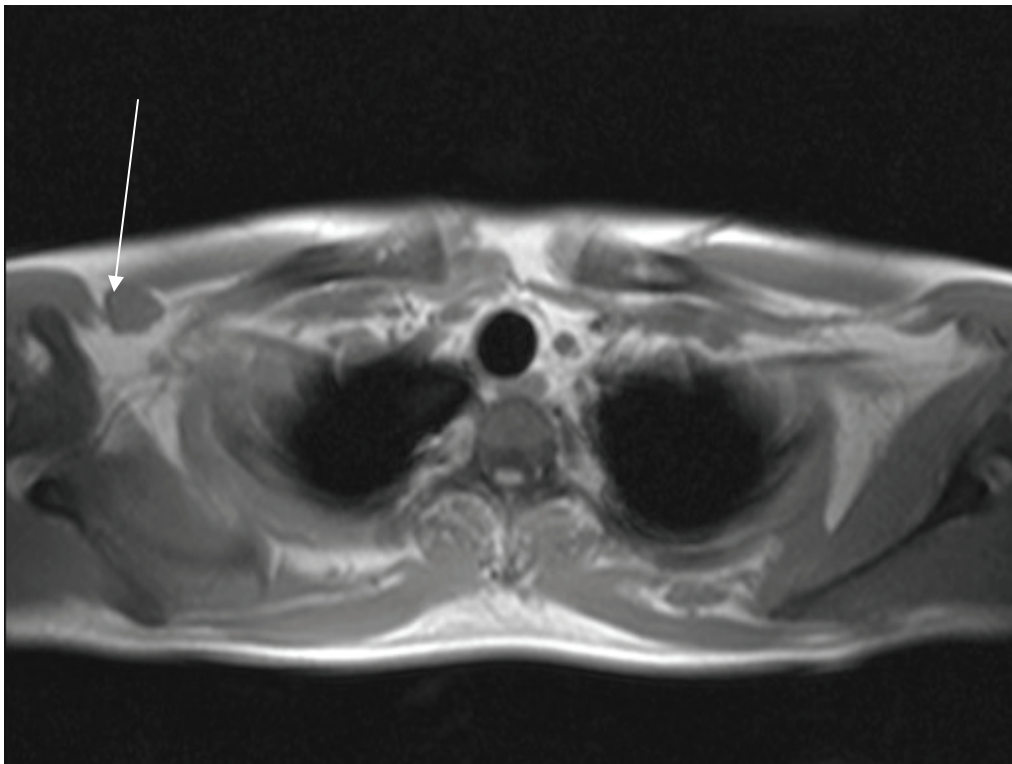


Image #3- Axial in phase image demonstrates an enlarged lymph node_(arrow)

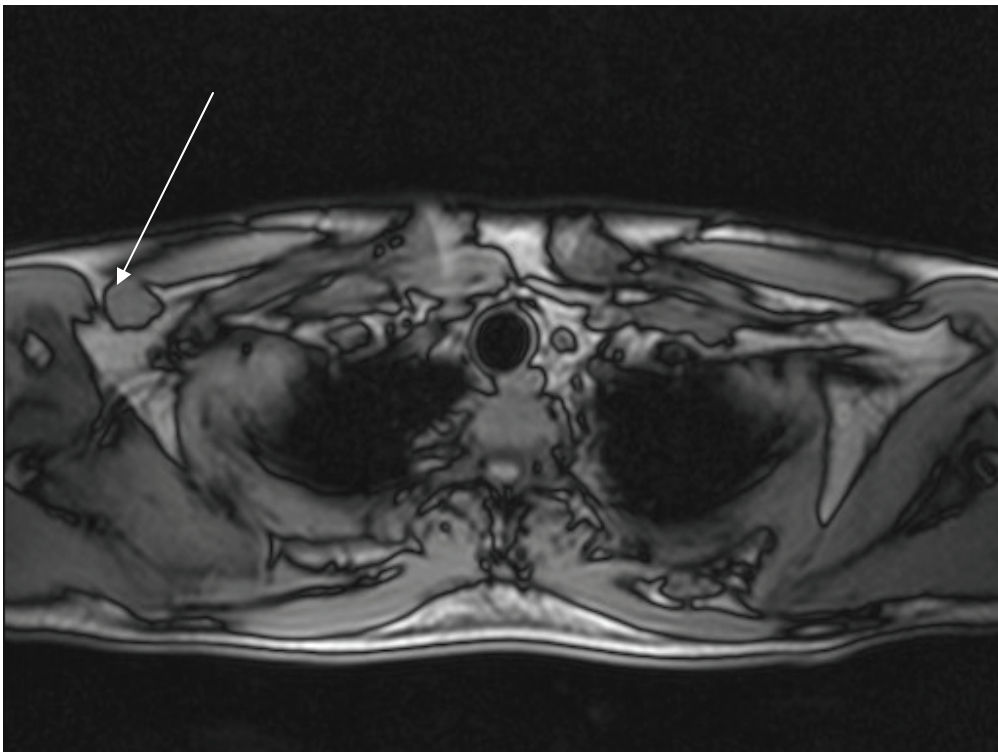


Image #4- Axial out of phase image demonstrates an enlarged lymph node_(arrow)



Image # 5-coronal 3d post arterial collapsed image demonstrates the 40% stenosis of the jugular vein at the junction with the subclavian vein (arrow)

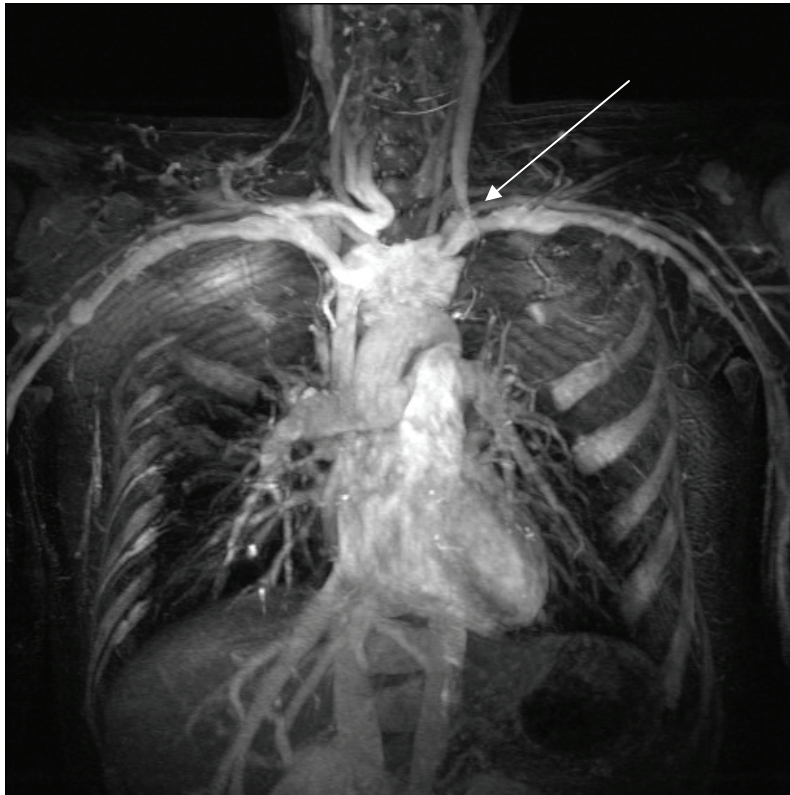


Image #6- coronal 3d post venous collapsed image demonstrates the left stenosis of the jugular vein (arrow). The right-sided occlusion is not easily visible

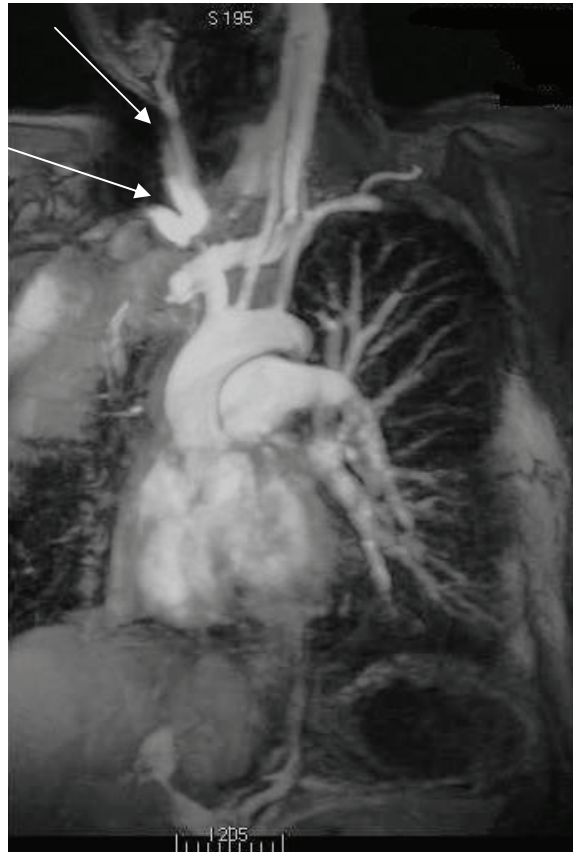
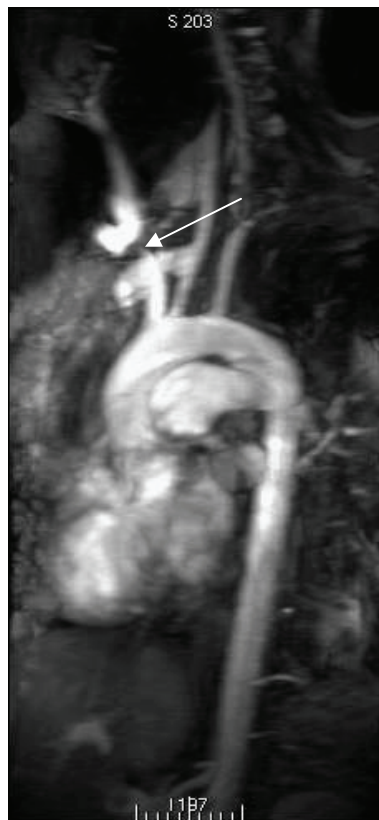


Image #7- MIP1 image demonstrates the right sided occlude internal jugular (white arrow) and the enlarged external jugular vein (black arrow)



8- MIP 4 image demonstrates the occlusion of the right internal jugular vein (arrow)