National Imaging Associates, Inc.	
Clinical guidelines **UPPER EXTREMITY MRA/MRV**	**Original Date: July 2008**
CPT Codes: 73225	**Last Revised Date: April 2023~~March 2022~~**
Guideline Number: NIA_CG_058-2	**Implementation Date: January 2024~~23~~**

GENERAL INFORMATION

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*

When a separate MRA and MRI exam is requested, documentation requires a medical reason that clearly indicates why additional MRI imaging of the upper extremity is needed.

INDICATIONS FOR UPPER EXTREMITY MRA/MRV

Hand Ischemia[1-3]

- Arterial Doppler not needed with any of these acute symptoms:
  - Ischemic ulceration without segmental temperature change
  - Ischemic ulceration with painful ischemia
  - Acute sustained loss of perfusion with or without acral ulceration
  - Imminent loss of digit
- Clinical symptoms without the above feature~~:~~s with~~,~~ abnormal arterial Doppler ~~abnormal~~ and will change management
  - Includes Raynaud's (can be associated with scleroderma), Buerger disease, and other vasculopathies[4]
- Clinical concern for vascular cause of ulcers with abnormal or indeterminate ultrasound[5]
- After stenting or surgery with signs of recurrence or indeterminate ultrasound[6]

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Deep Venous Thrombosis or Embolism[7, 8]

- After abnormal ultrasound of arm veins if it will change management, or with negative or indeterminate ultrasound to rule out other causes
- For evaluation of central veins
- Clinical suspicion of upper arterial emboli[9, 10]

Clinical suspicion of vascular disease with abnormal or indeterminate ultrasound or other imaging[9, 10]

- Tumor invasion[11, 12]
- Trauma[13]
- Vasculitis[2, 14]
- Aneurysm[15]
- Stenosis/occlusions[16]

Hemodialysis Graft Dysfunction, after Doppler ultrasound not adequate[17] for treatment decisions[18]

Vascular Malformation[19, 20] ~~[17,18]~~

- After initial evaluation with ultrasound and results will change management **OR**
- Inconclusive ultrasound **OR**
- For preoperative planning
    - ~~**Vascular Malformation**~~[19, 20]

      ~~Non-diagnostic doppler ultrasound~~

    - MRI is also approvable for initial evaluation

Traumatic injuries with clinical findings suggestive of arterial injury – CTA preferred emergently[13]

Assessment/evaluation of known vascular disease/condition

Further evaluation of indeterminate findings on prior imaging (unless follow up is otherwise specified within the guideline):

- For initial evaluation of an inconclusive finding on a prior imaging report (i.e., x-ray, ultrasound or CT) that requires further clarification.
- One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam.)

Pre-operative/procedural evaluation

- Pre-operative evaluation for a planned surgery or procedure[21]

Post-operative/procedural evaluations

- A follow-up study may be needed to help evaluate a patient's progress after treatment, procedure, intervention, or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested.

Special Circumstances[22]

- High suspicion of an acute arterial obstruction - Arteriography preferred (the gold standard)
- Renal impairment
    - Not on dialysis
        - Mild to moderate, GFR 30-45 ml/min MRA with contrast can be performed
        - Severe, GFR < 30 ml/min MRA without contrast
    - On dialysis
        - CTA with contrast can be performed
- Doppler ultrasound can be useful in evaluating bypass grafts

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BACKGROUND

Magnetic resonance angiography (MRA) is a noninvasive alternative to catheter angiography for evaluation of vascular structures in the upper extremity. Magnetic resonance venography (MRV) is used to image veins instead of arteries. MRA and MRV are less invasive than conventional x-ray digital subtraction angiography.

OVERVIEW

UPPER EXTREMITY DVT – "Secondary UEDVT is far more common. Indwelling venous devices, such as catheters, pacemakers, and defibrillators, put patients at the highest risk of thrombus. Other risk factors include advanced age, previous thrombophlebitis, postoperative state, hypercoagulability, heart failure, cancer, right-heart procedures, intensive care unit admissions, trauma, and extrinsic compression."[7]

~~**MRA and Raynaud's Syndrome – Raynaud's syndrome is evidenced by episodic waxy pallor or cyanosis of the fingers caused by vasoconstriction of small arteries or arterioles in the fingers. It usually occurs due to a response to cold or to emotional stimuli. MRA may be used in the evaluation of Raynaud's syndrome.**~~

MRA and Dialysis Graft – The management of the hemodialysis access is important for patients undergoing dialysis. With evaluation and interventions, the patency of hemodialysis fistulas may be prolonged. In selected cases, MRA is useful in the evaluation of hemodialysis graft dysfunction. MRA provides excellent image quality and accurately demonstrating significant stenosis with high sensitivity and specificity in the evaluation of hemodialysis graft[23] dysfunctions.

~~**MRV and Stenosis or Occlusion –** MRA of the central veins of the chest is used for the detection of central venous stenoses and occlusions. High-spatial resolution MRA characterizes the general morphology and degree of stenosis. Enlarged and well-developed collateral veins in combination with the non-visualization of a central vein may be indicative of chronic occlusion, whereas less-developed or absent collateral veins are suggestive of acute occlusions. A hemodynamically significant stenosis may be indicated by the presence of luminal narrowing with local collaterals.[24, 25]~~

~~**MRA and arterial obstructive disease –** Catheter angiography is the standard of reference for assessing arterial disease but MRA with contrast-enhanced media has gained acceptance and can image the entire vascular system. Contrast agents such as high dose gadolinium have been associated with the development of nephrogenic systemic fibrosis in patients with chronic renal insufficiency, but newer agents are safer in this regard. Gadolinium dosage may be decreased without compromising image quality in high-spatial-resolution contrast-enhanced MRA of the upper extremity.~~

~~**POLICY HISTORY**~~

~~**Date**~~	~~**Summary**~~
~~2023~~	~~Updated references~~ ~~Modified background section~~ ~~Added vascular malformations~~ ~~Added indeterminate prior imaging findings~~
~~March 2022~~	~~• Clarified renal impairment, not on dialysis, mild to moderate, GFR 30-45 ml/min MRA with contrast can be performed~~ ~~• Updated background section for upper extremity DVT~~
~~May 2021~~	~~No changes~~
~~May 2020~~	~~• Clarified that MRA does not include a baseline MR exam~~ ~~• Expanded section about vascular malformation to include initial testing.~~ ~~• Added information about renal function and contrast agents~~ ~~• Simplified language~~ ~~• Updated references~~

~~May 2019~~	• ~~Reformatted/modified indications to include hand ischemia; deep venous thrombosis or embolism and clinical suspicion of vascular disease~~ • ~~Updated background information and references~~

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~~ADDITIONAL RESOURCES~~

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~~**Reviewed / Approved by NIA Clinical Guideline Committee**~~

POLICY HISTORY

Date	Summary
April 2023	• Updated references • Modified background section • Added vascular malformations • Added indeterminate prior imaging findings
March 2022	• Clarified renal impairment, not on dialysis, mild to moderate, GFR 30-45 ml/min MRA with contrast can be performed • Updated background section for upper extremity DVT

Reviewed / Approved by NIA Clinical Guideline Committee

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