



Cohere Medicare Advantage Policy – Magnetic Resonance Angiography (MRA), Lower Extremity

Clinical Guidelines for Medical Necessity Review

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Important Notices

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Guideline Information:

Specialty Area: Diagnostic Imaging

Guideline Name: Cohere Medicare Advantage Policy - Magnetic Resonance Angiography (MRA), Lower Extremity

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Type: ☒ Adult (18+ yo) | ☒ Pediatric (0-17 yo)

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Medical Necessity Criteria

Service: Cohere Medicare Advantage Policy - Magnetic Resonance Angiography (MRA), Lower Extremity

Benefit Category

Diagnostic Services in Outpatient Hospital
Diagnostic Tests (other)

Please Note: This may not be an exhaustive list of all applicable Medicare benefit categories for this item or service.

Related CMS Documents

Please refer to CMS Medicare Coverage Database for the most current applicable CMS National Coverage.^{1-4, 36-37}

- [National Coverage Determination \(NCD\). Magnetic Resonance Imaging \(MRI\) 220.2](#)
- [Local Coverage Determination \(LCD\). Magnetic Resonance Angiography \(MRA\) L33633](#)
- [Local Coverage Determination \(LCD\). Magnetic Resonance Angiography \(MRA\) L34865](#)
- [Local Coverage Determination \(LCD\). Magnetic Resonance Angiography \(MRA\) L34372](#)
- [Billing and Coding: Magnetic Resonance Angiography \(MRA\)\(A56747\)](#)
- [Billing and Coding: Magnetic Resonance Angiography \(MRA\)\(A56805\)](#)
- [Billing and Coding: Magnetic Resonance Angiography \(MRA\)\(A57779\)](#)
- [Local Coverage Determination \(LCD\). Magnetic resonance angiography \(MRA\) \(L34424\)](#)
- [Billing and Coding: Magnetic resonance angiography \(MRA\) \(A56775\)](#)

Recommended Clinical Approach

Magnetic resonance angiography (MRA) is a noninvasive alternative to catheter angiography for evaluating vascular structures in the lower extremities. Magnetic resonance venography (MRV) images veins instead of arteries. MRA and MRV are less invasive than conventional X-ray digital subtraction angiography.¹

Evaluation of Clinical Harms and Benefits

Cohere Health uses the criteria below to ensure consistency in reviewing the conditions to be met for coverage of magnetic resonance angiography (MRA), lower extremity. This process helps to prevent both incorrect denials and inappropriate approvals of medically necessary services. Specifically, limiting incorrect approvals reduces the risks associated with unnecessary procedures, such as complications from surgery, infections, and prolonged recovery times.

The potential clinical harms of using these criteria may include:

- Inherent risk of procedure: There are inherent risks of imaging, including cumulative radiation exposure, contrast, allergy, nephrotoxicity, and contrast extravasation into surrounding tissues.⁵⁻⁸
- Despite not requiring radiation, MRA is relatively expensive compared to other imaging modalities and its use may be difficult to justify when cost-effective alternatives are available.⁹
- MRA exams may use gadolinium-based contrast agents to improve the quality of the images. Such agents must be used with caution when imaging patients with moderate to severe renal failure, who may be at risk of nephrogenic systemic fibrosis.¹⁰
- There is a risk of malfunction of implanted medical devices (e.g., implanted pacemakers, cochlear implants).
- Use of gadolinium-based contrast is not recommended in patients with acute or chronic kidney injury or disease.¹¹⁻¹³
- If sedation is used for the study (for anxiety or claustrophobia), there is a risk of over-sedation. The patient will be monitored during the procedure to reduce this risk.
- There is uncertain risk for MR imaging in pregnant patients. The decision to image in a pregnant patient should be made on an individual basis in consultation with the patient's obstetric provider.¹⁴
- There is a risk of increased healthcare costs and complications from the inappropriate use of additional interventions.¹⁵

The clinical benefits of using these criteria include:

- **Non-Invasive:** An MRA is a non-invasive examination that does not require sedation, catheterization, or ionized radiation, yet can be more accurate than conventional venography, offering an alternative imaging technique for patients with contrast allergies or renal dysfunction.^{9,10,16} The non-invasive nature of MRA, which allows for examinations of vessel anatomy without ionizing radiation, makes the imaging technique particularly suited to preoperative imaging.⁹
- **Quick And accurate:** Magnetic resonance angiography can produce timely and highly accurate assessments of arterial disease in the lower extremity, with high levels of clarity and fidelity.¹⁷ Compared to conventional angiography, MRA provides more sensitive visualizations of blood vessel pathology.¹⁶
- **Enhanced overall patient satisfaction and healthcare experience.**

This policy includes provisions for expedited reviews and flexibility in urgent cases to mitigate risks of delayed access. Evidence-based criteria are employed to prevent inappropriate denials, ensuring that patients receive medically necessary care. The criteria aim to balance the need for effective treatment with the minimization of potential harms, providing numerous clinical benefits in helping avoid unnecessary complications from inappropriate care.

In addition, the use of these criteria is likely to decrease inappropriate denials by creating a consistent set of review criteria, thereby supporting optimal patient outcomes and efficient healthcare utilization.

Medical Necessity Criteria

Indications

- **Magnetic resonance angiography (MRA), lower extremity** is considered appropriate if **ANY** of the following is **TRUE**¹⁷:
- ◆ MRA-preferred indications including **ANY** of the following:
 - Arterial entrapment syndrome, when ultrasound is indeterminate or for pre-treatment planning; **OR**
 - Adventitial cystic disease¹⁷; **OR**
 - When catheter angiography was unable to identify a viable run-off vessel for bypass; **OR**

- ◆ Neoplastic conditions (including masses or mass-like conditions) when the arterial blood supply needs to be evaluated (e.g., for treatment planning, treatment response, or prognostication); **OR**
- ◆ Neoplastic invasion of arteries or veins; **OR**
- ◆ Trauma-related conditions including, but not limited to, **ANY** of the following¹⁸:
 - Expanding hematoma¹⁹; **OR**
 - Major blunt trauma and the patient is hemodynamically stable²⁰; **OR**
 - Neurologic deficit of lower extremity in association with trauma²¹; **OR**
 - Known or suspected knee dislocation²²; **OR**
 - Vascular trauma to a lower extremity²³; **OR**
- ◆ Vascular conditions, known or suspected, including **ANY** of the following:
 - Aneurysm; **OR**
 - Intramural hematoma; **OR**
 - Dissection; **OR**
 - Critical limb ischemia strongly suspected (e.g., sudden onset of a cold leg with pain, gangrene, rest pain)²⁴; **OR**
 - Lower extremity ischemic symptoms; **OR**
 - Determination of hemorrhage source (including non-surgical, spontaneous)²⁵; **OR**
 - Localization and characterization of vascular malformation or fistula (e.g., assessing treatment response, treatment planning); **OR**
 - Vasculitis; **OR**
 - Pre and post-intervention evaluation; **OR**
- ◆ Repeat imaging (defined as repeat request following recent imaging of the same anatomic region with the same modality), in the absence of established guidelines, will be considered reasonable and necessary if **ANY** of the following is **TRUE**:
 - New or worsening symptoms, such that repeat imaging would influence treatment; **OR**
 - One-time clarifying follow-up of a prior indeterminate finding; **OR**

- In the absence of change in symptoms, there is an established need for monitoring which would influence management.

→ **Magnetic resonance venography (MRV), lower extremity** is

considered appropriate if **ANY** of the following are **TRUE**:

- ◆ MRV-preferred indications, including venous entrapment syndrome, when ultrasound is indeterminate or for pre-treatment planning; **OR**
- ◆ Ultrasound and CT/CTV are contraindicated or inconclusive (e.g., body habitus for ultrasound, anaphylactic reaction due to IV contrast reaction, pregnancy, pediatric) with **ANY** of the following:
 - Neoplastic conditions (including masses or mass-like conditions) when the arterial blood supply needs to be evaluated (e.g., for treatment planning, treatment-response, or prognostication); **OR**
 - Neoplastic invasion of arteries or veins; **OR**
 - Initial evaluation for a known venous leg ulcer, when ultrasound is indeterminate or non-diagnostic²⁷; **OR**
 - Known or suspected acute or chronic deep venous thrombosis, when results would change management and ultrasound has been completed; **OR**
 - Known severe post-thrombotic changes incompletely evaluated by ultrasound²⁷; **OR**
 - Evidence of severe venous reflux disease and **ALL** of the following²⁸:
 - Duplex ultrasound evaluation indeterminate, incomplete, or non-diagnostic; **AND**
 - Surgical or endovascular intervention planned; **OR**
- ◆ Pre and post-intervention evaluation when **ANY** of the following is **TRUE**:
 - Postoperative evaluation of the effectiveness of arterial or venous reconstruction or bypass; **OR**
 - Characterization of normal and variant vascular anatomy; **OR**
 - Determination of the patency, location, or integrity of grafts and other vascular devices (e.g., stents); **OR**
 - Planning autografts for musculoskeletal reconstruction; **OR**

- Treatment of popliteal entrapment syndrome; **OR**
- ◆ Repeat imaging (defined as repeat request following recent imaging of the same anatomic region with the same modality), in the absence of established guidelines, will be considered reasonable and necessary if **ANY** of the following is **TRUE**:
 - New or worsening symptoms, such that repeat imaging would influence treatment; **OR**
 - One-time clarifying follow-up of a prior indeterminate finding; **OR**
 - In the absence of change in symptoms, there is an established need for monitoring which would influence management.

Non-Indications

- **Magnetic resonance angiography (MRA), lower extremity** is not considered appropriate if **ANY** of the following is **TRUE**:
- ◆ Catheter angiography has been previously performed and demonstrated conclusive findings; **OR**
 - ◆ If contrast is used, history of anaphylactic allergic reaction to gadolinium contrast media with detailed guidelines for use in patients with renal insufficiency; **OR**
 - ◆ The patient has metallic clips on vascular aneurysms; **OR**
 - ◆ Incompatible implantable devices (e.g., pacemakers, defibrillators, cardiac valves); **OR**
 - ◆ Metallic foreign body in orbits/other critical area(s) or within the field of view and obscuring area of concern.

*NOTE: MRI in patients with claustrophobia should be requested at the discretion of the ordering provider.

**NOTE: MRI in pregnant patients should be requested at the discretion of the ordering provider and obstetric care provider.

Level of Care Criteria

Inpatient or Outpatient

Procedure Codes (CPT/HCPCS)

CPT/HCPCS Code	Code Description
73725	Magnetic resonance angiography (MRA), lower extremity, with or without contrast material(s)
C8912	Magnetic resonance angiography (MRA) with contrast, lower extremity
C8913	Magnetic resonance angiography (MRA) without contrast, lower extremity
C8914	Magnetic resonance angiography (MRA) without contrast followed by with contrast, lower extremity

Disclaimer: S Codes are non-covered per CMS guidelines due to their experimental or investigational nature.

Medical Evidence

Nassar et al. (2022) reviewed imaging modalities for preoperative planning. Computed tomography angiography (CTA) and magnetic resonance angiography (MRA) can generate detailed 3D images of vascular structures and surrounding anatomy, with applications in preoperative planning for breast, head, neck, and extremity reconstructions. While MRA eliminates the need for radiation exposure, it is less precise than CTA in detecting perforators smaller than 1 mm and contraindicated in specific patient groups. For assessing venous anatomy, the most effective modalities include duplex ultrasound, MRV, and the outflow phase of conventional angiography. While MR scanners and software continue to advance, the general preference is for strength 1.5-T scanners in reconstructive applications. Lower-strength scanners allow enhanced fat suppression, contributing to more precise imaging of vascular structures.¹²

Tamura and Nakahara (2014) conducted a retrospective study to assess pelvic and deep vein thrombosis (DVT) in the lower extremities with magnetic resonance venography (MRV) before surgical intervention for varicose veins. Time-of-flight MRV evaluated the 72 patients enrolled in the study before stripping varicose veins of the lower extremities. A total of 63.9% were female, with a mean age of 65.2 plus or minus 10.2 years; 55.6% of patients had bilateral varicose leg veins; 2.8% of patients had DVT; and 4.2% were diagnosed with iliac vein thrombosis. The remaining patients could undergo the stripping procedure in the saphenous veins. The study concluded that non-contrast MRV helps evaluate the lower extremity venous system.¹³

Koelemay et al. (2001) conducted a meta-analysis of 34 studies (1090 patients) that reports a high accuracy for assessing arteries in the lower extremities using MRA. Three-dimensional (3D) gadolinium-enhanced MRA demonstrated enhanced diagnostic accuracy compared to 2D MRA. The estimated thresholds for equal sensitivity and specificity were 94% and 90% for 3D gadolinium-enhanced MRA and 2D MRA, respectively. Recent investigations specifically examined the diagnostic capabilities of lower extremity 3D gadolinium-enhanced MRA compared to digital subtraction angiography.¹⁴

Ersoy et al. (2008) report on the precision of 3D MRA in assessing bypass grafts and detecting recurrent issues within the graft lumen is comparable to its accuracy in native arteries. Foot and calf MRA exhibit sensitivity and

specificity exceeding 80% and 90%, respectively. In contrast to digital subtraction angiography, gadolinium-enhanced MRA generates a 3D dataset that can create displays reminiscent of multilane digital subtraction angiography after reformatting. These displays emphasize pertinent information for prognosis and treatment planning, such as arterial wall inflammation, plaque composition, and mural and intramural thrombus formation.¹⁵

References

1. Centers for Medicare & Medicaid Services. National Coverage Determination (NCD) 220.2 Magnetic Resonance Angiography (MRA). Published April 10, 2018. Accessed September 24, 2024.
<https://www.cms.gov/medicare-coverage-database/view/ncd.aspx?ncdid=177&ncdver=6&keywordtype=starts&keyword=magnetic&bc=0>
2. Centers for Medicare & Medicaid Services. Local Coverage Determination (LCD) L33633. Magnetic Resonance Angiography (MRA). Published October 1, 2019. Accessed September 24, 2024.
<https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdid=33633&ver=49&bc=0>
3. Centers for Medicare & Medicaid Services. Local Coverage Determination (LCD) L34865. Magnetic Resonance Angiography (MRA). Published June 19, 2020. Accessed September 24, 2024.
<https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdid=34865&ver=72&bc=0>
4. Centers for Medicare & Medicaid Services. Local Coverage Determination (LCD) L34372. Magnetic Resonance Angiography (MRA). Published June 19, 2020. Accessed September 24, 2024.
<https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdid=34372&ver=22&bc=0>
5. The Image Gently Alliance. Procedures - image gentle and CT scans. Updated 2014. Accessed July 22, 2024.
6. Zhang F, Lu Z, Wang F. Advances in the pathogenesis and prevention of contrast-induced nephropathy. *Life sciences*. 2020 Oct 15;259:118379.
7. Rudnick MR, Leonberg-Yoo AK, Litt HI, Cohen RM, Hilton S, Reese PP. The controversy of contrast-induced nephropathy with intravenous contrast: what is the risk? *American Journal of Kidney Diseases*. 2020 Jan 1;75(1):105-13.
8. Summers LN, Harry ML, Colling KP. Evaluating our progress with trauma transfer imaging: repeat CT scans, incomplete imaging, and delayed definitive care. *Emergency Radiology*. 2021 Oct;28(5):939-48.
9. Nassar AH, Maselli AM, Manstein S, et al. Comparison of various modalities utilized for preoperative planning in microsurgical reconstructive surgery. *J Reconstr Microsurg*. 2022 Mar;38(3):170-180. doi: 10.1055/s-0041-1736316. PMID: 34688218.

10. Ersoy H, Rybicki FJ. MR angiography of the lower extremities. *AJR Am J Roentgenol*. 2008;190(6):1675–1684. doi: 10.2214/AJR.07.2223. PMID: 18492924. Erratum in: *AJR Am J Roentgenol*. 2008 Dec;191(6):1874. 11.
11. American College of Radiology (ACR). ACR manual on contrast media. 2024. https://www.acr.org/-/media/ACR/Files/Clinical-Resources/Contrast_Media.pdf.
12. American College of Radiology (ACR), North American Society for Cardiovascular Imaging (NASCI), Society for Pediatric Radiology (SPR). ACR–NASCI–SPR practice parameter for the performance of body magnetic resonance angiography (MRA). Published 2020. Accessed July 31, 2024. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Body-MRA.pdf>.
13. American College of Radiology (ACR). ACR practice parameter for performing and interpreting magnetic resonance imaging (MRI). 2022. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/MR-Performance-Interpret.pdf?la=en>.
14. American College of Obstetricians and Gynecologists (ACOG). Guidelines for diagnostic imaging during pregnancy and lactation: Committee opinion (no. 723). Published October 2017. Accessed September 23, 2024. <https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2017/10/guidelines-for-diagnostic-imaging-during-pregnancy-and-lactation>.
15. Kjelle E, Brandsæter IØ, Andersen ER, Hofmann BM. Cost of low-value imaging worldwide: a systematic review. *Applied Health Economics and Health Policy*. 2024 Mar 1:1–7.
16. Tamura K, Nakahara H. MR venography for the assessment of deep vein thrombosis in lower extremities with varicose veins. *Ann Vasc Dis*. 2014;7(4):399–403. doi: 10.3400/avd.oa.14-00068. Epub 2014 Dec 25. PMID: 25593625; PMCID: PMC4293190.
17. Koelemay MJ, Lijmer JG, Stoker J, et al. Magnetic resonance angiography for the evaluation of lower extremity arterial disease: A meta-analysis. *JAMA*. 2001;285(10):1338–1345. doi: 10.1001/jama.285.10.1338. PMID: 11255390.
18. American College of Radiology (ACR), North American Society for Cardiovascular Imaging (NASCI), Society for Pediatric Radiology (SPR). ACR–NASCI–SPR practice parameter for the performance of body

magnetic resonance angiography (MRA). Published 2020. Accessed July 31, 2024.

<https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Body-MRA.pdf>.

19. Brian R, Bennett DJ, Kim WC, et al. Computed tomography angiography is associated with low added utility for detecting clinically relevant vascular injuries among patients with extremity trauma. *Trauma Surg Acute Care Open*. 2021 Dec 20;6(1):e000828. doi: 10.1136/tsaco-2021-000828. PMID: 34993352; PMCID: PMC8689162.
20. Fox N, Rajani RR, Bokhari F, et al. Evaluation and management of penetrating lower extremity arterial trauma: An Eastern Association for the Surgery of Trauma practice management guideline. *J Trauma Acute Care Surg*. 2012 Nov;73(5 Suppl 4):S315-20. doi: 10.1097/TA.0b013e31827018e4. PMID: 23114487.
21. Expert Panel on Major Trauma Imaging, Shyu JY, Khurana B, et al. ACR appropriateness criteria – major blunt trauma. *J Am Coll Radiol*. 2020 May;17(5S):S160–S174. doi: 10.1016/j.jacr.2020.01.024. PMID: 32370960.
22. Dreizin D, Smith EB, Champ K, et al. Roles of trauma CT and CTA in salvaging the threatened or mangled extremity. *Radiographics*. 2022 Mar–Apr;42(2):E50–E67. doi: 10.1148/rg.210092. PMID: 35230918; PMCID: PMC8906352.
23. Expert Panel on Musculoskeletal Imaging, Taljanovic MS, Chang EY, et al. ACR appropriateness criteria – acute trauma to the knee. *J Am Coll Radiol*. 2020 May;17(5S):S12–S25. doi: 10.1016/j.jacr.2020.01.041. PMID: 32370956.
24. Expert Panels on Vascular Imaging, Francois CJ, Skulborstad EP, et al. ACR appropriateness criteria – nonatherosclerotic peripheral arterial disease. *J Am Coll Radiol*. 2019 May;16(5S):S174–S183. doi: 10.1016/j.jacr.2019.02.026. PMID: 31054743.
25. Expert Panel on Vascular Imaging, Browne WF, Sung J, et al. ACR appropriateness criteria – sudden onset of cold, painful leg: 2023 update. *J Am Coll Radiol*. 2023 Nov;20(11S):S565–S573. doi: 10.1016/j.jacr.2023.08.012. PMID: 38040470.
26. Expert Panel on Vascular Imaging, Azene EM, Steigner ML, Aghayev A, et al. ACR appropriateness criteria – lower extremity arterial claudication–imaging assessment for revascularization: 2022 update. *J Am Coll Radiol*. 2022 Nov;19(11S):S364–S373. doi: 10.1016/j.jacr.2022.09.002. PMID: 36436963; PMCID: PMC9876734.

27. Gerhard-Herman MD, Gornik HL, Barrett C, et al. 2016 AHA/ACC guideline on the management of patients with lower extremity peripheral artery disease: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2017 Mar 21;135(12):e726–e779. doi: 10.1161/CIR.0000000000000471. PMID: 27840333; PMCID: PMC5477786.
28. Expert Panels on Interventional Radiology and Vascular Imaging, Rochon PJ, Reghunathan A, et al. ACR appropriateness criteria – lower extremity chronic venous disease. *J Am Coll Radiol*. 2023 Nov;20(11S):S481–S500. doi: 10.1016/j.jacr.2023.08.011. PMID: 38040466.
29. Centers for Medicare & Medicaid Services. Local Coverage Determination (LCD) L33633. Magnetic Resonance Angiography (MRA). Published October 1, 2019. Accessed September 24, 2024. <https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcid=33633&ver=49&bc=0>
30. Centers for Medicare & Medicaid Services. Local Coverage Determination (LCD) L34865. Magnetic Resonance Angiography (MRA). Published June 19, 2020. Accessed September 24, 2024. <https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcid=34865&ver=72&bc=0>
31. Centers for Medicare & Medicaid Services. Local Coverage Determination (LCD) L34372. Magnetic Resonance Angiography (MRA). Published June 19, 2020. Accessed September 24, 2024. <https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcid=34372&ver=22&bc=0>
32. The Image Gently Alliance. Procedures – image gently and CT scans. Updated 2014. Accessed July 22, 2024.
33. Zhang F, Lu Z, Wang F. Advances in the pathogenesis and prevention of contrast-induced nephropathy. *Life sciences*. 2020 Oct 15;259:118379.
34. Rudnick MR, Leonberg-Yoo AK, Litt HI, Cohen RM, Hilton S, Reese PP. The controversy of contrast-induced nephropathy with intravenous contrast: what is the risk? *American Journal of Kidney Diseases*. 2020 Jan 1;75(1):105–13.
35. Summers LN, Harry ML, Colling KP. Evaluating our progress with trauma transfer imaging: repeat CT scans, incomplete imaging, and delayed definitive care. *Emergency Radiology*. 2021 Oct;28(5):939–48

36. Centers for Medicare & Medicaid Services (CMS). Local coverage determination (LCD): Magnetic resonance angiography (MRA)(L34424). Revision Effective Date: March 27, 2025.
<https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdid=34424&ver=47&=>
37. Centers for Medicare & Medicaid Services (CMS). Billing and coding: Magnetic resonance angiography (MRA)(A56775). Revision Effective Date: March 27, 2025.
<https://www.cms.gov/medicare-coverage-database/view/article.aspx?articleId=56775&ver=23>

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