



Cohere Medical Policy – Magnetic Resonance Angiography (MRA), Head

Clinical Guidelines for Medical Necessity Review

Version: 3
Effective Date: October 30, 2024

Important Notices

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Guideline Information:

Specialty Area: Diagnostic Imaging

Guideline Name: Cohere Medical Policy - Magnetic Resonance Angiography (MRA), Head

Date of last literature review: 8/22/2024

Document last updated: 10/30/2024

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

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Medical Necessity Criteria

Service: Magnetic Resonance Angiography (MRA), Head

Recommended Clinical Approach

Imaging analysis utilizing magnetic resonance angiography (MRA) of the head can be performed alone or in conjunction with MRA of the neck. Contrast and concurrent exams should be guided by clinical suspicion of disease presence or exclusion to direct value-based care. Staging, pre-surgical planning, and screening are also recommendations of a clinical approach. MRA plays a crucial role in the routine assessment of patients experiencing stroke syndrome, specifically for the evaluation of both cervical and intracranial vessels, enabling the identification and diagnosis of vascular anomalies. In conjunction with MRI, MRA enhances the examination by providing a comprehensive analysis of the cerebral parenchyma. MRA also serves as a viable alternative to CT angiography when using iodinated contrast material is not feasible.

Medical Necessity Criteria

Indications

- **Magnetic resonance angiography (MRA), head** is considered appropriate if **ALL** of the following are **TRUE**¹⁻²:
- ◆ CTA is contraindicated or inconclusive (e.g., anaphylactic reaction due to IV contrast reaction, pregnancy, pediatric); **AND**
 - ◆ **ANY** of the following is **TRUE**:
 - Trauma-related conditions as indicated by **ANY** of the following:
 - Trauma of the head with a suspected intracranial arterial injury based on clinical findings or prior imaging³; **OR**
 - Traumatic injury to cervicocerebral vessels, suspected⁴; **OR**

- Traumatic visual defect (including orbital injury)⁵; **OR**
- Vascular conditions, known or suspected, including **ANY** of the following:
 - Aneurysm with **ANY** of the following:
 - ◆ Screening for cerebral artery aneurysm when **ANY** of the following is **TRUE**²⁵⁻³²:
 - Autosomal dominant polycystic kidney disease (adults); **OR**
 - The patient has two or more first-degree relatives (parent, brother, sister, or child) with a history of intracranial aneurysm; **OR**
 - The patient is symptomatic with one first-degree relative who has a history of intracranial aneurysm³³⁻³⁶; **OR**
 - Fibromuscular dysplasia; **OR**
 - Loeyes–Dietz syndrome; **OR**
 - Spontaneous coronary arteries dissection (SCAD); **OR**
 - Known aortic coarctation (after age 10); **OR**
 - ◆ **ANY** of the following:
 - Diagnosis of intracranial hemorrhage; **OR**
 - Diagnosis of subarachnoid hemorrhage; **OR**
 - Intracerebral hemorrhage, known or suspected¹²; **OR**
 - The patient has a history of subarachnoid hemorrhages⁶; **OR**
 - Cervical bruit or thrill with suspicion of neck carotid stenosis; **OR**
 - Headache with **ANY** of the following:
 - ◆ Acute onset worst/thunderclap headache¹¹; **OR**
 - ◆ New onset or pattern during pregnancy or peripartum period; **OR**
 - ◆ Associated with exercise, exertion, Valsalva, or sexual activity; **OR**
 - Intracranial arterial dissection, suspected; **OR**

- Intracranial occlusive disease (arterial or venous), suspected¹³ **OR**
- Intracranial hypertension (idiopathic), suspected; **OR**
- Vascular disease¹³⁻¹⁵; **OR**
- Vascular malformation of the brain or skull base including **ANY** of the following occult cerebrovascular malformations:
 - ◆ Capillary telangiectasia; **OR**
 - ◆ Cavernous angioma; **OR**
 - ◆ Developmental venous anomaly; **OR**
- Vasculitis, suspected¹⁰; **OR**
- Signs/symptoms highly suggestive of leaking/ruptured internal carotid artery (ICA) or arteriovenous malformations (AVM) (e.g., blood in the cerebral spinal fluid, stiff neck, sudden explosive headache); **OR**
- Stroke/cerebrovascular accident (CVA); **OR**
- Transient ischemic attack (TIA)¹⁶; **OR**
- Vertebral basilar insufficiency (VBI), suspected, with **ANY** of the following symptoms:
 - ◆ Abnormal speech; **OR**
 - ◆ Ataxia and weakness in both sides of the body; **OR**
 - ◆ Blindness; **OR**
 - ◆ Diplopia; **OR**
 - ◆ Dizziness; **OR**
 - ◆ Dysarthria; **OR**
 - ◆ Dysphagia; **OR**
 - ◆ Headache; **OR**
 - ◆ Vertigo; **OR**
 - ◆ Vomiting; **OR**
- For evaluation of **ANY** of the following uncategorized/miscellaneous symptoms when applicable:
 - Massive epistaxis; **OR**
 - Neurological deficit(s) (focal or lateralizing); **OR**
 - Nontraumatic orbital asymmetry, exophthalmos, or enophthalmos⁵; **OR**
 - Ptosis (new-onset); **OR**

- Pulsatile tinnitus (subjective or objective) for vascular etiology; **OR**
- Visual loss (e.g., nonischemic)⁵; **OR**
- Optic nerve symptoms⁵; **OR**
- Chiasm symptoms (including pre- or post chiasm)⁵; **OR**
- Ophthalmoplegia⁵; **OR**
- Diplopia⁵; **OR**
- Preoperative, postoperative, or pre-treatment evaluation for **ANY** of the following:
 - Refractory trigeminal neuralgia when done for surgical planning; **OR**
 - Follow-up study for **ANY** of the following¹⁴⁻¹⁵:
 - ◆ Arteriovenous fistula (AVF); **OR**
 - ◆ Intracranial aneurysm; **OR**
 - Preoperative evaluation for **ANY** of the following:
 - ◆ Carotid endarterectomy or percutaneous intervention with **ANY** of the following¹⁷:
 - Acute stroke, and performed in conjunction with neck MRA; **OR**
 - **ANY** of the following duplex (Doppler) scan findings:
 - ◆ Findings are indeterminate; **OR**
 - ◆ High carotid bifurcation; **OR**
 - ◆ High-grade stenosis in an asymptomatic patient; **OR**
 - ◆ Kinks; **OR**
 - ◆ Loops; **OR**
 - History of neck radiation therapy; **OR**
 - ◆ Delineation of the vascular supply of vascular neoplasm¹⁸⁻¹⁹; **OR**
 - ◆ Vascular malformation of brain or skull base; **OR**
 - Post-procedural evaluation following surgical or endovascular therapy (e.g., coiling)⁶; **OR**
 - Vascular anatomy to determine the effect of therapeutic interventions, as indicated by **ANY** of the following:
 - ◆ Aneurysm; **OR**
 - ◆ Arteriovenous malformation (AVM)²⁰; **OR**

- ◆ Dissection²¹; **OR**
- ◆ Endovascular embolization; **OR**
- ◆ Post-treatment changes for **ANY** of the following:
 - Surgical procedures (including interventional); **OR**
 - Radiation therapy; **OR**
- ◆ Stent placement for treatment of stenosis; **OR**
- ◆ Tumor embolization; **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), head** is considered appropriate if **ALL** of the following are **TRUE**:
 - Ultrasound and CT venography (CTV) are contraindicated or inconclusive (e.g., body habitus for ultrasound, anaphylactic reaction due to IV contrast reaction, pregnancy, pediatric); **AND**
 - **ANY** of the following is **TRUE**:
 - Vascular conditions, known or suspected, including **ANY** of the following:
 - ◆ Venous/dural sinus abnormalities such as **ANY** of the following:
 - Acquired thrombosis/occlusion; **OR**
 - Venous sinus stenosis; **OR**
 - ◆ Large vein injury secondary to trauma; **OR**
 - ◆ Vascular invasion or displacement by tumor; **OR**
 - Headache with **ANY** of the following:

- ◆ With new onset or pattern during pregnancy or peripartum period; **OR**
- ◆ Headache with features of intracranial hypertension (e.g., papilledema, pulsatile tinnitus, visual symptoms worse with Valsalva)¹¹; **OR**
- Initial diagnostic, one-time pre or one-time post-treatment evaluation for treatment planning or evidence of clinical concern for vascular malformation; **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) or magnetic resonance venography (MRV), head** is not considered appropriate if **ANY** of the following is **TRUE**:

- ◆ The patient has undergone advanced imaging of the same body part within 3 months without undergoing treatment or developing new or worsening symptoms²²; **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
70544	Magnetic resonance angiography (MRA), head; without contrast material(s)
70545	Magnetic resonance angiography (MRA), head; with contrast material(s)
70546	Magnetic resonance angiography (MRA), head; without contrast material(s), followed by contrast material(s) and further sequences

Medical Evidence

Amin et al. (2023) present a scientific statement from the American Heart Association regarding the diagnosis, workup, and risk reduction of transient ischemic attack in the emergency department. Computed tomography angiography (CTA) demonstrates superior sensitivity and positive predictive value compared to magnetic resonance angiography (MRA) in detecting intracranial stenosis and occlusion. As a result, CTA is the recommended imaging modality over time-of-flight (without contrast) MRA. If there is a concern regarding administering iodinated contrast, expedited magnetic resonance imaging (MRI) with MRA is a viable alternative. Time-of-flight MRA may result in images of lower quality as there is a tendency to overestimate cervical carotid stenosis compared to gadolinium-enhanced MRA. However, this type of MRA may be suitable for screening purposes. Gadolinium-enhanced MRA of the neck is the preferred choice for patients who can safely receive gadolinium contrast.²³

AbuRahma et al. (2022) review clinical guidelines for managing extracranial cerebrovascular disease published by the Society for Vascular Surgery. Contrast-enhanced MRA can produce three-dimensional images that rival those from a formal arteriography. A key advantage of MRA is less radiation exposure to the individual, and the use of iodinated-based contrast materials is not needed. Further, MRA allows for the integration of MRI of the brain, enabling the identification of clinically silent cerebral infarction. It also facilitates the assessment of plaque morphology, focusing on detecting intraplaque hemorrhage. The severity of carotid stenosis is more identifiable with MRA than CTA. While MRA excels in various aspects, it is unsuitable for screening carotid artery disease due to its substantial cost.²⁴

Cummins et al. (2022) discuss the role of TOF MRA for pulsatile tinnitus (PT) and the identification of vascular causes of PT, including dural arteriovenous fistulas (DAVFs). The annual intracranial hemorrhage risk of DAVFs is over 24%. TOF-MRA is considered one of the most sensitive and specific noninvasive methods for diagnosing DAVF. The diagnosis of arterial aneurysms is aided by the use of TOF MRA, with a sensitivity greater than 90% and specificity over 80%. Stenoses are also detected by MRA (a sensitivity of 95.5% and specificity of 87.2%). When severe carotid artery stenosis is a cause of PT, the sensitivity

and specificity of TOF MRA is nearly 100%. Advantages of MRA include a greater pooled sensitivity for diagnosis than CT as well as excellent spatial resolution and is the most powerful sequence for DAVF diagnosis. In addition, MRA can diagnose intracranial and high cervical arterial etiologies (e.g., fibromuscular dysplasia, carotid stenosis, variant anatomy). Disadvantages include high cost, scanning time, and the dephasing of tortuous vessels.²⁵

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Clinical Guideline Revision History/Information

Original Date:		
Review History		
Version 2	08/29/2024	Annual review and policy restructure
Version 3	10/30/2024	Edited repeat imaging criteria language.