# Cohere Medicare Advantage Policy - Computed Tomography Angiography (CTA), Upper Extremity

***Clinical Guidelines for Medical Necessity Review***

**Version:** 1
**Effective Date:** September 12, 2024

# Important Notices

## Notices & Disclaimers:

**GUIDELINES ARE SOLELY FOR COHERE'S USE IN PERFORMING MEDICAL NECESSITY REVIEWS AND ARE NOT INTENDED TO INFORM OR ALTER CLINICAL DECISION-MAKING OF END USERS.**

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## Other Notices:



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## Guideline Information:

**Specialty Area:** Diagnostic Imaging
**Guideline Name:** Cohere Medicare Advantage Policy - Computed Tomography Angiography (CTA), Upper Extremity

**Date of last literature review**: 9/9/2024
**Document last updated:** 9/11/2024
**Type:** [**X**] Adult (18+ yo) | [**X**] Pediatric (0-17 yo)

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# Medical Necessity Criteria

***Service: Computed Tomography Angiography (CTA), Upper Extremity***

## Benefit Category

Not applicable.

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 the CMS Medicare Coverage Database for the most current applicable CMS National Coverage.

- There are no NCDs and/or LCDs for CTA

## Recommended Clinical Approach

For most indications, ultrasound with Doppler is the initial screening modality except in urgent conditions, including acute trauma or an extremity that is cold or painful. Computed tomography angiography (CTA) is most beneficial for the evaluation of peripheral artery disease (PAD), trauma, assessment of variant anatomy and congenital malformations, vasculitis, and surgical planning. CTA is generally preferred over MRA in urgent situations whereas magnetic resonance angiography (MRA) should be considered in non-urgent conditions, including inflammatory or connective tissue disease.[1-4]

## Evaluation of Clinical Benefits and Potential Harms

Cohere Health uses the criteria below to ensure consistency in reviewing the conditions to be met for coverage of CTA of upper 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.[9,13,18,19]

- Suboptimal upper extremity imaging: CTA may not adequately characterize small vessel vasculitis, such as Raynaud Syndrome[14], may not sufficiently delineate between acute vasculitis versus atherosclerosis in the absence of other diagnostic systemic symptoms[14], may be poor in examination of hand vasculature among patients with vasoconstriction caused by cold hands or tobacco/cannabis use prior to exam[17], and may be nondiagnostic/inconclusive if artifacts are present - including those caused by retained metal objects.[15]
- Nondiagnostic: Up to 8% of post-trauma extremity CTA is ultimately felt to be nondiagnostic.[16]
- Potential danger to pregnancy: CT imaging completed during pregnancy confers a dose of ionizing radiation to the fetus and is generally only utilized when the potential benefits of this specific imaging modality outweigh the risks to the pregnancy.[20] Fetal risk includes fetal demise, intrauterine growth restriction, microcephaly, delayed intellectual development, risk of childhood cancer, and fetal thyroid injury.[20]
- Increased healthcare costs and complications from the inappropriate use of additional interventions.[21]

The clinical benefits of using these criteria include:

- Expedited Diagnosis: CTA represents an accurate, fast, reproducible imaging modality which improves time to hemorrhage control and limb reperfusion.[15,16]
- Optimal View: CTA is of particular use to visualize extravascular tissue versus other modalities, such as DSA (digital subtraction angiography).[12,14] CTA also optimally evaluates mycotic aneurysms, as gas within an aneurysm is a characteristic/diagnostic sign that is best seen on CTA.[17]
- Streamlined Triage: In the setting of polytrauma and complex acute injury, CTA of the upper extremity can be performed as part of standard whole-body imaging and may improve likelihood of limb salvage among patients with competing multisystem injuries.[15,16]

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

- ➔ **Computed tomography angiography (CTA), upper extremity** is considered appropriate if **ANY** of the following is **TRUE**[1-4]:
  - ◆ 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 as indicated by **ANY** of the following[3]:
    - Expanding hematoma[4]; **OR**
    - Major blunt trauma and the patient is hemodynamically stable[5]; **OR**
    - Neurologic deficit of upper extremity in association with trauma; **OR**
    - Vascular trauma to upper extremity[6]; **OR**
    - Repetitive trauma syndromes with vascular complications (e.g., crutch injury, hypothenar hammer syndrome); **OR**
  - ◆ Vascular conditions, known or suspected, including **ANY** of the following:
    - Aneurysm, seen on ultrasound or where ultrasound is nondiagnostic; **OR**
    - Intramural hematoma; **OR**
    - Dissection; **OR**
    - Clinical suspicion of acute or chronic limb ischemia, when ultrasound is inconclusive or nondiagnostic, with **ANY** of the following:

    - Acute absence of radial or ulnar pulses; **OR**
    - Acute changes in motor or sensory function; **OR**
    - Symptoms with exercise attributable to vascular etiologies such as muscle pain that resolves with rest, coldness, pallor, or fatigue; **OR**
- Determination of hemorrhage source (including non-surgical, spontaneous)[4]; **OR**
- Localization and characterization of vascular malformation or fistula (e.g., assessing treatment response, treatment planning) with **ANY** of the following:
    - Duplex ultrasound indeterminate or nondiagnostic; **OR**
    - High flow lesion suspected clinically or by imaging; **OR**
    - Pre-operative planning; **OR**
- Vasculitis, initial evaluation, when **ANY** of the following is **TRUE**[6]:
    - Biopsy proven; **OR**
    - Rheumatologic panel work-up including but not limited to erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) is suggestive of vasculitis; **OR**
    - Requesting clinician specializes in rheumatology and outcome of the imaging is expected to change management and/or treatment plan; **OR**
- Non-inflammatory vasculopathy that is symptomatic such as Raynaud's, Buerger's disease, fibromuscular dysplasia, or scleroderma; **OR**
- Arterial entrapment syndrome, when ultrasound and MRI/MRA are inconclusive or contraindicated[7]; **OR**
- Pre and post-intervention evaluation, when ultrasound is inconclusive or non-diagnostic and **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 arterial entrapment syndrome; **OR**
    - Non-healing upper extremity ulcers with abnormal or inconclusive ultrasound results (e.g. arterial Doppler); **OR**
    - Vascular steal syndrome of the upper extremity, is suspected, and initial imaging is needed to guide therapy[6]; **OR**
    - Hemodialysis access evaluation, when duplex ultrasound inconclusive and fistulogram cannot be performed, for **ANY** of the following conditions:
        - Arteriovenous fistula (AVF) stenosis; **OR**
        - Occlusion; **OR**
        - Pseudoaneurysm; **OR**
        - Steal syndrome (cool and painful extremity); **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.

➔ **Computed tomography venogram (CTV), upper extremity** is considered appropriate if **ANY** of the following is **TRUE**:

- 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 known venous upper extremity ulcer, when ultrasound is indeterminate or nondiagnostic; **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 ultrasound[7]; **OR**
- Subclavian or central venous obstruction such as subclavian vein thrombosis, Paget-Schroetter syndrome, or thoracic outlet syndrome, either known or suspected clinically (e,g. edema aggravated by exercise/arm position); **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

➔ **Computed tomography angiography (CTA), upper extremity** is not considered appropriate if **ANY** of the following is **TRUE**[8]:

- The request is for CT/CTA with contrast, and the patient has a history of anaphylactic allergic reaction to iodinated contrast media.

*NOTE: The referring professional and radiologist should discuss the risks and benefits of contrast media administration, including possible prophylaxis, in patients with chronic or worsening kidney disease or severe renal failure.
**NOTE: CT in pregnant patients should be requested at the discretion of the

ordering provider and obstetric care provider.
***NOTE: CT in patients with claustrophobia should be requested at the discretion of the ordering provider.

## Disclaimer on Radiation Exposure in Pediatric Population

Due to the heightened sensitivity of pediatric patients to ionizing radiation, minimizing exposure is paramount. At Cohere, we are dedicated to ensuring that every patient, including the pediatric population, has access to appropriate imaging following accepted guidelines. Radiation risk is dependent mainly on the patient's age at exposure, the organs exposed, and the patient's sex, though there are other variables. The following technical guidelines are provided to ensure safe and effective imaging practices:

**Radiation Dose Optimization:** Adhere to the lowest effective dose principle for pediatric imaging. Ensure that imaging protocols are specifically tailored for pediatric patients to limit radiation exposure.[9-10]

**Alternative Modalities:** Prioritize non-ionizing imaging options such as ultrasound or MRI when clinically feasible, as they are less likely to expose the patient to ionizing radiation. For instance, MRI or ultrasound should be considered if they are more likely to provide an accurate diagnosis than CT, fluoroscopy, or radiography.[9-10]

**Cumulative Dose Monitoring:** Implement systems to track cumulative radiation exposure in pediatric patients, particularly for those requiring multiple imaging studies. Regularly reassess the necessity of repeat imaging based on clinical evaluation.[9-10]

**CT Imaging Considerations:** When CT is deemed the best method for achieving a correct diagnosis, use the lowest possible radiation dose that still yields reliable diagnostic images.[9-10]

### Cohere Imaging Gently Guideline

The purpose of this guideline is to act as a potential override when clinically indicated to adhere to Imaging Gently and Imaging Wisely guidelines and As Low As Reasonably Possible (ALARA) principles.

## Level of Care Criteria

Inpatient or Outpatient

## Procedure Codes (CPT/HCPCS)

| CPT/HCPCS Code | Code Description |
|---|---|
| 73206 | Computed tomographic angiography (CTA), upper extremity; with contrast material(s), including non-contrast images, if performed, and image postprocessing |

# Medical Evidence

Ghouri et al. (2019) review the use of computed tomography (CT) and magnetic resonance angiography (MRA) of the upper extremity vasculature. While less frequent than lower extremity vascular abnormalities, upper extremity vascular issues require comprehensive assessment. Color Doppler is more convenient and bedside-accessible however, it suffers from operator variability and lacks central vasculature evaluation. Computed Tomography Angiography (CTA) is the primary imaging tool and allows for optimal results. Contrast enhancement is pivotal in CTA imaging, with adjustments in acquisition methods, contrast injection rates, and patient characteristics like BMI enhancing diagnostic accuracy. Advancements in CTA and MRA, including 3D reconstructions and time-resolved techniques, expand the ability to assess vascular pathologies previously reliant on conventional angiography.[2]

Nagpal et al. (2017) discuss the advancements in CT and magnetic resonance imaging (MRI) technology. This type of imaging allows for the assessment of upper extremity vascular conditions non-invasively. CT captures a wide field of view and the widespread availability of CT makes it valuable in emergency scenarios and for patients with contraindications to gadolinium-based contrast agents. The capability of MRI provides dynamic imaging through techniques like time-resolved MRA and its superior resolution for soft tissues positions it as the preferred choice for diagnosing vascular malformations, dynamic vascular compression disorders, and issues related to digital arteries. The technology of CT and MR ensures better anatomical and functional assessments for patients with upper extremity vascular symptoms.[11]

Dave and Fleischmann (2016) provide an overview of CTA of the upper extremities. While the value of CTA in trauma situations is widely acknowledged, its extensive and diverse clinical applications in subacute settings are equally significant. These include crucial roles in presurgical anatomical mapping, such as identifying variant arterial structures, assessing connective tissue disorders, diagnosing vasculitis, managing overuse syndromes, evaluating arteriovenous fistulae/grafts, diagnosing vascular malformations, recognizing compression syndromes and investigating perivascular pathology.[4]

# References


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# Clinical Guideline Revision History/Information

| Original Date: September 12, 2024 | | |
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| **Review History** | | |
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