



Cohere Medical Policy – Computed Tomography Angiography (CTA), Upper Extremity

Clinical Guidelines for Medical Necessity Review

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Guideline Information:

Specialty Area: Diagnostic Imaging

Guideline Name: Cohere Medical Policy - Computed Tomography Angiography (CTA), Upper Extremity

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

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Medical Necessity Criteria

Service: Computed Tomography Angiography (CTA), Upper Extremity

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

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 following³:
 - Expanding hematoma⁴; **OR**
 - Major blunt trauma and the patient is hemodynamically stable⁵; **OR**
 - Neurologic deficit of upper extremity in association with trauma; **OR**
 - Vascular trauma to upper extremity⁶; **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 contraindicated⁷; **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 therapy⁶; **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 ultrasound²; **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 patient has undergone advanced imaging of the same body part within 3 months without undergoing treatment or developing new or worsening symptoms⁹; **OR**
 - ◆ 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.¹⁰⁻¹¹

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.¹⁰⁻¹¹

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.¹⁰⁻¹¹

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.¹⁰⁻¹¹

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

Ghuri 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.¹²

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

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Clinical Guideline Revision History/Information

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Version 2	08/13/2024	Annual review and policy restructure.
Version 3	10/30/2024	Edited repeat imaging criteria language