National Imaging Associates, Inc.	
Clinical guidelines **UPPER EXTREMITY CTA/CTV**	**Original Date: July 2008**
CPT Codes: 73206	**Last Revised Date: April 2023~~March 2022~~**
Guideline Number: NIA_CG_061-2	**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 CTA and CT exam is requested, documentation requires a medical reason that clearly indicates why additional CT imaging of the upper extremity is needed.

INDICATIONS FOR UPPER EXTREMITY CTA/CTV (Computed Tomography Angiogram/Computed Tomography Venogram)

Hand Ischemia[1, 2]

- 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 features; with abnormal arterial Doppler ~~abnormal~~ and will change management
  - Includes Raynaud's (can be associated with scleroderma), Buerger disease, and other vasculopathies[3]
- Clinical concern for vascular cause of ulcers with abnormal or indeterminate ultrasound[4]
- After stenting or surgery with signs of recurrence or indeterminate ultrasound[5]

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Deep Venous Thrombosis or Embolism ~~after abnormal ultrasound~~[6, 7]

- 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[8, 9]

Clinical suspicion of vascular disease with abnormal or indeterminate ultrasound[8, 9]

- Tumor invasion[10, 11]
- Trauma[12]
- Vasculitis[1, 13]
- Aneurysm[14]
- Stenosis/occlusions[15, 16]

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

Vascular Malformation

- After initial evaluation with ultrasound and results will change management OR
- Inconclusive ultrasound OR
- If a known or suspected high flow lesion
- For preoperative planning (CT is also approvable for initial evaluation if MRI contraindicated)~~If MRA is contraindicated~~[18, 19]
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~~Non-diagnostic doppler ultrasound~~

(MRA preferred however CTA useful in delineating some high flow lesions such as an arteriovenous malformation)
~~**Note**: CTA useful in delineating high flow lesions such as an arteriovenous malformation.~~

Traumatic injuries with clinical findings suggestive of arterial injury[12]

Assessment/evaluation of known vascular disease/condition

Further evaluation of indeterminate ~~or questionable~~ 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~~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[20]

Post-operative/procedural evaluation

- 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.[21, 22]

Special Circumstances[23]

- 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

Computed tomography angiography (CTA) can visualize blood flow in arterial and venous structures throughout the upper extremity using a computerized analysis of x-ray images. It is enhanced by contrast material that is injected into a peripheral vein to promote visualization. CTA is much less invasive than catheter angiography which involves injecting contrast material into an artery. CTA is less expensive and carries lower risks than catheter 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."[6]

~~**CTA 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. CTA may be used in the evaluation of Raynaud's syndrome.~~

CTA 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, CTA is useful in the evaluation of hemodialysis graft dysfunction due to its speed and high resolution. Rapid data acquisition during the arterial phase, improved visualization of small vessels and lengthened anatomic coverage increase the usefulness of CTA.

CTA and Stenosis or Occlusion – CTA of the central veins of the chest is used for the detection of central venous stenoses and occlusions. High spatial resolution CTA 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.

POLICY HISTORY

Date	**Summary**
2023	Updated references Modified background section Added vascular malformations Added indeterminate prior imaging findings
March 2022	• Added a background section for upper extremity DVT. • Clarified renal impairment, not on dialysis, mild to moderate, GFR 30-45 ml/min MRA with contrast can be performed
May 2021	No changes
May 2020	• Added CT Venography to the title • Clarified that CTA does not include a baseline CT exam • Expanded section about vascular malformation to include initial testing • Added information about renal function and contrast agents • Added acute arterial obstruction and renal impairment • 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 • General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline
March 2022	• Added a background section for upper extremity DVT. • Clarified renal impairment, not on dialysis, mild to moderate, GFR 30-45 ml/min MRA with contrast can be performed

Reviewed / Approved by NIA Clinical Guideline Committee

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