National Imaging Associates, Inc.	
Clinical guidelines **NECK CTA**	**Original Date: September 1997**
CPT Codes: 70498	**Last Revised Date: May 2023~~March 2022~~**
Guideline Number: NIA_CG_012-1	**Implementation Date: January 2024~~3~~**

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.*

INDICATIONS FOR NECK CTA

If there is a combination request* for an overlapping body part, either requested at the same time or sequentially (within the past 3 months) the results of the prior study should be:

- Inconclusive or show a need for additional or follow up imaging evaluation **OR**
- The office notes should clearly document an indication why overlapping imaging is needed and how it will change management for the patient.

(*Unless approvable in the combination section as noted in the guidelines)

Patients with claustrophobia, limited ability to cooperate, an implanted device or in an urgent situation may be better suited for CTA, whereas those with extensive calcification, renal disease iodine contrast allergy should have MRA.[1]

For evaluation of known or suspected extracranial vascular disease

Cerebrovascular Disease

- Recent ischemic stroke or transient ischemic attack (see Background)[2-4]

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Note: For remote strokes with no prior vascular imaging, imaging can be considered based on location/type of stroke and documented potential to change management

- Known or suspected vertebrobasilar insufficiency (VBI) in patients with symptoms such as dizziness, vertigo, headaches, diplopia, blindness, vomiting, ataxia, weakness in both sides of the body, or abnormal speech[5-7]
- Asymptomatic patients with an abnormal ultrasound of the neck or carotid duplex imaging (e.g., carotid stenosis ≥ 70%, technically limited study, aberrant direction of flow in the carotid or vertebral arteries)[8-10]
- Symptomatic patients with an abnormal ultrasound of the neck or carotid duplex imaging (e.g., carotid stenosis ≥ 50%, technically limited study, aberrant direction of flow in the carotid or vertebral arteries)[8, 11, 12]

Aneurysm screening

- Screening for aneurysm in Loeys-Dietz syndrome**, fibromuscular dysplasia or spontaneous coronary arteries dissection (SCAD)[13-16]

**For Loeys-Dietz imaging should be repeated at least every two years

Tumor/pulsatile mass

- Pulsatile mass on exam[17]
- Known or suspected carotid body tumors, or other masses such as a paraganglioma, arteriovenous fistula pseudoaneurysm, atypical lymphovascular malformation[18]

Note: Ultrasound (US) may be used to identify a mass overlying or next to an artery in initial work up of a pulsatile mass.

Other extracranial vascular disease[19]

- Large vessel vasculitis (Giant cell or Takayasu arteritis) with suspected extracranial involvement[20-23]
- Subclavian steal syndrome when ultrasound is positive or indeterminate **OR** for planning interventions[24]
- Suspected carotid or vertebral artery dissection; secondary to trauma or spontaneous due to weakness of vessel wall[25, 26]
- To identity an arterial source of bleeding in patients with hemorrhage of the head and neck[27]
- Horner's syndrome (miosis, ptosis, and anhidrosis)[28]
- For evaluation of pulsatile tinnitus (subjective or objective) for suspected arterial vascular etiology[29]
- For further evaluation of a congenital vascular malformation of the head and neck
- Known extracranial vascular disease that needs follow-up or further evaluation

Pre-operative/procedural evaluation

- Pre-operative evaluation for a planned surgery or procedure

Post-operative/procedural evaluation (e.g., carotid endarterectomy)

- 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.

Further evaluation of indeterminate 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 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)

INDICATIONS FOR COMBINATION STUDIES

Neck CTA/Brain CTA

- Recent ischemic stroke or transient ischemic attack (TIA)(see Background) [2, 3, 30]

Note: For remote strokes with no prior vascular imaging, imaging can be considered based on location/type of stroke and documented potential to change management

- Known or suspected vertebrobasilar insufficiency (VBI) in patients with symptoms such as dizziness, vertigo, headaches, diplopia, blindness, vomiting, ataxia, weakness in both sides of the body, or abnormal speech[5, 7]
- Suspected carotid or vertebral artery dissection; due to trauma or spontaneous due to weakness of vessel wall[25, 26]
- Follow-up of known carotid or vertebral artery dissection within 3-6 months for evaluation of recanalization and/or to guide anticoagulation treatment[31, 32]
- Asymptomatic patients with an abnormal ultrasound of the neck or carotid duplex imaging (e.g., carotid stenosis ≥ 70%, technically limited study, aberrant direction of flow in the carotid or vertebral arteries) and patient is surgery or angioplasty candidate[8-10]
- Symptomatic patients with an abnormal ultrasound of the neck or carotid duplex imaging (e.g., carotid stenosis ≥ 50%, technically limited study, aberrant direction of flow in the carotid or vertebral arteries) and patient is surgery or angioplasty candidate[8, 11, 12]
- Pulsatile tinnitus (subjective or objective) for suspected arterial vascular etiology[29]

BACKGROUND

For vascular disease, MRA and CTA are generally comparable. No current literature compares the efficacy of contrast enhanced CT to CTA or MRI and MRA for evaluation of pulsatile neck mass, so any are approvable.[33] CTA may be complementary to CT in the following settings: evaluation of a pulsatile neck mass to assess vascular detail when needed; assessment of relevant vascular anatomy for pre-procedural evaluation; vascular supply to tumors and vessel encasement and narrowing by tumors; extent of disease in vasculitis; and to help determine the nature and extent of congenital or acquired vascular anomalies.

MRA vs CTA for Carotid Artery Evaluation[34, 35] - MRA and CTA are generally comparable noninvasive imaging alternatives, each with their own advantages and disadvantages. Advantages of CTA over MRA include superior spatial resolution, rapid image acquisition, decreased susceptibility to motion artifacts and artifacts from calcification as well as being better able to evaluate slow flow and tandem lesions. However, CTA can also overestimate high-grade stenosis. Limitations of CTA include radiation exposure to the patient, necessity of IV contrast, and risk of contrast allergy and contrast nephropathy. MRA is an excellent screening test since it does not utilize ionizing radiation. Duplex US and contrast-MRA is a common choice for carotid artery evaluation. Limitations of MRA include difficulty in patients with claustrophobia and the risk of nephrogenic systemic sclerosis with gadolinium contrast agents in specific patients. In patients with high radiation exposure, MRA as an alternative imaging modality should be considered.

CTA and dissection - Craniocervical dissections can be spontaneous or traumatic. Patients with blunt head or neck trauma who meet Denver Screening criteria should be assessed for cerebrovascular injury (although about 20% will not meet criteria). The criteria include: focal or lateralizing neurological deficits (not explained by head CT), infarct on head CT, face, basilar skull, or cervical spine fractures, cervical hematomas that are not expanding, ~~glasgow~~Glasgow coma score less than 8 without CT findings, massive epistaxis, cervical bruit or thrill.[25, 36-38] Spontaneous dissection presents with headache, neck pain with neurological signs or symptoms. There is often minor trauma or precipitating factor (e.g., exercise, neck manipulation). Dissection is thought to occur due to weakness of the vessel wall, and there may be an underlying connective tissue disorder. Dissection of the extracranial vessels can extend intracranially and/or lead to thrombus, which can migrate into the intracranial circulation causing ischemia. Therefore, MRA of the head and neck is warranted.[26, 39]

CTA and recent stroke or transient ischemic attack (TIA) - A stroke or central nervous system infarction is defined as "brain, spinal cord, or retinal cell death attributable to ischemia, based on neuropathological, neuroimaging, and/or clinical evidence of permanent injury. … Ischemic

stroke specifically refers to central nervous system infarction accompanied by overt symptoms, whereas silent infarction causes no known symptoms."[40] If imaging or pathology is not available, a clinical stroke is diagnosed by symptoms persisting for more than 24 hours. Ischemic stroke can be further classified by the type and location of ischemia and the presumed etiology of the brain injury. These include large-artery atherosclerotic occlusion (extracranial or intracranial), cardiac embolism, small-vessel disease and less commonly dissection, hypercoagulable states, sickle cell disease and undetermined causes.[41] TIAs in contrast, "are a brief episode of neurological dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting less than one hour, and without evidence of acute infarction on imaging."[42] On average, the annual risk of future ischemic stroke after a TIA or initial ischemic stroke is 3–4%, with an incidence as high as 11% over the next 7 days and 24–29% over the following 5 years. This has significantly decreased in the last half century due to advances in secondary prevention.[43]

When revascularization therapy is not indicated or available in patients with an ischemic stroke or TIA, the focus of the work-up is on secondary prevention. This includes noninvasive vascular imaging to identify the underlying etiology, assess immediate complications and risk of future stroke. The majority of stroke evaluations take place in the inpatient setting. Admitting TIA patients is reasonable if they present within 72 hours and have an ABCD(2) score ≥3, indicating high risk of early recurrence, or the evaluation cannot be rapidly completed on an outpatient basis.[42] Minimally, both stroke and TIA should have an evaluation for high-risk modifiable factors, such as carotid stenosis atrial fibrillation, as the cause of ischemic symptoms.[41] Diagnostic recommendations include neuroimaging evaluation as soon as possible, preferably with magnetic resonance imaging, including DWI; noninvasive imaging of the extracranial vessels should be performed, and noninvasive imaging of intracranial vessels is reasonable.[30]

Patients with a history of stroke and recent work up with new signs or symptoms indicating progression or complications of the initial CVA should have repeat brain imaging as an initial study. Patients with remote or silent strokes discovered on imaging should be evaluated for high-risk modifiable risk factors based on the location and type of the presumed etiology of the brain injury.[30, 40-43]

~~**POLICY HISTORY**~~

~~**Date**~~	~~**Summary**~~
~~February 2023~~	~~Updated References~~ ~~Added~~ ~~For further evaluation of a congenital vascular malformation of the head and neck~~ ~~Follow-up of known carotid or vertebral artery dissection within 3-6 months for evaluation of recanalization and/or to guide anticoagulation treatment (Combo Neck/Brain CTA)~~

	~~Section on further evaluation of indeterminate or questionable findings on prior imaging~~
~~March 2022~~	~~Updated and reformatted references~~ ~~Expanded background on CTA vs MRA~~ ~~Clarified~~ • ~~Pulsatile tinnitus to identify a suspected arterial vascular etiology~~ • ~~Large vessel vasculitis with suspected extracranial involvement~~ ~~Added:~~ • ~~To identity an arterial source of bleeding in patients with hemorrhage of the head and neck~~ • ~~New Combo statement~~
~~May 2021~~	~~Updated references~~ ~~Added:~~ • ~~Loeys-Dietz syndrome to aneurysm screening section~~ • ~~Known or suspected vertebrobasilar insufficiency (VBI) in patients with symptoms such as dizziness, vertigo, headaches, diplopia, blindness, vomiting, ataxia and weakness in both sides of the body, or abnormal speech – which was before only in the combo section~~ • ~~Pulsatile mass on exam~~ • ~~For evaluation of pulsatile tinnitus (subjective or objective) for vascular etiology – which was before only in the combo section~~ • ~~Pre-operative evaluation for a planned surgery or procedure~~ ~~Clarified:~~ • ~~Giant cell arteritis *with suspected extracranial involvement*~~ • ~~*Known* carotid body tumors, or other masses such as a paraganglioma, arteriovenous fistula pseudoaneurysm, atypical lymphovascular malformation~~
~~May 2020~~	~~Clarified:~~ • ~~Patients with claustrophobia, limited ability to cooperate or an implanted device may be better suited for CTA, whereas those with extensive calcification, renal disease or iodine contrast allergy should have MRA~~ • ~~Recent ischemic stroke or transient ischemic attack (also in combo section)~~ • ~~Pulsatile mass on exam after ultrasound (US)~~ • ~~Takayasu arteritis based on findings in other blood vessels on previous imaging~~ • ~~Giant cell arteritis~~ • ~~Known or suspected vertebrobasilar insufficiency (VBI) in patients with symptoms such as dizziness, vertigo, headaches, diplopia,~~

	~~blindness, vomiting, ataxia and weakness in both sides of the body, or abnormal speech~~ • ~~Suspected carotid or vertebral artery dissection; due to trauma or spontaneous due to weakness of vessel wall leading to dissection (combo section)~~ ~~Added:~~ • ~~Known extracranial vascular disease that needs follow-up or further evaluation~~ • ~~Spontaneous coronary arteries dissection (SCAD) in screening for aneurysm~~ • ~~Suspected carotid or vertebral artery dissection; due to trauma or spontaneous due to weakness of vessel wall leading to dissection~~ • ~~Horner's syndrome (miosis, ptosis, and anhidrosis)~~ • ~~Known extracranial vascular disease that needs follow-up or further evaluation~~ - ~~Deleted:~~ • ~~Ehlers-Danlos syndrome and neurofibromatosis in screening for aneurysm~~
~~April 2019~~	• ~~Added initial statement describing the use of CTA versus MRA~~ • ~~Suspected or known disease: Added "Giant cell arteritis" and "Subclavian steal syndrome when ultrasound is positive or indeterminate or for planning interventions~~ • ~~"Known or suspected tumor/*pulsatile* mass": Added 'pulsatile';~~ • ~~Neck CTA/Brain CTA: Added Denver screening criteria to assess for cerebrovascular injury~~ • ~~Added background information describing CTA and MRA as complimentary information to CT or MRI~~

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~~ADDITIONAL RESOURCES~~

~~1. Jadhav AP, Jovin TG. Vascular imaging of the head and neck. *Semin Neurol.* Sep 2012;32(4):401-10. doi:10.1055/s-0032-133181~~

POLICY HISTORY

Date	Summary
May 2023	Updated References Added • For further evaluation of a congenital vascular malformation of the head and neck • Follow-up of known carotid or vertebral artery dissection within 3-6 months for evaluation of recanalization and/or to guide anticoagulation treatment (Combo Neck/Brain CTA) • Section on further evaluation of indeterminate or questionable findings on prior imaging • General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline
March 2022	Updated and reformatted references Expanded background on CTA vs MRA Clarified • Pulsatile tinnitus to identify a suspected arterial vascular etiology • Large vessel vasculitis with suspected extracranial involvement Added: • To identity an arterial source of bleeding in patients with hemorrhage of the head and neck • New Combo statement
~~May 2021~~	~~Updated references~~ ~~Added:~~ ~~• Loeys-Dietz syndrome to aneurysm screening section~~ ~~• Known or suspected vertebrobasilar insufficiency (VBI) in patients with symptoms such as dizziness, vertigo, headaches, diplopia, blindness, vomiting, ataxia and weakness in both sides of the body, or abnormal speech – which was before only in the combo section~~ ~~• Pulsatile mass on exam~~ ~~• For evaluation of pulsatile tinnitus (subjective or objective) for vascular etiology - which was before only in the combo section~~ ~~• Pre-operative evaluation for a planned surgery or procedure~~

	~~Clarified:~~ ~~Giant cell arteritis *with suspected extracranial involvement*~~ ~~*Known* carotid body tumors, or other masses such as a paraganglioma, arteriovenous fistula pseudoaneurysm, atypical lymphovascular malformation~~
~~May 2020~~	~~Clarified:~~ ~~Patients with claustrophobia, limited ability to cooperate or an implanted device may be better suited for CTA, whereas those with extensive calcification, renal disease or iodine contrast allergy should have MRA~~ ~~Recent ischemic stroke or transient ischemic attack (also in combo section)~~ ~~Pulsatile mass on exam after ultrasound (US)~~ ~~Takayasu arteritis based on findings in other blood vessels on previous imaging~~ ~~Giant cell arteritis~~ ~~Known or suspected vertebrobasilar insufficiency (VBI) in patients with symptoms such as dizziness, vertigo, headaches, diplopia, blindness, vomiting, ataxia and weakness in both sides of the body, or abnormal speech~~ ~~Suspected carotid or vertebral artery dissection; due to trauma or spontaneous due to weakness of vessel wall leading to dissection (combo section)~~ ~~Added:~~ ~~Known extracranial vascular disease that needs follow-up or further evaluation~~ ~~Spontaneous coronary arteries dissection (SCAD) in screening for aneurysm~~ ~~Suspected carotid or vertebral artery dissection; due to trauma or spontaneous due to weakness of vessel wall leading to dissection~~ ~~Horner's syndrome (miosis, ptosis, and anhidrosis)~~ ~~Known extracranial vascular disease that needs follow-up or further evaluation~~ ~~Deleted:~~ ~~Ehlers-Danlos syndrome and neurofibromatosis in screening for aneurysm~~
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	~~"Known or suspected tumor/*pulsatile* mass": Added 'pulsatile';~~ ~~Neck CTA/Brain CTA: Added Denver screening criteria to assess for cerebrovascular injury~~ ~~Added background information describing CTA and MRA as complimentary information to CT or MRI~~

Reviewed / Approved by NIA Clinical Guideline Committee

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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.