EVOLENT CLINICAL GUIDELINE 004-1 FOR BRAIN CTA

Guideline or Policy Number: NIAEvolent_CG_004-1	**Applicable Codes**	
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STATEMENT

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.

Purpose

Indications for performing computed tomography angiography (CTA) in the head/brain region.

NOTE: Authorization for CT Angiography covers both arterial and venous imaging. The term angiography refers to both arteriography and venography

Special Note

Brain CT/CTA are not approvable simultaneously unless they meet the criteria described below in the Indications for Brain CT/Brain CTA combination studies section. 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 scenario may be better suited for CTA; whereas those with renal disease or iodine contrast allergy should have MRA.~~

INDICATIONS FOR BRAIN CTA

Evaluation of Suspected Intracranial Vascular Disease [1,2]

Aneurysm Screening

- Screening for intracranial aneurysm if two or more first-degree family members (parent, brother, sister, or child) of intracranial aneurysm [1]
    - **Note**: Repeat study is recommended every 5-7 years [3]
- For one first degree relative with aneurysm, asymptomatic screening is not indicated - would require a neurological sign or symptom supporting clinical concern for aneurysm. [4,5,6]
- Screening for aneurysm in ~~polycystic kidney disease (in adults), Loeys-Dietz syndrome‡ [3], fibromuscular dysplasia, spontaneous coronary arteries dissection (SCAD) [4,5], or known~~high-risk populations [1,7,8,9,10,11,12]:
    - KNOWN genetic syndromes (see **Genetic Syndromes and Rare Diseases**)
    - Bicuspid aortic valve
    - Known aortic diseases (aneurysm, coarctation ~~(after age 10)~~, dissection)

~~‡For Loeys-Dietz, imaging should be repeated at least every two years~~

Vascular Abnormalities

- Suspected vascular malformation (arteriovenous malformation (AVM) or dural arteriovenous fistula) in patient with previous or indeterminate imaging study [2]
- Thunderclap headache with continued concern for underlying vascular abnormality (i.e., aneurysm or reversible cerebral vasoconstriction syndrome) after initial negative brain imaging. [13,14,15,16]
    - **Note**: Negative brain CT < 6 hours after headache onset excludes subarachnoid hemorrhage in neurologically intact patients [15]. MRI lacks sensitivity in excluding subarachnoid hemorrhage less than 24 hours after headache onset. [13,17]
- Headache associated with exercise, exertion, Valsalva or sexual activity [13]
- Isolated third nerve palsy (oculomotor) with pupil involvement to evaluate for aneurysm [18,19]
- Horner's syndrome, non-central (miosis, ptosis, and anhidrosis) [20]
- Pulsatile tinnitus to identify a suspected arterial vascular etiology [21,22]

Note: MRI is the study of choice for detecting low flow malformations (see **background** section) [2]

Cerebrovascular Disease

Ischemic

- Recent ischemic stroke or transient ischemic attack (See **background** section) [23,24]
    - **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. [25,26,27,28]
- Suspected carotid or vertebral artery dissection; secondary to trauma or spontaneous due to weakness of vessel wall [29,30]
- Suspected cerebral vasospasm [1]

Hemorrhagic

- Known subarachnoid hemorrhage (SAH) [1,2]
- Known cerebral intraparenchymal hemorrhage with concern for underlying vascular abnormality [2,24]

Venous and MRV is contraindicated or cannot be performed [31] ***– CTV*****

- Suspected venous thrombosis (dural sinus thrombosis) [24]
- Distinguishing benign intracranial hypertension (pseudotumor cerebri) from dural sinus thrombosis [16]

Sickle cells disease (ischemic and/or hemorrhagic) and MRA is contraindicated or cannot be performed [32]

- Neurological signs or symptoms in sickle cell disease
- Stroke risk in sickle cell patients (2 - 16 years of age) with a transcranial doppler velocity > 200

Vasculitis ~~with initial laboratory Workup~~and Other Intracranial Vascular Disease

- Suspected secondary CNS vasculitis based on neurological signs or symptoms in the setting of an underlying systemic disease with abnormal inflammatory markers or autoimmune antibodies [1]
- Suspected primary CNS vasculitis based on neurological signs and symptoms with completed infectious/inflammatory lab work-up [1,33,34]
- Large vessel vasculitis (Giant cell or Takayasu arteritis) with suspected intracranial involvement [35,36,37,38,39]
- Suspected Moyamoya disease [40,41]

- Suspected reversible cerebral vasoconstriction syndrome [16,42]

Note: Vessel wall MRI (ordered as Brain MRI) can also be performed in the evaluation of vasculitides [43]

Evaluation of Known Intracranial Vascular Disease [1,2]

- Known intracranial aneurysm, treated aneurysm, or known vascular malformation (i.e., AVM or dural arteriovenous fistula)
- Known vertebrobasilar insufficiency with new or worsening signs or symptoms (VBI) [25,26,28]
- Follow-up of known carotid or vertebral artery dissection within 3-6 months for evaluation of recanalization and/or to guide anticoagulation treatment [44,45]
- Known vasculitis, reversible cerebral vasoconstriction syndrome or Moyamoya disease [2,34,46,47,48]

Pre-operative/procedural Evaluation

- Pre-operative evaluation for a planned surgery or procedure
- Refractory trigeminal neuralgia or hemifacial spasm when done for surgical evaluation [49,50]

Post-operative/procedural Evaluation [51,52]

- 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

Unless follow up is otherwise specified within the guideline

- For initial evaluation of an inconclusive finding on a prior imaging report (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.)

Genetic Syndromes and Rare Diseases

- For patients with fibromuscular dysplasia (FMD):[53,54]
  - One-time vascular study from brain to pelvis
- Vascular Ehlers-Danlos syndrome: [55,56]
  - At diagnosis and then every 18 months
  - More frequently if abnormalities are found
- Loeys-Dietz: [57]
  - At diagnosis and then every two years
  - More frequently if abnormalities are found
- Spontaneous coronary arteries dissection (SCAD) [12]
  - One-time vascular study from brain to pelvis
- Takayasu's Arteritis:[39]
  - For evaluation at diagnosis then as clinically indicated
- For other syndromes and rare diseases not otherwise addressed in the guideline, coverage is based on a case-by-case basis using societal guidance

Combination Studies

Brain CT and/or Brain CTA

- Recent ischemic stroke or transient ischemic attack (TIA) when MRI is contraindicated or cannot be performed [23,24]
- Acute, sudden onset of headache with personal history of a vascular abnormality or first-degree family history of aneurysm [1,16]
- Thunderclap headache >6 hours after onset in an acute setting with high suspicion of SAH [16]
- Headache associated with exercise, exertion, Valsalva or sexual activity when MRI is contraindicated or cannot be performed [13]
- Suspected venous thrombosis (dural sinus thrombosis) and MRI is contraindicated or cannot be performed [24] – **CT/CTV****
- Neurological signs or symptoms in sickle cell patients when MRI is contraindicated or cannot be performed [58]
- High stroke risk in sickle cell patients (2 - 16 years of age) with a transcranial doppler velocity > 200 when MRI is contraindicated or cannot be performed [58]
- Known Moyamoya disease [2,41] or reversible cerebral vasoconstriction with any new or changing neurological signs or symptoms [16,42]

- Suspected secondary CNS vasculitis based on neurological signs or symptoms in the setting of an underlying systemic disease with abnormal inflammatory markers or autoimmune antibodies when MRI is contraindicated or cannot be performed [1]
- Suspected primary CNS vasculitis based on neurological signs and symptoms with completed infectious/inflammatory lab work-up when MRI is contraindicated or cannot be performed [1,33,34]

Brain CT and/or Brain CTA and/or Neck CTA

- Recent ischemic stroke or transient ischemic attack (TIA) [23,24] when MRI is contraindicated or cannot be performed.
- Suspected or known carotid or vertebral artery dissection with focal or lateralizing neurological deficits
- Approved indications as noted above and being performed in high-risk populations (in whom MRI is contraindicated or cannot be performed) and will need anesthesia for the procedure and there is a suspicion of concurrent intracranial pathology

*__Note__: MRA and CTA are generally comparable noninvasive imaging alternatives each with their own advantages and disadvantages. Brain MRI can alternatively be combined with Brain CTA/Neck CTA.

Brain CTA and/or Neck CTA

- Recent ischemic stroke or transient ischemic attack (see **background**) [23,24]
    - **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 [25,26,27,28]
- Suspected carotid [59] or vertebral [60] artery dissection; secondary to trauma [61] or spontaneous due to weakness of vessel wall [24,62,63]
- Follow-up of known carotid or vertebral artery dissection within 3-6 months for evaluation of recanalization and/or to guide anticoagulation treatment [64,65,66]
- 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 [67,68,69]
- 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 [68,70]

- Pulsatile tinnitus to identify a suspected arterial vascular etiology [21,22]
- Large vessel vasculitis (Giant cell or Takayasu arteritis) with suspected intracranial and extracranial involvement

Brain/Neck/Chest/Abdomen/Pelvis CTA

- For patients with fibromuscular dysplasia (FMD), a one-time vascular study from brain to pelvis [53,54]
- Vascular Ehlers-Danlos syndrome: At diagnosis and then every 18 months; more frequently if abnormalities are found [55,56]
- Loeys-Dietz: at diagnosis and then every two years, more frequently if abnormalities are found [57]
- For assessment in patients with spontaneous coronary artery dissection (SCAD), can be done at time of coronary angiography [71]

CODING AND STANDARDS

Coding

CPT Codes

70496

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

General Overview

~~*CTA for Evaluation of Aneurysm*~~

~~CTA is useful in the detection of cerebral aneurysms. The sensitivity of CTA to detect cerebral aneurysms ≤ 5 mm is higher than that with digital subtraction angiography (DSA). Most aneurysms missed with CTA are ≤ 3mm. Aneurysms in the region of the anterior clinoid process may extend into the subarachnoid space where they carry the threat of hemorrhage. CTA can help delineate the borders of the aneurysm in relation to the subarachnoid space and may help detect acute ruptured aneurysms. It may be used in the selection of patients for surgical or endovascular treatment of ruptured intracranial aneurysms.~~

~~*CTA for Screening of Patients with First-degree relative having Aneurysm*~~

~~Data has suggested that individuals with a parent, brother, sister, or child harboring an intracranial aneurysm are at increased risk of aneurysms. It is likely that multiple genetic and environmental risk factors contribute to the increased risk.~~

~~*CTA and PCKD*~~

~~Screening imaging every 5 years, and annual follow-up imaging in patients in with a known intracranial aneurysm is recommended. The current literature recommends initial screening by the age of 30 years and earlier if there is a strong family history of intracranial aneurysm. Screening is generally not recommended is the pediatric population (less than 18 years). No upper age limit for screening patients with ADPKD has been recommended.~~

~~*CTA for Evaluation of Arteriovenous Malformation*~~

~~A good correlation has been found between catheter angiography and CTA in the detection of arteriovenous malformations. CTA allows calculation of the volume of an AVM nidus and identifies and quantifies embolic material within it. CTA may be used for characterization and stereotactic localization before surgical resection or radiosurgical treatment of arteriovenous malformations.~~

Computed tomography angiography (CTA) is recognized as a valuable diagnostic tool for the management of patients with cerebrovascular disease. With its three-dimensional reconstructions, CTA can simultaneously demonstrate the bony skull base and its related vasculature. CTA's use of ionizing radiation and an iodine-based intravascular contrast medium is a disadvantage when compared to magnetic resonance angiography (MRA), but it is quicker and requires less patient cooperation than MRA. CTA is much less invasive than catheter angiography which involves injecting contrast material into an artery.

CTA and Non-Aneurysmal Vascular Malformations

Non-aneurysmal vascular malformations can be divided into low flow vascular malformations and high flow vascular malformations. Low flow vascular malformations include dural venous anomalies (DVA), cavernomas, and capillary telangiectasias. High flow vascular malformations include AVM and dural arteriovenous fistulas (dAVF). For low flow malformations, MRI is the study of choice. There is limited medical literature to support vascular imagining (CTA or MRA). CTA plays a limited role in the assessment of cavernoma but may be used to demonstrate a DVA. MRA is not usually helpful in the assessment of cavernoma, capillary telangiectasia, and DVA. Vascular imaging is indicated in high flow vascular malformations. [1,2,72]

There is no evidence to support screening of first-degree relatives for AVMs [73]. The risk of having an AVM may be higher than in the general population, but absolute risk is low.

Pulsatile tinnitus

Pulsatile tinnitus has many etiologies, and the choice of study should be based on accompanying signs and symptoms. For general screening MRI brain with IAC/MRA brain and neck is approvable. If IIIH is suspected (typically with headache and vision changes in a younger woman with a high BMI), MRI/MRV brain is indicated. If there is concern for vascular etiology, CTA or MRA brain/neck is indicated. If there is associated hearing loss and neurological signs/symptoms, MRI brain with IAC is indicated. If the temporal bone is suspected to be involved and/or retrotympanic lesion seen on otoscopy, CT temporal bone/IAC is indicated. If there is concurrent concern for boney and a vascular issue, CTA of the head and neck can be used to evaluate both.

MRA vs CTA for CVA

Preferred vascular imaging of the head and neck includes non-contrast head MRA and contrast-enhanced neck MRA. MRA may not be able to be performed in patients with claustrophobia, morbid obesity, or implanted device, but it can be useful in patients with renal failure or contrast allergies. In patients with high radiation exposure, MRA as an alternative should be considered. For acute stroke, CTA is preferred after CT (to rule of hemorrhage) and to look for thrombus/possible intervention that is time sensitive. [2,24]

CTA and Recent Stroke or Transient Ischemic Attack

- ~~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".~~
- ~~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.

- 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". 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.

- 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. Minimally, bothBoth stroke and TIA should have an evaluation for high-risk modifiable factors such as carotid stenosis atrial fibrillation as the cause of ischemic symptoms. [74]. 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. [75]

- 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.

CTA for Evaluation of Vertebrobasilar Insufficiency

Multidetector CT angiography (MDCTA) may be used in the evaluation of vertebral artery pathologies. The correlation between MDCTA and color Doppler sonography is moderate. CTA is used for minimally invasive follow-up after intracranial stenting for VBI. It enables visualization of the patency of the stent lumen and provides additional information about all brain arteries and the brain parenchyma.

CTA and Intracerebral Hemorrhage [76]

CTA is useful as a screening tool for an underlying vascular abnormality in the evaluation of spontaneous intracerebral hemorrhage (ICH). Etiologies of spontaneous ICH include tumor, vascular malformation, aneurysm, hypertensive arteriopathy, cerebral amyloid angiopathy,

venous thrombosis, vasculitis, RCVS, drug-induced vasospasm, venous sinus thrombosis, Moyamoya disease, anticoagulant use and hemorrhagic transformation of an ischemic infarct. History can help point to a specific etiology. Possible risk factors for the presence of underlying vascular abnormalities include age younger than 65, female, lobar or intraventricular location, and the absence of hypertension or impaired coagulation.

*CTV and Central Venous Thrombosis***

CT Venogram is indicated for the evaluation of a central venous thrombosis/dural sinus thrombosis. The most frequent presentations are isolated headache, intracranial hypertension syndrome, seizures, focal neurological deficits, and encephalopathy. Risk factors are hypercoagulable states inducing genetic prothrombotic conditions, antiphospholipid syndrome and other acquired prothrombotic diseases, such as cancer, oral contraceptives, pregnancy, puerperium (6 weeks postpartum), infections, and trauma. Since venous thrombosis can cause SAH, infarctions, and hemorrhage, parenchymal imaging with MRI/CT is also appropriate. [31,77,78,79]

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 coma score less than 8 without CT findings, massive epistaxis, cervical bruit or thrill. [62,80,81,82]

Spontaneous dissection presents with headache, neck pain with neurological signs or symptoms. There is often minor trauma or precipitating factor (i.e., 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, vascular imaging of the head and neck is warranted. [63,83]

Contraindications and Preferred Studies

- Contraindications and reasons why a CT/CTA cannot be performed may include: impaired renal function, significant allergy to IV contrast, pregnancy (depending on trimester).
- Contraindications and reasons why an MRI/MRA cannot be performed may include: impaired renal function, claustrophobia, non-MRI compatible devices (such as non-compatible defibrillator or pacemaker), metallic fragments in a high-risk location, patient exceeds weight limit/dimensions of MRI machine.

Acronyms / Abbreviations

ADPKD: Autosomal Dominant Polycystic Kidney Disease
AVM: Arteriovenous Malformation
CNS: Central Nervous System
CTA: Computed Tomography Angiography
CTV: Computed Tomography Venography
CVA: Cerebrovascular Accident
dAVF: Dural Arteriovenous Fistulas
DVA: Dural Venous Anomalies
IAC: Internal Auditory Canal
ICH: Intracerebral Hemorrhage
MRA: Magnetic Resonance Angiography
MRI: Magnetic Resonance Imaging
MRV: Magnetic Resonance Venography
SCAD: Spontaneous Coronary Arteries Dissection
SAH: Subarachnoid Hemorrhage
VBI: Vertebrobasilar Insufficiency
TIA: Transient Ischemic Attack

POLICY HISTORY

Summary

Date	Summary
June 2024	● Updated references ● Updated background section ● Updated combination section ● Clarified ○ Frequency of screening in genetic syndromes ● Added ○ Screening for aneurysm in high-risk populations ■ Bicuspid aortic valve ■ Known aortic diseases (aneurysm, coarctation, dissection) ○ Suspected cerebral vasospasm ○ Suspected carotid or vertebral artery dissection; secondary to trauma or spontaneous due to weakness of vessel wall (already in combo) ○ Follow-up of known carotid or vertebral artery dissection within 3-6 months for evaluation of recanalization and/or to guide anticoagulation treatment (already in combo) ○ Horner's syndrome, non-central (miosis, ptosis, and anhidrosis) - also in combo section ○ Genetic syndromes and rare disease section.

	○ Refractory trigeminal neuralgia or hemifacial spasm when done for surgical evaluation ○ 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 ○ To combo CT/CTA section Thunderclap headache >6 hours after onset in an acute setting with high suspicion of SAH ○ Large vessel vasculitis (Giant cell or Takayasu arteritis) with suspected intracranial and extracranial involvement (Brain/Neck CTA combo) ○ Known Moyamoya disease or eversible cerebral vasoconstriction with any new or changing neurological signs or symptoms (Brain CTA/Brain CT combo ○ Suspected secondary CNS vasculitis based on neurological signs or symptoms in the setting of an underlying systemic disease with abnormal inflammatory markers or autoimmune antibodies (Brain CTA /CT combo) when MRI is contraindicated or cannot be performed ○ Suspected primary CNS vasculitis based on neurological signs and symptoms with completed infectious/inflammatory lab work-up ((Brain CTA /CT combo) when MRI is contraindicated or cannot be performed ● Deleted ○ Pulsatile tinnitus combo section
May 2023	● Updated and reformatted references ● Updated background section ● General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline ● Added statement regarding further evaluation of indeterminate findings on prior imaging ● Added: ○ Section on further evaluation of indeterminate or questionable findings on prior imaging ○ Follow-up of known carotid or vertebral artery dissection within 3-6 months for evaluation of recanalization and/or to guide anticoagulation treatment ○ 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 (also in combo section) ○ Note on CTA VS MRA ● Clarified:

	○ Screening for aneurysm in polycystic kidney disease (in adults) ○ Screening for intracranial aneurysm if two or more first-degree family members (parent brother, sister, or child) with history of intracranial aneurysm ○ For one first degree relative with aneurysm, asymptomatic screening is not indicated - would require a neurological sign or symptom supporting clinical concern for aneurysm. ○ Thunderclap headache with continued concern for underlying vascular abnormality (i.e., aneurysm or reversible cerebral vasoconstriction syndrome) after initial negative brain imaging ○ Note: MRI lacks sensitivity in excluding subarachnoid hemorrhage less than 24 hours after headache onset ○ Headache associated with exercise, exertion, Valsalva or sexual activity (Also in Combo Brain CT/CTA) ● Deleted: ○ Vascular abnormality visualized on previous brain imaging that is equivocal or needs further evaluation
~~March 2022~~	~~● Updated and reformatted references~~ ~~● Added New combo statement~~ ~~● Updated background~~ ~~Clarified:~~ ~~● Aneurysm screening in aortic coarctation after age 10~~ ~~● MRI is the study of choice for detecting low flow vascular malformations (see background)~~ ~~● Follow-up of known intracranial aneurysm, treated aneurysm, or known vascular malformation~~ ~~● Pulsatile tinnitus to identify a suspected arterial vascular etiology~~ ~~● Combo studies- CVA/TIA when MRI is contraindicated or cannot be performed~~ ~~Changed:~~ ~~● Thunderclap headache with continued concern for underlying vascular abnormality after initial negative brain imaging > 6 hours after onset~~ ~~Added:~~ ~~● Brain MRI/Brain MRA combination (when MRI contraindicated)~~ ~~● Neurological signs or symptoms in sickle cell patients~~ ~~● High stroke risk in sickle cell patients (2 - 16 years of age) with a transcranial doppler velocity > 200~~

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by ~~NIA~~Evolent Specialty Clinical Guideline Review Committee

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