Cohere Medical Policy - Computed Tomography Angiography (CTA), Head

Clinical Guidelines for Medical Necessity Review

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Important Notices

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Guideline Information:

Specialty Area: Diagnostic Imaging
Guideline Name: Cohere Medical Policy - Computed Tomography Angiography (CTA), Head

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Type: [**X**] Adult (18+ yo) | [**X**] Pediatric (0-17 yo)

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Medical Necessity Criteria

Service: Computed Tomography Angiography (CTA), Head

Recommended Clinical Approach

Computed tomography angiography (CTA) and CT venography (CTV) of the head help detect and characterize vascular disease and anatomy relevant to treating extravascular disorders. CTA may be used as the primary modality for detecting disease, as an adjunctive tool for characterizing a known disease, or to assess changes over time.[1] Magnetic resonance angiography (MRA) or magnetic resonance venography (MRV) is the preferred imaging study due to the lack of ionizing radiation.

Medical Necessity Criteria

Indications

- ➔ **Computed tomography angiography (CTA), head** is indicated if **ANY** of the following is **TRUE**:
  - ◆ Neoplastic conditions including surgical and radiation therapy localization, planning, and neuronavigation to delineate the vascular anatomy (e.g., tumor is in the vicinity or encases a major artery or occludes major vein)[1]; **OR**
  - ◆ Trauma-related conditions as indicated by **ANY** of the following:
    - Head trauma with suspected intracranial arterial injury due to clinical risk factors or positive findings on prior imaging[2]; **OR**
    - Blunt cerebrovascular injury (BCVI) is suspected based on the mechanism and location of trauma (CT neck is also indicated with CT head)[3]; **OR**
    - Traumatic vascular injuries[1]; **OR**
    - Suspected carotid or vertebral artery dissection secondary to trauma; **OR**
  - ◆ Vascular conditions, known or suspected, including **ANY** of the following:
    - Aneurysm with **ANY** of the following[5-10]:
      - Screening for cerebral artery aneurysm when **ANY** of the following is **TRUE**[26-34]:

        - Autosomal dominant polycystic kidney disease (adults); **OR**
        - The patient has two or more first-degree relatives (parent, brother, sister, or child) with a history of intracranial aneurysm; **OR**
        - The patient is symptomatic with one first-degree relative who has a history of intracranial aneurysm[4-7]; **OR**
        - Fibromuscular dysplasia; **OR**
        - Loeys-Dietz syndrome; **OR**
        - Spontaneous coronary arteries dissection (SCAD); **OR**
        - Known aortic coarctation (after age 10); **OR**
    - **ANY** of the following:
        - Diagnosis of intracranial hemorrhage; **OR**
        - Diagnosis of subarachnoid hemorrhage; **OR**
        - Intracerebral hemorrhage, known or suspected[12]; **OR**
        - The patient has a history of subarachnoid hemorrhages[6]; **OR**
- Cervical bruit or thrill with suspicion of neck carotid stenosis; **OR**
- Headache with **ANY** of the following:
    - Acute onset worst/thunderclap headache[11]; **OR**
    - New onset or pattern during pregnancy or peripartum period; **OR**
    - Associated with exercise, exertion, Valsalva, or sexual activity; **OR**
- Intracranial arterial dissection, suspected; **OR**
- Intracranial occlusive disease (arterial or venous), suspected[13]; **OR**
- Intracranial hypertension (idiopathic), suspected; **OR**
- Pseudoaneurysm[1]; **OR**
- Recent stroke, up to 6 months (remote history is not an indication unless recent TIA episodes)[1]; **OR**
- Cranial neuropathy as indicated by **ANY** of the following and prior imaging is suspicious for a vascular pathology (e.g., aneurysm, arteriovenous fistulas [AVF])[1,8-9]:

    - Lower cranial nerve palsies, weakness or paralysis (CN IX-XII) (i.e., glossopharyngeal neuralgia); **OR**
    - Unilateral isolated weakness or paralysis of the tongue (hypoglossal nerve, CN XII); **OR**
    - Refractory trigeminal neuralgia when done for surgical planning; **OR**
    - Isolated third nerve palsy (oculomotor) with pupil involvement to evaluate for aneurysm; **OR**
    - Any combination or isolated involvement of cranial nerves where prior imaging is suspicious for vascular pathology; **OR**
- Acute or recent unexplained intracranial hemorrhage[1]; **OR**
- Atherosclerotic stenosis or occlusive disease, including suspected vasospasm or thromboembolism with **ANY** of the following[1]:
    - Patient has documented symptoms suggestive of stroke or TIA; **OR**
    - Based on prior imaging; **OR**
- Vasculopathy that is non-atherosclerotic, non-inflammatory (e.g., radiation vasculopathy) and suspected on prior imaging (e.g., CT, MRI)[1]; **OR**
- The patient has **ANY** of the following:
    - Abnormal neurologic signs; **OR**
    - Fever; **OR**
    - Visual disturbance; **OR**
    - Vertigo; **OR**
    - Weight loss; **OR**
- Vascular malformation and fistula based on prior imaging[1]; **OR**
- Cerebrovascular disease in a patient age 18 or older including **ANY** of the following[10]:
    - Acute subarachnoid hemorrhage (SAH), suspected or known on CT; **OR**
    - Central nervous system (CNS) vasculitis, suspected; **OR**
    - Cerebral aneurysm (treated or untreated), known; **OR**
    - Cerebral vasospasm, suspected; **OR**
    - High-flow vascular malformation (AVM/AVF), known; **OR**

    - Aneurysmal SAH in a younger patient who is at-risk of de novo aneurysm formation; **OR**
    - The patient has **ANY** of the following:
        - Moyamoya disease; **OR**
        - Bicuspid aortic valve; **OR**
        - Aortic aneurysm; **OR**
        - Coarctation of the aorta; **OR**
- Cerebrovascular disease in a patient age 17 or under and **ANY** of the following is **TRUE**[11]:
    - Acute stroke is suspected with **ANY** of the following:
        - Non-sickle–cell related with new focal fixed or worsening neurologic deficit lasting less than 24 hours from last seen normal state and there are no contraindications to emergent intervention; **OR**
        - Known or suspected arteriopathy or moyamoya[9-10] **OR**
        - Known or suspected central nervous system vasculitis; **OR**
        - Known or suspected low- or high-flow vascular anomaly; **OR**
        - The patient is not a candidate for emergent intervention; **OR**
    - Acute subarachnoid hemorrhage (SAH), suspected or known on CT; **OR**
    - Spontaneous cervicocranial arterial dissection based on clinical or imaging findings. (CTA head and neck ordered together); **OR**
    - Nontraumatic intracranial hemorrhage (hematoma) of unknown etiology found on CT or MRI and additional imaging study is needed; **OR**
    - Nontraumatic SAH detected by non-contrast CT; **OR**
- Vertebrobasilar insufficiency (VBI) as indicated by **ANY** of the following[12-13]:
    - Abnormal neurologic examination is consistent with central vertigo; **OR**
    - Associated with other brainstem neurologic deficits; **OR**

        - HINTS (Head Impulse-Nystagmus-Test of Skew) examination is consistent with central vertigo; **OR**
        - Neurological symptoms (central vertigo); **OR**
- For evaluation of **ANY** of the following miscellaneous pathologies when prior testing has failed:
    - Headache with an unrevealing MRI and **ANY** of the following is **TRUE**:
        - Persistent in nature; **OR**
        - Undifferentiated; **OR**
        - Unexplained; **OR**
    - Pulsatile tinnitus (unilateral or bilateral) as evidenced by **ANY** of the following[1,15-16]:
        - Localized to one ear (prior testing not required); **OR**
        - Focal neurological abnormalities (consider MRI brain internal auditory canal [IAC] protocol first); **OR**
        - Asymmetric hearing loss (consider MRI brain internal auditory canal [IAC] protocol first); **OR**
    - Visual impairment including **ANY** of the following[17]:
        - Isolated third nerve palsy (oculomotor) with pupil involvement to evaluate for aneurysm; **OR**
        - Suspected venous thrombosis (e.g., dural sinus thrombosis) when MRV is contraindicated or cannot be performed; **OR**
- Preoperative assessment of vascular anatomy or pathology; **OR**
- Post-treatment follow-up to monitor treatment result and surveillance of vascular condition; **OR**
- Congenital conditions or anomalies including vascular abnormality associated with chronic anemic conditions (e.g., sickle cell disease) (MRA head is preferred in pediatric patients)[18-19]; **OR**
- **Computed tomography venography (CTV), head** is indicated when **ALL** of the following are **TRUE**:
    - Ultrasound and CT venography (CTV) are contraindicated or inconclusive (e.g., body habitus for ultrasound, anaphylactic reaction due to IV contrast reaction, pregnancy, pediatric); **AND**
        - **ANY** of the following is **TRUE**:
            - Vascular conditions, known or suspected, including **ANY** of the following:

- Venous/dural sinus abnormalities such as **ANY** of the following:
    - Acquired thrombosis/occlusion; **OR**
    - Venous sinus stenosis; **OR**
- Venous sinus stenosis; **OR**
- Large vein injury secondary to trauma; **OR**
- Vascular invasion or displacement by tumor; **OR**

◆ Headache with **ANY** of the following:

- New onset or pattern during pregnancy or peripartum period; **OR**
- Headache with features of intracranial hypertension (e.g., papilledema, pulsatile tinnitus, visual symptoms worse on Valsalva)[11]; **OR**

◆ Initial diagnostic, one-time pre or one-time post-treatment evaluation for treatment planning or evidence of clinical concern for vascular malformation; **OR**

◆ Repeat imaging of a specific area or structure using the same imaging modality (in the absence of an existing follow-up guideline) is considered appropriate when **ALL** of the following is **TRUE**:

- There is documented clinical necessity; **AND**
- Prior imaging results of the specific area or structure, obtained using the same imaging modality, must be documented and available for comparison; **AND**
- **ANY** of the following is **TRUE**:
    - A change in clinical status, such as worsening symptoms or the emergence of new symptoms, that may influence the treatment approach; **OR**
    - The requirement for interval reassessment, which may alter the treatment plan; **OR**
    - One-time follow-up of a prior indeterminate finding to assess for interval change; **OR**
    - The need for re-imaging either before or after performing an invasive procedure.

Non-Indications

- ➔ **Computed tomography angiography (CTA) or computed tomography venography (CTV), head,** is not considered appropriate if **ANY** of the following is **TRUE**[20]:
  - ◆ The patient has undergone advanced imaging of the same body part within 3 months without undergoing treatment or developing new or worsening symptoms; **OR**
  - ◆ If contrast is used, 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.[21-22]

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.[21-22]

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.[21-22]

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.[21-22]

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 and Outpatient

Procedure Codes (CPT/HCPCS)

CPT/HCPCS Code	Code Description
70496	Computed tomographic angiography (CTA), head; with contrast material(s), including non-contrast images, if performed, and image postprocessing

Medical Evidence

Tu et al. (2022) conducted a retrospective review on the utilization of head and neck computed tomography angiography (CTA) in the emergency department (ED). Head and neck CTA in the ED has shown a disproportionate increase compared to other neuroimaging examinations. The study contrasted utilization and the frequency of communicating non-routine results across different patient chief concerns. The study identified the top 50 primary concerns leading to the most CTA examinations. A total of 17903 CTAs for 833 distinct chief concerns were included, which accounts for 2.5% of 708,145 ED visits. The rates of ordering and communication of non-standard results exhibit significant variability across different chief concerns. Approximately half of the non-standard communications made by radiologists pertain to acute indications. Understanding the trends in ordering head and neck CTA and communicating non-standard results can aid in refining patient selection and enhancing radiologist interactions in the ED.[23]

Schenk et al. (2021) report on a retrospective review of stroke in young adults. The use of CTA head and neck diagnostic yield for anterior circulation ischemic stroke evaluation is discussed. The review included adults aged 18-50 who presented to the Mayo Clinic Rochester ED. Carotid dissection is a predominant cause of anterior circulation ischemic stroke, as evidenced by findings on CTA. Studies found that carotid webs were infrequent in the patients studied, while carotid atherosclerosis was relatively rare - the presence of carotid webs, understanding their potential to trigger recurrent strokes. The authors did not cite a significant disparity in the prevalence of carotid atherosclerosis between the symptomatic and asymptomatic sides. Clinicians can recognize high-risk morphological attributes of carotid plaque observed on CT angiography, even in cases with no discernible stenosis.[24]

Heit et al. (2016) conducted an 11-year single-center retrospective review to analyze the yield of digital subtraction angiography (DSA) in patients with subarachnoid hemorrhage. DSA reveals vascular abnormalities in 13% of patients who initially test negative for subarachnoid hemorrhage (SAH) on CTA. Upon subsequent DSA, aneurysms or pseudoaneurysms are found in 4% of cases. Utilization of DSA may be appropriate for all patients with SAH-negative CT scans. To aid the clinician, the type of SAH pattern observed with DSA may offer clues to the underlying cause of the hemorrhage.[25]

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