EVOLENT CLINICAL GUIDELINE 015 FOR CEREBRAL PERFUSION CT

Guideline or Policy Number: Evolent_CG_015	**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

Cerebral perfusion computed tomography (CTP) is an imaging technique that provides quantitative evaluation of cerebral perfusion by generating maps of cerebral blood flow, cerebral blood volume, and mean transit time after passage of an IV contrast bolus through the region of interest.

INDICATIONS

In the following settings after initial CT and/or MRI has been performed or when MRI is contraindicated

- In the non-acute setting: [1,2]
  - Pre-operative evaluation of cerebral blood flow in patients at high risk for developing cerebral hyperperfusion after carotid revascularization [3]
  - For assessment of cerebrovascular reserve by using acetazolamide challenge in individuals with intracranial vascular stenosis who are potential candidates for bypass surgery or neuroendovascular treatment [4]
  - For the assessment of microvascular permeability in individuals with intracranial neoplasms[5]
  - A follow-up study may be needed to help evaluate an individual'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
- In the acute setting: [1,2,6]
  - For early detection of acute cerebral ischemia and infarct to determine the appropriateness of an intervention or procedure [7,8]
  - Prediction of hemorrhagic transformation in acute ischemic stroke [7,8,9]

- Differentiating post-ictal paralysis or other stroke mimics from acute stroke after MRI has been completed or is contraindicated and will guide treatment[9]
- For noninvasive evaluation of suspected vasospasm related cerebral ischemia/infarction and/or delayed cerebral ischemia after subarachnoid hemorrhage when transcranial Doppler cannot be done or is indeterminate
- For the assessment of cerebral blood flow after carotid revascularization in individuals with severe carotid artery stenosis or signs/symptoms of cerebral hyperperfusion[10]

CODING AND STANDARDS

Coding

CPT Codes

0042T

Applicable Lines of Business

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

BACKGROUND

Overview

CTP is not widely used especially in outpatients. It is useful in specific scenarios after initial CT and/or MR imaging has been obtained for assessment of, patients with acute stroke, and also a wide range of patients with other cerebrovascular diseases. In evaluating acute stroke it may assist in differentiating the unsalvageable core infarct and salvageable ischemic regions of the brain that may benefit from thrombectomy or thrombolysis. [2]

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.

Acute Cerebral Ischemia

Cerebral perfusion CT can quantitatively distinguish the extent of irreversibly infarcted brain tissue (infarct core) from the severely ischemic but salvageable tissue (penumbra), providing a basis for the selection of acute stroke patients that are most likely to benefit from thrombolytic treatment[2]

Cerebral Ischemia and Infarction and Evaluation of Vasospasm after Subarachnoid Hemorrhage (SAH)

Cerebral perfusion CT can be useful in identifying patients at risk for cerebral ischemia or infarction and for evaluation of vasospasm after subarachnoid hemorrhage. Catheter angiography is the gold standard for detecting vasospasm. Screening for vasospasm can be performed with TCD US (transcranial doppler ultrasound) and has high sensitivity and negative predictive value. CTA, CT perfusion or MRA may be useful in the setting of indeterminate TCD. CT or MR perfusion can help differentiate patients with vascular narrowing but normal perfusion due to the presence of collateral circulation from those without adequate collaterals.

Carotid Artery Stent Placement/Revascularization

Cerebral perfusion CT helps in the assessment of the hemodynamic modifications in patients with severe carotid stenosis. Pre-operatively, CTP may help identify patients at high risk of developing hyperperfusion syndrome after carotid revascularization. The presence of internal carotid artery (ICA) stenosis ≥90% is a main risk factor for the development of HPS. Other important risk factors include severe contralateral ICA disease, poor collateral flow, hypertension, and recent stroke or ischemia Post-operatively CTP provides valuable information for a more thorough assessment in the follow-up of patients after they have undergone carotid revascularization, especially when there is concern for hyperperfusion syndrome.[1,2]

Temporary Balloon Occlusion (TBO)

Ballon occlusion testing is used prior to a planned endovascular or surgical procedure that will disrupt blood flow to a part of the brain. CTP can be used to detect patients who may not tolerate a prolonged occlusion during a surgery/procedure. Given the length of testing and the need for transport other methods are generally preferred. [11,12]

Cerebrovascular Reserve

Cerebral perfusion CT, in conjunction with acetazolamide challenge in patients with intracranial vascular stenosis, can evaluate cerebrovascular reserve capacity and help in estimating the potential risk of stroke. It may help to identify candidates for bypass surgery and endovascular treatment to increase cerebral blood flow.[13,14]

Intracranial Tumors

Cerebral perfusion CT generates permeability measurements in images of brain tumors depicting areas of different blood flow within tumors and the surrounding tissues. This may allow for diagnosis and grading of tumors and may help to monitor treatment.[5]

POLICY HISTORY

Summary

Date	Summary
May 2024	● Updated background and references
May 2023	● Updated references ● Added - Prediction of hemorrhagic transformation in acute ischemic stroke ● General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Clinical Guideline Review Committee

Disclaimer

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