Cohere Medical Policy - Positron Emission Tomography (PET), Brain

Clinical Guidelines for Medical Necessity Review

Version: 2
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Important Notices

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Other Notices:

Guideline Information:

Specialty Area: Diagnostic Imaging
Guideline Name: Cohere Medical Policy**-** Positron Emission Tomography (PET), Brain

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Document last updated: 8/15/2024
Type: [**X**] Adult (18+ yo) | [**X**] Pediatric (0-17 yo)

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Medical Necessity Criteria

Service: Positron Emission Tomography (PET), Brain

Recommended Clinical Approach:

Two distinct types of positron emission tomography (PET) of the brain are considered for different indications. Utilizing ^{18}FDG (fluorodeoxyglucose) PET/CT imaging enables the assessment of metabolic activity and cerebral function. Specifically, ^{18}F-FDG brain imaging proves valuable across a spectrum of clinical scenarios, such as dementia, seizure disorders, and the detection of new or recurring brain tumors.[1] FDG-PET imaging reveals regional variations in glucose metabolism, serving as a marker for neurodegeneration. These patterns not only signify the existence of neurological decline but also offer insight into the specific cerebral regions and pathways affected by the condition.[2] Amyloid imaging is advised for identifying the presence or absence of abnormal Aß amyloid deposits in individuals experiencing progressive cognitive decline or dementia of unknown cause, where Alzheimer's disease is considered a potential diagnosis.[2]

Medical Necessity Criteria

Indications

- ➔ **Positron emission tomography (PET), brain** is considered appropriate if **ANY** of the following is **TRUE**:
  - ◆ **Fluorodeoxyglucose (FDG) PET brain** and the patient has **ANY** of the following exam findings[3]:
    - Cognitive impairment or suspected diagnosis of dementia with **ANY** of the following that require evaluation[1-2,4]:
      - Progressive dementia and the age of onset was atypically early[5]; **OR**

    - Differentiation of Alzheimer's dementia and frontotemporal dementia, and the patient has had **ALL** of the following:
        - Evaluation by a physician experienced in neurodegenerative disease; **AND**
        - Abnormal cognitive testing (MMSE, MoCA, SLUMS); **AND**
        - Non-diagnostic structural imaging of the brain(CT or MRI); **AND**
        - Relevant lab values are normal or non-diagnostic (B12, TSH); **OR**
- Seizure disorder (epilepsy), known, with **ANY** of the following[1,6]:
    - Change in seizure presentation or new neurologic deficit or no return to previous neurologic baseline; **OR**
    - History of medically refractory epilepsy for which invasive treatment is considered; **OR**
    - The patient is a surgical candidate (including surgical planning); **OR**
- Tumor, suspected or known, and **ALL** of the following are **TRUE**[7-8]:
    - MRI is contraindicated or inconclusive; **AND**
    - Evaluation of **ANY** of the following:
        - Differentiation of radiation necrosis versus previously treated tumor recurrence[1]; **OR**
        - Guiding biopsy and radiation therapy planning[1]; **OR**
        - Evaluation of a primary brain tumor; **OR**

- ◆ **Single Amyloid PET** is considered appropriate if **ALL** of the following are **TRUE**[9]:
  - Alzheimer's disease following an interdisciplinary evaluation with **ALL** of the following:
    - General medical and neurological examination; **AND**
    - Laboratory testing; **AND**
    - Mental status testing; **AND**
    - Structural neuroimaging; **AND**
    - Imaging is needed to determine the extent of the amyloid build-up prior to treatment with amyloid beta-directed antibodies (e.g., Lecanemab).

* NOTE: MRI is the preferred imaging modality for follow-up imaging following an initial amyloid PET scan.

Non-Indications

- ➔ **Positron emission tomography (PET), brain** is not considered appropriate for **ANY** of the following:
  - ◆ The patient has undergone advanced imaging of the same body part and for the same indication within 3 months, without being on treatment.

*NOTE: PET in pregnant patients should be requested at the discretion of the ordering provider and obstetric care provider.

**NOTE: PET scans should be scheduled at least 4–6 weeks after radiation therapy or surgery to avoid false positives due to inflammation from recent treatments.

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.[10-11]

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.[10-11]

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.[10-11]

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.[10-11]

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

Outpatient

Procedure Codes (CPT/HCPCS)

CPT/HCPCS Code	Code Description
78608	Brain imaging, positron emission tomography (PET); metabolic evaluation
78609	Brain imaging, positron emission tomography (PET); perfusion evaluation
78811	Positron emission tomography (PET) imaging; limited area (eg, chest, head/neck)
78814	Positron emission tomography (PET) with concurrently acquired computed tomography (CT) for attenuation correction and anatomical localization imaging; limited area (eg, chest, head/neck)

Medical Evidence

Spano et al. (2023) analyzed the efficacy of PET imaging in cases of cognitive decline, specifically its significance in diagnosing Alzheimer's disease (AD). While FDG PET remains the predominant PET tracer in clinical use, several PET radiotracers enable the observation of underlying pathophysiological processes in AD, including Aβ deposition, tau deposition, synaptic density loss, neuroinflammation, cholinergic cell death, and reduced monoamine neurotransmission. Three FDA-approved 18F-labeled radiopharmaceuticals exist, including florbetaben (NeuraCeq), florbetapir (Amyvid), and flutemetamol (Vizamyl). These assess Aβ deposition, predominantly utilized in clinical trials with limited reimbursement for diagnostic purposes. The advancement of PET radiotracers in routine practice allows clinicians to diagnose and intervene in neurodegenerative diseases effectively.[12]

Quigg et al. (2022) report on using positron emission tomography with fluorine-18 fluorodeoxyglucose (^{18}F-FDG-PET) to map brain glucose metabolism patterns. This imaging modality aids in assessing normal brain function and identifying metabolic abnormalities in various brain disorders. Traditional PET methods cannot distinguish normal from pathological tissue, particularly in conditions such as brain neoplasms or focal epilepsy. The aim is to enhance the functional mapping of metabolic activity within the target organ. Recent technological advancements may broaden dynamic PET across various clinical settings.[13]

Rabinovici et al. (2019) conducted a single-group, multi-center longitudinal study called Imaging Dementia-Evidence for Amyloid Scanning (IDEAS) (ClinicalTrials.gov Identifier: NCT02420756). The study assessed whether amyloid PET scans influence the subsequent management decisions for patients diagnosed with mild cognitive impairment (MCI) or dementia of uncertain origin. Participants (n=11409) at 343 imaging centers underwent amyloid PET. Within 90 days of evaluation, participants diagnosed with MCI or dementia of uncertain origin who underwent amyloid PET scans exhibited alterations in clinical management. Further research is needed to ascertain whether amyloid PET correlates with enhanced clinical outcomes.[14]

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Clinical Guideline Revision History/Information

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