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

Clinical Guidelines for Medical Necessity Review

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Important Notices

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Guideline Information:

Specialty Area: Diagnostic Imaging
Guideline Name: Positron Emission Tomography (PET), Cardiac

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

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Service: Positron Emission Tomography (PET), Cardiac

Recommended Clinical Approach

Cardiac PET is considered advanced imaging, and it is best utilized per institutional internal medicine and cardiology protocols. Radiologic and cardiology guidelines from the American Society of Nuclear Cardiology (ASNC), American College of Radiology (ACR), American College of Cardiology (ACC), Society of Nuclear Medicine and Molecular Imaging (SNMMI), and European Association of Nuclear Medicine (EANM) may be consulted prior to ordering.

Cardiac PET is specifically optimized for the evaluation of myocardial perfusion and viability. It may also be utilized to evaluate infection and inflammation. Myocardial perfusion in the setting of suspected or known coronary artery disease (CAD) can be evaluated with cyclotron-produced (^{13}N-ammonia) or generator-produced (^{82}Rb) PET agents.[1-16]

Medical Necessity Criteria

Indications

- ➔ **Positron emission tomography (PET), cardiac** is considered appropriate if **ANY** of the following is **TRUE**:
  - ◆ **Cardiac PET or PET/CT** for **ANY** of the following[2]:
    - The patient is asymptomatic with known CAD or a high pretest probability (PTP) of CAD (See the Pre-Test Probability of CAD published by the CAD Consortium) with **ANY** of the following:
      - Equivocal prior coronary CT angiography (CCTA, with 40-90% stenosis); **OR**
      - Equivocal exercise stress test; **OR**
      - History of coronary artery bypass grafting and no stress test performed in the last 5 years prior; **OR**
      - History of percutaneous coronary intervention and no stress test performed in the last 2 years prior; **OR**
      - Coronary artery calcium score equal to or above 400; **OR**

        - New left ventricular dysfunction (ejection fraction [EF] less than or equal to 45%); **OR**
    - The patient is symptomatic with suspected or known coronary artery disease (CAD) and imaging is recommended for **ANY** of the following reasons:
        - Detection of obstructive CAD with myocardial ischemia in patients with chest pain (acute but stabilized or chronic); **OR**
        - Intermediate or high pretest probability; **OR**
        - For clarification of equivocal or discordant prior tests and **ANY** of the following is **TRUE**:
            - Presence of anomalous coronary arteries with suspected ischemia; **OR**
            - Presence of borderline obstructive lesions on coronary angiography (50-70% non-left main stenosis or CCTA (40-90% stenosis); **OR**
        - New heart failure diagnosis without previous assessment for CAD with **ANY** of the following:
            - Heart failure with preserved ejection fraction (intermediate or high-risk of CAD); **OR**
            - Ejection fraction less than 45% (any clinical risk of CAD)[3]; **OR**
        - Pre-operative risk assessment before high-risk surgical procedures (e.g., vascular surgery, kidney/liver/lung transplantation); **OR**
        - Post-operative assessment of reimplanted coronary arteries (e.g., surgically corrected transposition of the great arteries); **OR**
    - Evaluation or surveillance for **ANY** of the following:
        - For assessment of myocardial blood flow in suspected microvascular disease; **OR**
        - Myocardial viability for detection of hibernating or stunned myocardium; **OR**
- **FDG PET/CT** and **ANY** of the following is **TRUE**[12]:
    - Evaluation for **ANY** of the following:
        - An abnormality considered indeterminate by another imaging modality to determine whether glucose metabolism in that abnormality favors a benign or malignant process; **OR**

- Cardiomyopathy (inflammatory or restrictive) and ischemic cardiomyopathy has been excluded[13]; **OR**
- Ventricular arrhythmia (frequent PVCs, non-sustained ventricular tachycardia, sustained ventricular tachycardia, or cardiac arrest)[14,15]; **OR**
- Infective endocarditis (known or suspected)[16-17]; **OR**
- Myocardial viability assessment and **ALL** of the following is **TRUE**:
  - Determination of the appropriateness of invasive revascularization management; **AND**
  - Ischemic heart failure; **OR**
- Nontraumatic chest wall pain with a normal chest radiography and **ANY** of the following[18]:
  - History of prior chest intervention; **OR**
  - Known or suspected malignancy; **OR**
  - Suspected infectious or inflammatory condition; **OR**
- Cardiac sarcoidosis[4-5]; **OR**

- Repeat imaging of a specific area or structure using the same imaging modality is considered appropriate when **ALL** of the following is **TRUE**:
  - There is documented clinical necessity; **AND**
  - No existing follow-up guideline for that indication; **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; **OR**
    - Prior imaging results of the specific area or structure, obtained using the same imaging modality, must be documented and available for comparison.

Non-Indications

- ➔ **Positron Emission Tomography (PET), cardiac** is not considered appropriate if **ANY** of the following is **TRUE**:
  - ◆ The patient has undergone advanced imaging of the same body part and for the same indication within 3 months, without being on treatment; **OR**
  - ◆ The imaging request is for **myocardial perfusion PET** and **ANY** of the following is **TRUE**:
    - Acute nonspecific chest pain with a low probability of CAD[7]; **OR**
    - Asymptomatic patients with less than an intermediate risk for CAD who may benefit from CT coronary calcium or coronary CT angiography; **OR**
    - Chest trauma[5,19]; **OR**
    - Nonischemic myocardial disease (excluding sarcoidosis)[4-5]; **OR**
  - ◆ The imaging request is for **FDG PET/CT**, and **ANY** of the following is **TRUE**:
    - Acute chest pain with suspected aortic dissection; **OR**
    - Chest trauma[19]; **OR**
    - Congenital or acquired heart disease[20]; **OR**
    - Nonischemic myocardial disease (excluding sarcoidosis)[4-5]

*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.[22-23]

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 or Outpatient

Procedure Codes (CPT/HCPCS)

CPT/HCPCS Code	Code Description
78429	Myocardial imaging, positron emission tomography (PET), metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), single study; with concurrently acquired computed tomography transmission scan
78430	Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); single study, at rest or stress (exercise or

	pharmacologic), with concurrently acquired computed tomography
78431	Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); multiple studies at rest and stress (exercise or pharmacologic), with concurrently acquired computed tomography (CT) transmission scan
78432	Myocardial imaging, positron emission tomography (PET), combined perfusion with metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), dual radiotracer (eg, myocardial viability)
78433	Myocardial imaging, positron emission tomography (PET), combined perfusion with metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), dual radiotracer (eg, myocardial viability); with concurrently acquired computed tomography (CT) transmission scan
78459	Myocardial imaging, positron emission tomography (PET), metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), single study
78491	Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); single study, at rest or stress (exercise or pharmacologic)
78492	Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); multiple studies at rest and stress (exercise or pharmacologic)
78811	Positron emission tomography (PET) imaging; limited area (e.g., of chest, head/neck)

Medical Evidence

Patel et al. (2020) assess the use of positron emission tomography (PET) myocardial perfusion imaging (MPI) as a way to non-invasively measure myocardial blood flow reserve (MBFR). One aim was to determine if patients with MBFR with a survival benefit after revascularization, which helps guide post-test management. A total of 12594 patients who underwent Rb82 rest/stress PET MPI were included. The MBFR observed on PET MPI correlates with overall mortality risk and can pinpoint individuals who would potentially derive survival advantages from early revascularization as opposed to medical management alone. The authors conclude that utilization of the metric can inform decision-making regarding revascularization strategies, however, further validation through prospective studies is warranted.[23]

Gulati et al. (2021) recommended for intermediate-high risk patients with stable chest pain and no known CAD for whom rest/stress nuclear MPI is selected, PET is reasonable in preference to SPECT, if available to improve diagnostic accuracy and decrease the rate of nondiagnostic test results.[24]

Swart et al. (2018) performed a multicenter study to enhance the accuracy of ^{18}F-Fluorodeoxyglucose (FDG) positron-emission tomography/computed tomography (PET/CT) in patients suspected of having prosthetic heart valve endocarditis (PVE). The study identified and eliminated potential confounding factors using visual and standardized quantitative evaluations. A total of 160 patients with a prosthetic heart valve were included (median age 62; 68% male; 82 mechanical valves; 62 biological; 9 transcatheter aortic valve replacements; 7 other). All patients underwent FDG PET/CT for suspicion of PVE. Early integration of FDG PET/CT into the diagnostic protocol is shown to mitigate the potential impact of low inflammatory activity (for example, that induced by prolonged antibiotic treatment).[17]

Chen et al. (2017) conducted the CORE320 Multicenter Study (NCT00934037) to compare the prognostic significance of combined CT angiography and CT myocardial stress perfusion imaging vs a combination of invasive coronary angiography (ICA) and stress single photon emission CT myocardial perfusion imaging. The study also addressed the time to major adverse cardiovascular events (MACE). Results indicate that the combined use of CT angiography and CT myocardial perfusion demonstrates comparable predictive ability for 2-year MACE-free survival. This encompasses the necessity for myocardial revascularization procedures compared to the

standard approach involving ICA and single photon emission CT perfusion imaging.[8]

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