



# **Myocardial Perfusion Imaging Single Photon Emission Computed Tomography (MPI-SPECT) - Single Service**

*Clinical Guidelines for Medical Necessity Review*

**Version:** 2.0  
**Effective Date:** November 17, 2023

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## Guideline Information:

**Specialty Area:** Cardiology

**Guideline Name:** Myocardial Perfusion Imaging Single Photon Emission Computed Tomography (MPI-SPECT) (Single Service)

**Literature review current through:** 11/17/2023

**Document last updated:** 11/17/2023

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

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# Care Path Services & Medical Necessity Criteria

**Service: Myocardial Perfusion Imaging Single Photon Emission Computed Tomography (MPI-SPECT)**

## General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** This is typically appropriate for patients with chest pain (or an ischemic equivalent) and an intermediate or high pretest probability of CAD. An exercise stress test is appropriate if the patient can exercise to a satisfactory workload. If the patient cannot exercise or has ECG abnormalities that interfere with the ECG interpretation during exercise, then MPI-SPECT or stress echocardiography should be considered. Limitations of MPI-SPECT include cost and radiation. Interpretation of MPI-SPECT can be affected by attenuation artifacts related to soft tissue overlying the heart or extracardiac radioisotope (e.g., liver or gastrointestinal uptake adjacent to the heart).<sup>1-2</sup>
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

→ **Myocardial perfusion imaging single-photon emission computed tomography (MPI-SPECT)** is considered appropriate if **ALL** of the following are **TRUE**<sup>3</sup>:

- ◆ The patient has chest pain (or an ischemic equivalent) or syncope and **ANY** of the following<sup>4</sup>:
  - No known CAD and has an intermediate or high pretest probability of CAD; **OR**
  - History of CAD with symptoms on optimal guideline-directed medical therapy (GDMT) or documented intolerance to GDMT; **AND**
- ◆ The patient has **ANY** of the following:
  - ECG abnormalities that interfere with the ECG diagnosis of ischemia, including **ANY** of the following<sup>2</sup>:

- An inability to achieve the target heart rate with a standard exercise treadmill test (greater than or equal to 85% of age-predicted maximal heart rate); **OR**
- Ventricular preexcitation (Wolff-Parkinson-White pattern); **OR**
- Ventricular-paced rhythm; **OR**
- Left bundle branch block (LBBB); **OR**
- Greater than 1 mm ST depression at rest; **OR**
- Left ventricular hypertrophy with ST-T abnormalities; **OR**
- The patient takes digoxin; **OR**
- Prior indeterminate stress testing (e.g., heart rate did not reach 85% of age-predicted maximum heart rate, previous stress echocardiography had poor echocardiographic windows); **OR**
- **ANY** of the following conditions where MPI may be preferential to stress echocardiography:
  - Evidence of ventricular tachycardia; **OR**
  - Severe aortic valve dysfunction; **OR**
  - Severe chronic obstructive pulmonary disease (COPD) defined as a forced expiratory volume (FEV1) less than 30% predicted or FEV1 less than 50% predicted plus respiratory failure or clinical signs of right heart failure (use caution when using a vasodilator stress agent); **OR**
  - Congestive heart failure (CHF) with current ejection fraction (EF) less than or equal to 40%; **OR**
  - Inability to get an echo window for imaging
  - Prior thoracotomy (CABG, other surgery); **OR**
  - Poorly controlled hypertension (i.e., above 180 mm Hg systolic; both physical stress and dobutamine stress may exacerbate hypertension during stress echo); **OR**
  - Poorly controlled atrial fibrillation (i.e., resting heart rate greater than 100 BPM while the patient is on a medication to control the rate); **OR**
  - Segmental wall motion abnormalities at rest (e.g., due to cardiomyopathy, recent MI, or pulmonary hypertension); **OR**
- The patient has a greater than or equal to 1% risk for major adverse cardiac event (MACE) for non-cardiac surgery, the patient has unknown or poor functional capacity, and the results will change management<sup>5</sup>; **OR**
- Clinical suspicion for inducible conduction abnormalities related to ischemia.

## Non-Indications

→ **Myocardial perfusion imaging single-photon emission computed tomography (MPI-SPECT)** is not considered appropriate if **ANY** of the following is **TRUE**<sup>3.6</sup>:

- ◆ The patient is pregnant; **OR**
- ◆ Vasodilators (i.e., adenosine, regadenoson, and dipyridamole) are contraindicated in patients with hypotension, sinus node dysfunction, high-degree atrioventricular (AV) block (in the absence of back up pacemaker capability), and reactive airway disease; **OR**
- ◆ An active cardiac condition that has not been stabilized (e.g., uncontrolled hypertension, uncontrolled arrhythmias, undiagnosed chest pain); **OR**
- ◆ An active pulmonary condition that has not been stabilized (e.g., difficulty breathing, the possibility of pulmonary embolism); **OR**
- ◆ Normal coronary angiogram or CCTA within the last two years and with no stenosis or plaque; **OR**
- ◆ Normal stress test (given adequate stress) within the last year.

## Site of Service Criteria

Outpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition  |
|------------|--|
| 78451      | Single-photon emission computed tomography (SPECT) myocardial perfusion imaging study with stress            |
| 78452      | Multiple single-photon emission computed tomography (SPECT) myocardial perfusion imaging studies with stress |

## **Definitions**

**Symptomatic/Ischemic Equivalent**<sup>7</sup>: Chest pain syndrome, anginal equivalent, or ischemic electrocardiogram (ECG) abnormalities are any constellation of clinical findings that the physician believes is consistent with CAD manifestations. Examples of such findings include, but are not limited to, pain, pressure, tightness, or discomfort in the chest, shoulders, arms, neck, back, upper abdomen, or jaw, new ECG abnormalities, or other symptoms/findings suggestive of CAD. Clinical presentations in the absence of chest pain (e.g., dyspnea with exertion, fatigue, or reduced/worsening effort tolerance) consistent with CAD may also be considered an ischemic equivalent.

**Pretest Probability (of CAD)**: Pretest probability of CAD is the likelihood that the patient has CAD, calculated before the test result is known. These guidelines reference the 2019 European Society of Cardiology (ESC) Guidelines for the diagnosis and management of chronic coronary syndromes model to calculate the pretest probability based on age, sex, and type of chest pain.<sup>8-10</sup>

# Medical Evidence

The following guidelines have been published by national and professional organizations on the topic of myocardial perfusion imaging:

- A joint publication titled *Multimodality Appropriate Use Criteria for the Detection and Risk Assessment of Stable Ischemic Heart Disease* was published by the **American College of Cardiology (ACC)**, **American Heart Association (AHA)**, **American Society of Echocardiography (ASE)**, **American Society of Nuclear Cardiology (ASNC)**, **Heart Failure Society of America (HFSA)**, **Heart Rhythm Society (HRS)**, **Society for Cardiovascular Angiography and Interventions (SCAI)**, **Society of Cardiovascular Computed Tomography (SCCT)**, **Society for Cardiovascular Magnetic Resonance (SCMR)**, and the **Society of Thoracic Surgeons (STS)**. The criteria provides information on related tests to aid clinicians in determining the appropriate modality.<sup>3</sup>
- The **AHA**, **ACC**, **ASE**, **CHEST**, **SAEM**, **SCCT**, and **SCMR** published a guideline for the *Evaluation and Diagnosis of Chest Pain*. Recommendations and algorithms are provided to assist clinicians who are managing adult patients.<sup>4</sup>
- The **European Society of Cardiology (ESC)** published *Guidelines for the Diagnosis and Management of Chronic Coronary Syndromes*. Recommendations are also provided including myocardial perfusion imaging.<sup>10</sup>
- The **European Association of Cardiovascular Imaging (EACI)** and the **ASE**, in collaboration with **ASNC**, **SCCT**, and **SCMR** published **recommendations on Non-Invasive Imaging in Coronary Syndromes**. This includes myocardial perfusion imaging.<sup>1</sup>



## References

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# Clinical Guideline Revision History/Information

|                                   |            |
|-----------------------------------|------------|
| Original Date: September 21, 2022 |            |
| <b>Review History</b>             |            |
| Version 2                         | 11/17/2023 |
|                                   |            |