3. Blood pool activity:
   a. Increased blood pool activity is commonly seen due to low ejection fraction.
   b. Reconstruction of the images with an appropriate pre-scan delay may improve blood pool activity and image resolution (Table 2).

INTERPRETATION AND REPORTING
Image interpretation and reporting is outlined in the ASTRO Imaging Guidelines for Nuclear Cardiology Procedures. The essential elements of a PET MPI report are shown in Table 3.

1. MPI and gated PET:
   a. The relative PET myocardial perfusion images are interpreted semi-quantitatively.
   b. The quantitation of myocardial blood flow enables the identification of balanced ischemia or microvascular flow reserve abnormalities but is presently a research application.

2. Calcium scoring:
   a. If a gated calcium score is performed, those findings must be incorporated into the report.
   b. A review of the transmission CT scan for the presence or absence of coronary artery calcium is not recommended. The slice thickness (~5 mm) and motion blurring from cardiac and breathing motion can render coronary calcium estimates erroneous, especially if there is no coronary artery calcium detected.

3. Non-cardiac findings:
   a. Transaxial perfusion images should be routinely inspected for pathological extracardiac uptake.
   b. Review of the low resolution transmission CT scan is helpful in identifying extracardiac pathology (pleural or pericardial effusions, coronary or aortic/aortic valve calcifications, mediastinal masses, lung nodules, etc.).

SUGGESTED READING
Dilsizian V, Bacharach SL, Beanlands RS, et al. Imaging guidelines for nuclear cardiology procedures: PET myocardial perfusion and metabolism clinical imaging. J Nucl Cardiol 2009;16:doc.10.1007/j12350-009-9094-9. ASNC thanks the following members for their contributions to this document: Writing Group: Sharmila Dorbala, MD (Chair); Karthik Ananthasubramaniam, MD; Mosaz H. Al-Mallah, MD; and Rupa Mehta, MD. Reviewers:

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**PET MPI**

**Table 1. Pharmacologic stress procedures for PET MPI**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Adenosine*</th>
<th>Dipyridamole*</th>
<th>Dobutamine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Peripheral IV lines recommended</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Radiotracer Injection</td>
<td>Mid infusion</td>
<td>3 minutes after completion of infusion</td>
<td>When target heart rate is reached</td>
</tr>
</tbody>
</table>

Note: Patients should not eat or drink for 6 hours before the procedure. Anti-anginal therapies (beta blockers, nitrates) should be held in patients without a known diagnosis of coronary artery disease (diagnostic test).

* Avoid caffeine intake for >12 hours and avoid theophylline intake for > 48 hours

**TEST PREPARATION**

1. **Patient preparation** is similar to that of pharmacologic SPECT (Table 1).
2. Patient height, weight, chest circumference (to ensure patients will fit on the scanner), ejection fraction (as it will affect pre-scan delay, see Table 2), and history of claustrophobia are assessed.

**STRESS PROCEDURES**

1. Most PET stress scans are performed using pharmacologic stress with vasodilator stress being the most common.
2. The radiotracer is injected during peak hyperemia using the same or a separate intravenous line (Table 1).
3. Exercise stress is feasible but may be cumbersome due to high radiation dose to personnel, coordination with the cyclotron, and patient motion.

**IMAGING PROCEDURE**

Commonly used imaging parameters for PET MPI are shown in Table 2. There are three steps in acquiring a PET MPI study (Figure 1): 1. Topogram/Scout scan: This is a computed tomography (CT) or a low-dose radionuclide-based image to localize the heart position.
2. Transmission scan: After obtaining the topogram, a radionuclide scan or a low-dose CT transmission scan is obtained for attenuation correction.
3. Emission scan: The emission image acquisition starts with the bolus injection of the radionuclide (list mode) or after a pre-scan delay as static or gated images (Table 2). In a list mode (images are acquired with a time signal as well as an ECG signal), a single radiotracer injection and image acquisition allows multiple image reconstructions (i.e., summed static images, multi-frame ECG gated images, and multi-frame dynamic images). A list mode or rest- and stress-gated acquisition is recommended.

**RA DiOTrAC ERS**

1. Rubidium-82 (76-second half-life) is produced by a generator (does not require a cyclotron on site) and is the most widely used radiotracer for clinical PET MPI. The generator produces Rb-82, which is used for exercise stress.
2. Rubidium-82 (Rb-82) and Strontium-82 (Sr-82) are produced by generators that do not require a cyclotron on site (does not require a cyclotron on site) and are the most commonly used radiotracers for PET MPI.

**QUALITY CONTROL, INTERPRETATION AND REPORTING**

Physicians interpreting perfusion PET need to have a thorough understanding of coronary physiology and myocardial perfusion imaging with nuclear techniques (PET and SPECT).

**QUALITY CONTROL**

Quality control of PET MPI is important and includes the evaluation of the following:

1. Patient motion:
   a. Is more difficult to recognize with PET (due to simultaneous acquisition of counts, not step and shoot) and can degrade images.
   b. Can be minimized by ensuring proper patient instruction and positioning.
2. Attenuation correction:
   a. Interpret only attenuation-corrected PET MPI.
   b. Review an overlay of the transmission and emission images to ensure appropriate registration because misregistration of transmission and emission images can result in artifactual defects (most common in the antero-lateral walls from under-correction by emission images overlying lung tissue).
   c. Software programs are available for the appropriate registration of the PET and CT images.

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* Optional: Y, a repositioning scan may be necessary if the patient has been moved out of the gantry after the rest scan (eg., N-13 ammonia PET scans)

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