Resting Tc-99m Sestamibi/Tetrofosmin Gated Myocardial Scintigraphy

**Primary Indications:**
Evaluation of resting myocardial perfusion in patients with known or suspected coronary artery disease to detect perfusion defects that could represent either acute myocardial infarction or ischemia. Typically, such patients are evaluated in the hospital or emergency department for acute chest pain. This study is not useful for detecting ischemia in a patient who has had a prior myocardial infarction unless there is a recent resting study for comparison.

Resting Tc-99m sestamibi/tetrofosmin myocardial scintigraphy can also be performed as part of a two-day rest-stress Tc-99m sestamibi/tetrofosmin study.

**Rationale:**
Following intravenous administration, Tc-99m sestamibi and tetrofosmin are distributed in proportion to regional myocardial perfusion. Because Tc-99m sestamibi and tetrofosmin do not clear appreciably from myocardium, perfusion images can be obtained 45 minutes to 4 hours following the administration of this tracer. Thus, the radiopharmaceutical can be injected at the patient's bedside or in the emergency department, and imaging can be performed later either as a portable planar examination or as a SPECT study in the nuclear medicine facility.

**Interfering Conditions:** None

**Precautions** Assure intravenous position of the catheter before tracer administration. Subcutaneous extravasation of a significant portion of an administered dose of Tc-99m sestamibi or tetrofosmin reduces the diagnostic value of the study, since much of the radiopharmaceutical will not reach the myocardium at the time of suspected acute ischemia.

**Radiopharmaceutical:** Tc-99m sestamibi (Cardiolite®) or tetrofosmin (Myoview®)

**Adult Dose:** 20 mCi
[A dose of 30 mCi of Tc-99m sestamibi or tetrofosmin is used for patients with body weight ≥ 250 pounds.]

**Pediatric Dose:** 280 µCi/kg

**Radiation Dosimetry:** Tc-99m sestamibi (based on resting distribution)
Adult. Critical organ (gallbladder): 2.89 rem.
Effective dose: 0.63 rem.
Effective dose: 0.50 rem.
Tc-99m tetrofosmin (based on resting distribution)
Adult. Critical organ (gallbladder): 2.66 rem.
Effective dose: 0.56 rem.
Effective dose: 0.43 rem.

**Route of Administration:** Intravenous through pre-established, freely infusing cannula. In adults, 22-gauge is the minimum recommended cannula size.

**Patient Preparation:**
Whenever practical, the patient should have been fasting for 4 or more hours before the study. A study done to assess acute chest pain should not be delayed, however, if the patient is not fasting.

**Equipment Setup:**
Gamma Camera: SPECT imaging, with gated acquisition if possible, is preferred for both adult and pediatric patients. In patients who are unable to tolerate SPECT, planar imaging should be performed with a LFOV camera in adults and a SFOV or zoomed-LFOV camera in small children. For patients in intensive care units, planar imaging is performed with a mobile camera.
Collimator: Low-energy high-resolution
Energy Window: 140 keV with 20% window

**Patient Positioning:**
SPECT: The patient should be positioned supine, with the arms comfortably positioned above head; the arms should **NOT** be physically restrained above the head. A hand grip for the patient to hold and/or a wedge pillow placed under knees may be used for patient comfort. The arm should not be lowered midway through the study (e.g., after the camera passes one side). It is essential that the patient remain motion-less during the entire SPECT acquisition.
Planar: The patient will be placed in the supine position for the 35° left anterior oblique (LAO) view and anterior view. The patient will be placed in the right lateral decubitus position with the left arm above the head for the 70° LAO view.

**Procedure:**
The patient is injected in the **upright** position, if possible; imaging is begun approximately 45 minutes later. Patients being evaluated for acute chest pain should only be injected if they are still symptomatic. If necessary because of patient condition, the start of imaging may be delayed for up to 4 hours after injection. SPECT imaging should be performed in all patients who can tolerate SPECT. Whenever possible, gating (8 frames/RR interval) should be performed. Attach three nuclear-medicine-computer electrocardiographic leads to the
patient. Confirm that the electrocardiographic gating is functioning properly. If there is an arrhythmia, obtain a rhythm strip, if possible, and attach it to the requisition. If not possible, note the presence of an arrhythmia on the requisition.

In patients unable to tolerate SPECT, a standard set of three 8-minute planar images in 35° LAO, anterior, and 70° LAO projections is to be performed.

### View

<table>
<thead>
<tr>
<th>View</th>
<th>Digital Acquisition</th>
<th>Film Display (If Applicable)</th>
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<tbody>
<tr>
<td><strong>SPECT Acquisition</strong></td>
<td>64 projection views covering 180° (45° RAO to 135° LPO); 64 x 64 word-mode.&lt;br&gt;Roving 1.5 zoom (Cardiotrac)&lt;br&gt;20 secs/view&lt;br&gt;Total imaging time - ~11 minutes [20 sec/view x 32 views (with 2 heads)]&lt;br&gt;8 Frames/RR interval, whenever possible&lt;br&gt;Other acquisition specifics depend on camera (see bench manual)</td>
<td>Image of rest slices and image of ED, ES, motion, thickening bull's-eyes.</td>
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<tr>
<td><strong>SPECT Reconstruction</strong></td>
<td>No attenuation correction (see bench manual)</td>
<td></td>
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<tr>
<td><strong>Planar Study (3 views)</strong></td>
<td>256 x 256 word-mode&lt;br&gt;8-minute/image</td>
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Items Required For Complete Study:

1. Processing of the SPECT and/or planar images.

2. SPECT Study: A) Image of slices; B) Image of ED, ES, motion and thickening bull's-eyes.

3. Planar Study: Film of planar images.

4. Documentation of the successful loading of previous studies onto workstation.