PET Cardiac Viability

Special Instructions  Consult with the attending radiologist about the appropriateness of the examination and regarding the patient’s blood sugar measurements during the examination.

Outpatients with diabetes who take insulin should be instructed to bring their short-acting insulin and/or other diabetic medications with them. For inpatients with diabetes, consult with the patient’s nurse about whether the patient has sliding-scale insulin on order.

When feasible, schedule this patient as the last PET patient of the day to allow for delays in imaging due to blood sugar control. Order the FDG dose timed for at least 1 hour later than anticipated earliest administration time, so that administration can be delayed if blood glucose is too high.

To be performed at UNMH only.

Radiopharmaceutical:  F-18 fluorodeoxyglucose (FDG), and Tc-99m tetrofosmin (Myoview) or Tc-99m sestamibi (Cardiolite)

Dose (Adult/Pediatric):  Refer to Nuclear Medicine Dose Chart

Route of Administration:  Intravenous.

Patient Preparation:  Please ensure the following:
- 50-g oral glucose load (see below for timing)
- NPO for minimum 4 hrs (prefer 6-12)

Equipment Setup:  Refer to Cardiac Perfusion – Technetium Agents protocol for the rest gated acquisition.

Cardiac PET-CT time:
- 45-minute delay between FDG injection and imaging:
  - 10 minutes (1 bed position)
- 60-90-minute delay:
  - 15 minutes (1 bed position)

CT imaging protocol:  Care dose, 5 mm slice thickness.

Patient Positioning:  Supine. Head first.

Procedure:  Perform cardiac PET-CT in conjunction with a resting gated cardiac study as follows:
1) Intravenously administer Tc-99m tetrofosmin or sestamibi for the resting gated cardiac SPECT study (use stress activity).
2) Measure blood glucose (usually with CBG).
PET Cardiac Viability (continued)

a. If blood glucose < 200 mg/dL, administer 50-g oral glucose (45 minutes prior to anticipated FDG injection).

b. If CBG ≥ 200 mg/dL, do not administer oral glucose.

3) Consult with the attending radiologist about whether the patient should receive insulin, and how much. (Insulin Guidelines below are for reference only.)

4) Obtain resting gated cardiac SPECT images approximately 30 minutes after sestamibi/tetrofosmin injection (follow Cardiac Perfusion – Technetium Agents Stress Protocol for ECAM or SPECT-CT but change name to Rest).

5) Recheck CBG; consult with attending radiologist about whether to proceed with FDG injection or whether the patient needs insulin first. Typically blood sugar should be less than 150 mg/dL prior to FDG administration, although higher levels may be acceptable if the blood sugar has stabilized or gone down rather than increasing from earlier measurements.

6) When instructed by the attending radiologist to proceed, inject FDG and flush with normal saline (10 mL for butterfly needles; 20 mL for angiocatheters, 40 mL or greater for indwelling catheters).

7) Perform CT examination of heart, followed by PET of the same region. Confirm delay time to imaging after FDG injection with the radiologist, approximately:

   a. Nondiabetic patients: 45 minutes
   b. Diabetic patients: preferably 90 minutes or longer; minimum 60 minutes. Consult with the attending radiologist.

8) Process images immediately and have them checked by the radiologist before releasing the patient. If there is extensive blood pool activity, the patient may need additional insulin and repeat imaging approximately 30-60 minutes later.

Acquisition:
1. On chronicle, enter PET dose and time administered.
2. Load topogram
3. Set parameters for scan
4. Load → move → start
5. When CT is complete (approximately 25 secs), you will be prompted to move patient for PET scan (table moves all the way to the back of the gantry)
6. Options → PET monitor to view scan length (usually 10-20 minute acquisition).
7. When acquisition is complete, load fusion on Wizard before sending to PACS and Leonards

   • For outpatients who have taken insulin, recheck blood glucose prior to releasing the patient and give them a snack.

Processing: Resting gated perfusion study:
• Follow processing instructions in Cardiac Perfusion – Technetium
PET Cardiac Viability (continued)

Agents protocol

- Before sending Resting Corrected images to Leonardo, select File - Edit - Correct - Profile Name. Delete "@profile" but leave numbers

PET-CT:

- Process CT in B 5 31 algorithm
- Process PET into attenuation corrected and non-attenuation corrected PET files

### Insulin Guidelines*:

<table>
<thead>
<tr>
<th>Blood Glucose (mg/dL)</th>
<th>Possible restorative measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>130-140</td>
<td>1U insulin</td>
</tr>
<tr>
<td>140-160</td>
<td>2U</td>
</tr>
<tr>
<td>160-180</td>
<td>3U</td>
</tr>
<tr>
<td>180-200</td>
<td>5U</td>
</tr>
<tr>
<td>&gt;200</td>
<td>Notify attending radiologist</td>
</tr>
</tbody>
</table>

*based on ASNC guidelines for blood glucose maintenance after oral glucose administration 45-90 minutes after FDG administration. As the above guidelines are written for intravenous insulin, larger amounts and/or longer delays after insulin administration prior to FDG administration may be required for subcutaneous insulin. Preferred are fast-acting versions of insulin: lispro (Humalog), glulisine (Apidra), or aspart (Novolog). Inpatients may alternatively be administered sliding-scale insulin as prescribed by the referring physicians.

### Items Required For Complete Study:

- Enter protocol, protocoling physician, FDG dose, sestamibi/tetrafosmin dose, blood glucose measurements, and injection site in comments section on PACS
- Processing and transfer of all images to PACS and/or Leonardo as appropriate
  - Topogram to PACS
  - CT, PET Corrected, and PET Uncorrected to PACS and Leonardo.
  - Resting Gated Sestamibi/Tetrofosmin images to PACS as per Cardiac Perfusion – Technetium Agents Protocol
  - Fused Axial images to PACS
  - Resting - Corrected raw data to Leonards
- Complete the examination in RIS