Myocardial Perfusion Study (Cardiolite-Cardiolite Same Day)

Version History, Similar Studies & Variations

- V 1.3 – 02/10/04 – Added mention of motion correction, new acquisition information
- v 1.2 – 11/2904 – Added QPS, adjust slices for MD review.
- v 1.1 – 11/09/04 – Refined Inbox information, added Patient Rename, refined MC info, annotation
- v 1.0 - 10/15/04 - Added version history information
- Planar Myocardial Perfusion
- Cardiac Viability
- Dual-Isotope or Tl201 Myocardial Perfusion

Indications

- Detection of coronary artery disease by way of classification of the left ventricular myocardium as normal, irreversibly ischemic, and reversibly ischemic.
- Detection of hibernating myocardium.
- Emergency room evaluation of chest pain.
- Documentation of myocardial perfusion abnormalities pre and post interventional therapy
- Detection of myocardial perfusion abnormalities secondary to causes other than coronary artery disease.

Contraindications

- Patients should be fasting for 4-6 hours before the test.
- For optimal results the patient should discontinue all cardioactive medications before the study:
  - Beta-blockers, e.g. propranolol, for at least 24 hours.
  - Long acting nitrates for at least 4 hours, nitroglycerin for at least 1 hour.
  - Calcium channel blockers.
  - Caffeine for 24-36 hours prior to pharmacologic stress with dipyridamole or adenosine
- For pharmacologically induced stress, the following conditions are contraindications:
  - severe asthma or bronchospasm – Only adenosine is contraindicated
  - chronic obstructive pulmonary disease – Only adenosine is contraindicated
  - unstable angina.
  - recent myocardial infarction, e.g. less than 48 hours.
  - sick sinus syndrome, and 2nd and 3rd degree AV block unless the patient has a cardiac pacemaker.
  - hypotension, e.g. resting systolic pressure < 80 mm Hg.

Equipment & Supplies

- Camera with LE collimator and gated SPECT ability, Intima angiocath, appropriate flushes, a glass of ice water, instruction/information sheet, multiple saline flushes
- 7-10 mCi $Tc99^m$ Cardiolite resting dose
- 21-40 mCi $Tc99^m$ Cardiolite stress dose (that is at least three times the amount of the resting dose)

Preparation

- Have females remove all clothing, including bras, above the waist and wear two gowns with opposing openings
- Provide the patient with an information sheet while explaining the entire test
- Place the Intima (in order of preference) in a vein in the hand, AC, or distal arm.

Administration

- Administer the rest dose of the cardiolite through the angiocath and flush with a saline flush
- Have the patient wait for at least one hour and drink a full 16oz glass of ice water prior to the rest images.
- A cardiology nurse will instruct the NM tech when to inject the stress dose of cardiolite.
- During a pharmacological stress, the stress injection should take place 2.5 minutes post infusion of the adenosine, or when instructed for a dobutamine stress.
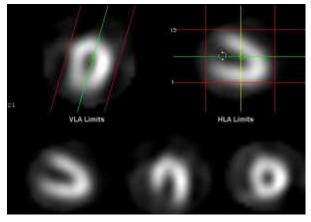
Acquisition

- Position the patient in a supine position with the camera directly above the heart, left hand extended above the head, and right hand strapped to the body.
- Ensure the camera is as close as possible to the patient
- Rest acquisition
    - Prepare the camera for a SPECT acquisition
    - 30 sec/frame, 64 frames, 64x64x16 matrix
    - if a dual head camera is used, the heads should be at 90 degree angles
    - Image should be labeled REST MIBI SPECT
- Stress acquisition
    - Prepare the camera for a gated SPECT acquisition
    - 30 sec/frame, 64 frames, 64x64x16 matrix, 8 gated segments, 35% window
    - if a dual head camera is used, the heads should be at 90 degree angles
    - Image should be labeled GATED STRESS MI
- If the heart rhythm is not normal, have the NM physician determine if the study should be acquired with a wider gating window
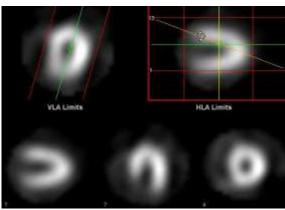   - If the gate window is wider than 35%, the ejection fraction will not be valid.

Required History

- Prior MI or CAD
- Family history of MI or CAD
- Chest pain and presence of radiation to extremities
- Shortness of breath
- EKG results (preferably from chart)
- CPK & MB
- smoking history
- Hypertension
- abnormal lipids or cholesterol level
- Record the patient's height, weight, and, for females, bra size; this information assists in identifying attenuation artifacts in the tomographic images
- Diabetes Mellitus

Processing

- Ensure that the study has an accession number using **Patient Rename**.
- Select the appropriate rest and stress SPECT images.
- Select **QGS/QPS** under Cardiac Apps
- Click **Start**
- Set the limits and orientation on VLA/HLA images for both stress and rest (pictured below)

MOTION CORRECTION

- Evaluate the cine for each acquisition for motion.
- If motion correction is used, film/snapshot the UNCORRECTED slices, then **Save&Exit**. Reselect only the original SPECT files and reopen **QGS/QPS**.
- Click on the study with motion so that a red box appears around it
- Click **Motion Correction**.
- The program will automatically process and correct for motion.
- If further tweaking is necessary, use the embossed-appearing arrows to manipulate each frame individually. The slide bar on the right allows you to change frames.
- When finished, click **Save**.
- If both studies need to be motion corrected, you will need to repeat this process with the second study.
- More detailed motion correction information is available in the Motion Correction SOP
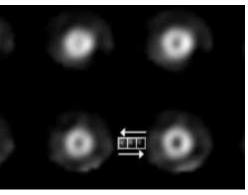- Click the **Review** tab.

- Align and match the slices.
- Change the combobox at the bottom to **Current** in order to move only one row.
- Change it back to **All** to move all of a projection's slices at once.
- Right and Left Click on a row of images to move the slices.
- This is pictured above and to the left.
- Add annotation using the **Overlay Annotation** button, then clicking where you want to type your annotation (such as initials, or "Stress motion corrected"). Overlay annotations will be saved with the results.
- Click the intensity tab. Change the intensity combobox to **%All**, and the max value to **140%** and the minimum value to **10%**.
- You may need to type these numbers in to have the correct intensities.
- This is pictured to the right.

- **CTRL-Leftclick** to remove the red box on the screen.
- Perform a screen capture AND print a film until directed otherwise.
- Name the screen capture **Slices 1**.
- Adjust the rows to show the rest of the slices, and repeat filming.
- Name this screen capture **Slices 2**.
- Adjust the rows so that they are at the beginning again.
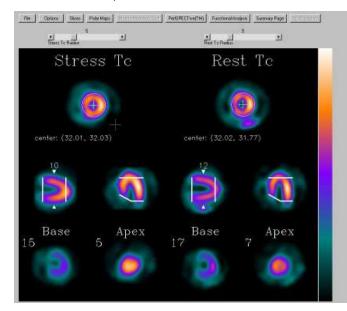
- Click the **Process** icon.
- Click **Quantitative Gated SPECT**. It will automatically process.
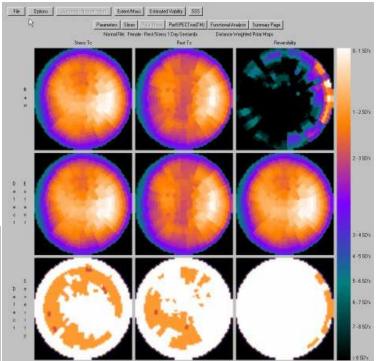
- Print the **Results** and **Views** pages as you did the slices.
    - o Name these screencaptures **QGS Results** and **QGS Views**, respectively.
    - o Orient the 3D model of the heart in all views so that the apex is **NOT** at an oblique angle (as pictured to the right)
- Click **Quantitative Perfusion SPECT**. It will automatically process.
- Under **File**, click **Save and Exit**.

- Select the entire study, and click on **ECToolbox** under Cardiac Apps.
- Click **Start**.
- Click **ECToolbox** under the **Process** tab.
- With the setting page, make sure all fields are correct – especially gender.
- Click **OK**.
- Set your regions for the Stress and Rest images, and click **Polar Map** (pictured below)
- Under **File**, click **Save and Exit**.

• NON-Xeleris processing is not addressed in this protocol.

Hand in Study

- If motion correction was performed, send the raw data and the **CARDIAC SPECT** and **Cardview Results** from that first processing to the Inbox using QGS/QPS
- More detailed information on Motion Correction with QGS/QPS is found in the Motion Correction SOP.
- Send the raw data and the **CARDIAC SPECT**, **Cardview Results,** and **QGS/QPS Results** to the Inbox using **QGS/QPS**.
- Then select all the raw data, the second (or third, if motion correction was performed) **Cardview Results**, the **ECTb_Results**, and **all snapshots** and send it to the Inbox under ECToolbox.
- Ensure that you have the stress dose slip and stress history attached to the requisition
- Ensure the stress history has:
    - o Time and Heartrate for treadmill studies
    - o Dosage of adenosine
    - o Full sheet for dobutamine
- Ensure that this study is properly billed in IDX.
- Complete the study, and hand it in.

Send the above by QGS/QPS to the Inbox. If motion correction was done, there will be a second **CARDIAC SPECT** and **Cardview Results**; send them and the raw data a second time to the Inbox using QGS/QPS.

Send the above – **and there should be no ECToolbox snapshots now** - by ECToolbox to the Inbox.