Radiopharmaceutical: ^{99m}Tc-PYP
Dose: 20 mCi
T1/2: 6 hours
Energy: 140 keV
CPT: Amyloid Planar spot view and SPECT: 78803, Amyloid Planar spot view only: 78800

Indications include, but are not limited to:
1. Suspected transthyretin (ATTR) cardiac amyloidosis.

Patient prep:
1. No prep, no fasting required.
2. Instruct patient to drink at least 4 cups of 8 oz of water between injection and images.

Equipment
1. Philips SKYLight with VXUR collimators.
2. Philips Forte with VXUR collimators.
3. Philips Vertex with LEUHR collimators.

Procedure:
1. Inject 25 mCi of ^{99m}Tc-pertechnetate into PYP vial, let stand for at least 10 minutes
2. Set intravenous line for injection of radiotracer.
3. Withdraw 20 mCi of ^{99m}Tc-PYP from kit and inject patient followed by at least 20 ml normal saline flush.
4. At 3 hours post injection acquire planar images of the chest in the Anterior, Lateral and Left Anterior Oblique projections with the detector configuration at 90⁰.
5. Immediately following static views, acquire SPECT scan of the chest with the detector configuration at 180⁰.

Acquisition Parameters

STATIC IMAGES
- VXUR (or LEUHR) collimator
- Matrix size: 128 x 128
- Zoom: 1.46
- Total counts 1,000K
- Detector angle 90⁰

SPECT
- VXUR (or LEUHR) collimator
- Matrix size: 128 x 128
- Zoom: 1.0 (Full Field)
- Number of angles: 128
- Time per angle: 25 sec
- Detector angle 180⁰
- Starting angle 0⁰
- SPECT mode: Step
- Orbit type: Non-circular
- Rotation direction: Counter-clockwise

Processing

STATICS

1. Left click on ALL IMAGE DISPLAY from top menu in Pegasys.
2. Select ANTERIOR/LT LAT/LAO/LPO to display and PROCEED,
3. Increase brightness as necessary for interpretation.
4. Left click on pencil tool for annotation defaults. Choose proper labeling, ensuring proper image orientation.
5. Left click on camera icon to snapshot the image.

SPECT

1. LEFT click on AutoSPECT.
2. Select the PROJECTION EARLY dataset and LEFT click on PROCEED.
3. Load the proper reconstruction protocol (BONE SPECT).
4. Ensure that there is no patient motion, if motion is greater than 0.5 pixels, then motion correct or repeat the SPECT scan.
5. On the Reconstruction tab, adjust the yellow lines to the top and bottom of the FOV and select RECONSTRUCT button at the top left of the screen.
6. Select the Reorient tab, and center the patient in the FOV, if necessary, by manipulating the blue arrows on the different projections to the far right of the screen.
7. Adjust the yellow lines around the axial, coronal, and sagittal views, so as to eliminate any excess space around the patient.
8. On the Save tab, ensure the proper labeling, and slice thickness, for each image. If motion corrected, select the MoCo Raw option.
9. LEFT click on the SAVE button at the top right of the screen.
10. LEFT click on QUIT.
11. LEFT click on SPECT FRAME REVERSE.
12. Choose the AXIAL slices that you just created and left click on PROCEED.
13. After a few seconds, the reversed images will appear next to the original AXIAL images.
14. LEFT click on EXIT and then SAVE SELECTED AND PROCEED.
15. Do the same for the SAGITTAL slices.
16. LEFT click on REFRAME ULTRA DYNAMIC DISPLAY.
17. Choose the AXIAL_R images and LEFT click on PROCEED.
18. RIGHT click on SELECTION MENU and choose 3, the RIGHT click again and choose 3 STANDARD.
19. LEFT click on the 24-view display on the right of the screen. Place the images at a proper start and end point. Turn off the frames around the images by LEFT clicking on the ON/OFF button at the bottom right.
20. Window and level to the proper intensity. LEFT click on the annotation tool and choose the appropriate label.
21. LEFT click on the camera tool to take a snapshot of the image. LEFT click on QUIT.
22. Do the same for the CORONAL and SAGITTAL_R image sets.
23. LEFT click on the MD/MCD PHYSICIAN'S REVIEW button across the top of the screen.
24. Select the AXIAL image set (unreversed) and LEFT click on PROCEED.
25. LEFT click on 3D across the top and then on VOLUME on the right side of the screen.
26. Extend the green line from the middle of the AXIAL image from the center of the image to the edge. To do this, MIDDLE click in the center of the image and drag to the edge of the image.
27. Change the DEPTH to 128.
28. Change the VIEWS to 32.
29. LEFT click on CREATE.

30. Once created, LEFT click on SAVE. Leave the name as "VOLUME" and then LEFT click on PROCEED.
31. LEFT click on CANCEL, and then CANCEL again (at top right), and then QUIT.
32. LEFT click on ALL IMAGE DISPLAY and choose the ANTERIOR/LT LAT/LAO/LPO images and then PROCEED.
33. Choose the 4-view layout.
34. Adjust window and level to proper intensity.
35. Turn off the frames.
36. Annotate using the appropriate label. Snapshot and QUIT.
37. On the MANIPULATION MENU, left click on region ratio.
38. Select ANTERIOR image.
39. Label first ROI "target"
40. Label second ROI "bkgd"
41. Middle click to draw ROI for heart, middle click to draw ROI for bkgd, PROCEED (use the image below for ROI reference of size and location)

Figure 1. Quantitation of Cardiac ^{99m}Tc-PYP Uptake Using Heart to Contralateral Lung (H/CL) Ratio

Biopsy proven ATTR with H/CL = 2.08
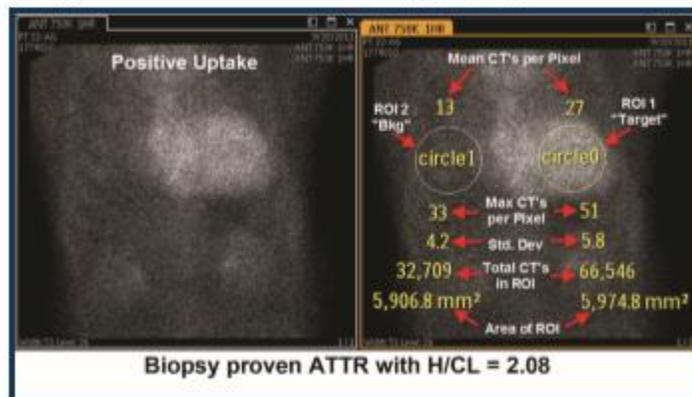
42. **Circular** target regions of interest (ROI) are drawn over the heart on the planar images and are mirrored over the contralateral chest to account for background and ribs.
43. When drawing ROIs the "target" ROI needs to be over the left ventricle of the heart, the "bkgd" ROI needs to be over the lung (this will include ribs, the sternum should not be included in either ROI) if the heart is enlarged the "bkgd" ROI may need to be shifted laterally as not to include any cardiac uptake.
44. SNAPSHOT IMAGE
45. PROCEED without saving
46. From the home screen left click on all dynamic display.
47. Choose Axial_R data set
48. Look for the best 5 images that are centered in the chest at the sternum/cardiac level, notate these frame numbers.
49. From the MANIPULATION MENU select IMAGE MANIPULATION
50. Select AXIAL_R data set, PROCEED
51. Left click on FRAME EXTRACT
52. Right click SELECTION MENU
53. Left click on IMAGE 1
54. Enter frame start number (from the frames you noted earlier) ENTER
55. Enter number of frames (5)
56. PROCEED, QUIT, SAVED SELECTED AND PROCEED

57. From the IMAGE MANIPULATION MENU, pick EXTRACT, PROCEED
58. FRAME COMPRESS, right click on SELECTION MENU and right click on IMAGE 1
59. Number of frames to compress (5), PROCEED, QUIT, SAVE SELECTED AND PROCEED
60. Left click on region ration
61. Select COMPRESS data set, PROCEED
62. Label first ROI "target"
63. Label second ROI "bkgd"
64. Use middle mouse to draw ROIs, PROCEED
65. SNAPSHOT image
66. Double snapshot all static and SPECT snapshots.
67. DICOM send all double snapshots, the AXIAL_R, SAGITTAL_R, CORONAL, PROJECTION and VOLUME image sets to PACS and put online in proper order for radiologist interpretation.