

99mTechnetium-Pyrophosphate Imaging for Cardiac Amyloidosis

Adopted 12.2018

Special Instructions: No specific preparation.

Adverse Reactions: Several reactions have been reported, including flushing, hypotension, fever, chills, nausea, vomiting and dizziness, as well as hypersensitivity reactions such as itching and various rashes.

To be performed **ONLY at UNMH**

Radiopharmaceutical: Tc-99m pyrophosphate (99mTc-PYP)

Dose: Refer to Nuclear Medicine Dose Chart

Route of Administration: Intravenous

Patient Preparation: No specific preparation. (No fasting required.)

Equipment Setup:

- Collimator (All): Low energy, high resolution (*LEHR*)
- Non-gated imaging
- Energy window: 140 keV (20% window)
- Matrix: 128 x 128
- Pixel size: 3.5 – 6.5 mm

Computer Setup:

- **Planar Imaging:**
 - Static acquisitions, 750K counts/image
 - Views: anterior, L lateral, *and LAO* (anterior and L lateral can be acquired simultaneously, using 90-degree detector configuration)
 - Magnification 1.46
- **SPECT/CT Imaging:**
 - Angular range: 360 degrees
 - Detector configuration: 180 degrees
 - Number of views/detector: 40
 - Time per stop: 20 seconds

- Magnification: 1.0

Patient Positioning: Supine

Procedure:

1. Planar images of the chest at 1-hour post injection (ANTERIOR, L lateral, and LAO); check with NM attending for possible SPECT/CT (at one hour).
2. SPECT/CT imaging through the heart at 3 hours post injection (unless directed otherwise at 1 hour); check with NM attending for any additional images (may obtain repeat planar, as above).

Image Processing:

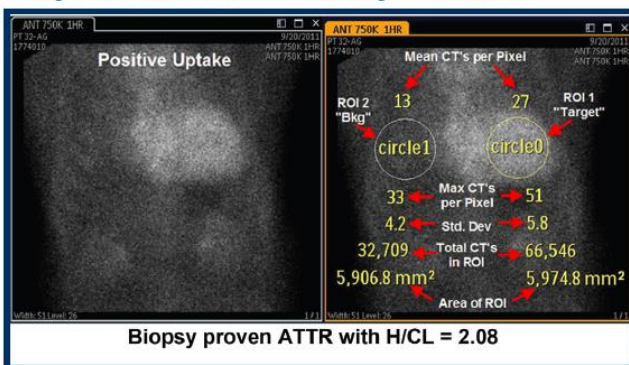
1. **Planar Images:**

- a. Create static display (lightbox/savescreens) of all static images, labeled with view and time of acquisition.
- b. On **one-hour anterior** planar image, draw ROI over the heart “H”, with copied (same size, if possible) ROI over the contralateral lung “CL” (for background).
- c. Provide mean counts for each ROI.
- d. Calculate H/CL ratio, as follows:

$$(\text{Mean Heart Counts}) \div (\text{Mean Contralateral Lung Counts})$$

Example of ROI drawing taken from ASNC document:

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



2. SPECT-CT or SPECT: Follow automatic processing workflow

- a. If SPECT-CT performed, process CT in soft tissue (B30) algorithm; should have attenuation-corrected (AC) and non-corrected (NAC) SPECT tomo files
- b. If SPECT only (per request of MD), should have reconstructed tomographic file and axial/coronal/sagittal lightboxes/savescreens

Items Required For Complete Study:

1. Processing and transfer of all images to PACS and/or Leonardo as appropriate

Planar Images

- Raw data of all planar images (to PACS and Leo)
- Lightbox/savescreen of all *labeled* planar images (to PACS)
- Lightbox/savescreen of drawn and calculated ROI ratio for anterior planar view at one hour. Include mean counts for each ROI.

SPECT-CT:

- Attenuation Corrected and Non Attenuation Corrected Tomo Reconstructions,
- CT (B30) to Leonardo and PACS.
- Rename SPECT and CT files to include region imaged (e.g., Reconstructed Tomo- AC - HEART)

SPECT (rarely done):

- Reconstructed tomo (to Leonardo and PACS),
- Lightboxes/savescreens of axial/coronal/sagittal SPECT (to PACS).
- Rename SPECT to include region imaged (e.g., Reconstructed Tomo HEART)

2. Complete the examination in RIS

Reference(s):

- ASNC Practice Points: 99mTechnetium-Pyrophosphate Imaging for Transthyretin Cardiac Amyloidosis. Accessed 9.3.2018.
<https://www.asnc.org/Files/Practice%20Resources/Practice%20Points/ASNC%20Practice%20Point>

-99mTechnetiumPyrophosphateImaging2016.pdf

- PYP Package Insert: https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/017538s019lbl.pdf