

Cisternogram for CSF Leak

Special Instructions **Schedule these patients in conjunction with Neuroradiology/Fluoroscopy for the lumbar puncture/injection. Strict aseptic technique must be used when dispensing and injecting the radiopharmaceutical. Arrangements should also be made with the ENT service if nasal or ear pledgets are needed.**

The patient must lie flat for a minimum of 30 minutes after the lumbar puncture. The patient may be transferred if needed via a board onto a stretcher and onto the imaging table but must remain flat during transfers.

To be performed at UNMH only.

Radiopharmaceutical: In-111 DTPA Pyrogen Free

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

Route of Administration: Intrathecal (lumbar puncture), typically performed fluoroscopically by Neuroradiology. If CSF samples are needed, the injection should be performed after any these samples are taken. All the radiopharmaceutical should be injected in one push. The syringe/needle should be returned immediately to the nuclear medicine technologist or physician in attendance for proper disposal.

Patient Preparation: None.

Equipment Setup: Gamma Camera: LFOV camera for adult studies; LFOV camera with ZOOM for studies in small children as appropriate

Collimator: Medium Energy (all cameras)

Computer Setup:

256 x 256 matrix

Static acquisition, ~100 K counts or 10 min/image

SPECT-CT (if needed):

High resolution collimator, 128 x 128 matrix

1.00 ZOOM

180 degrees, CW (clockwise)

64 steps, 30 sec/step

Noncircular, continuous

Patient Positioning: Supine (prone as needed)

Procedure:

Pledgets:

ENT places labeled pledgets in the nose or ears depending on suspected site of leak (prior to or within one hour after injection). Obtain an extra (dry) pledget

Cisternogram for CSF Leak (continued)

and weigh it to obtain an approximate dry-pledget weight.

Remove pledgets at 24 hours (after imaging) and place in labeled test tubes. If the patient is unable to tolerate having the pledgets in place for 24 hours, the pledgets may be removed, and preferably replaced, at 4 hours. Early removal of the pledgets may decrease the sensitivity of the examination.

At the time of pledget removal, draw 1 ml blood to provide background counts.

Count each pledget for set amount of time (usually 1-2 minutes). Record cpm and dpm for each

dpm is determined from the detector efficiency for In-111, which is a manufacturer's setting.

Imaging: After the lumbar puncture, the patient must lie flat for a minimum of 30 minutes but can be transferred (via a board) to the imaging table.

Obtain the following static images. Transmission scans may be useful in some cases to localize the activity (particularly on lateral views).

Image:

Immediate: Posterior and lateral views of the lumbar spine injection site, to assess for extravasation.

4 hours:

If concern for leak from the nose or ears:

Anterior head

Lateral head (bilaterally)

If concern for leak from the spine:

Posterior spine (Can do in prone positioning)

Lateral spine

18-24 hours:

If concern for leak from the nose or ears:

Anterior head

Lateral head (bilaterally)

If concern for leak from the spine:

Posterior spine (Can do in prone positioning)

Lateral spine

Anterior image of the abdomen (to assess for swallowed activity)

Check with the radiologist about need for SPECT/CT at each time point.

Basic calculation for leak:

To analyze:

--Give 1 mCi of In-111 DTPA

1 mCi = 3.7×10^7 dps

Cisternogram for CSF Leak (continued)

--Will decay to ~76% (decay factor) at 24 hrs = 2.8×10^7 dps
--was dissolved in ~150 cc CSF vol → 1cc has $\sim 1.9 \times 10^5$ dps

--assuming a small leak of 0.1 cc in 4-24 hrs
→ 1 pledget will have $\sim 1.9 \times 10^5$ dps OR 1×10^7 dpm
→ Any pledget count less than 1×10^7 dpm is probably not a leak

Processing: Static display of all planar images labeled with time and view.

SPECT-CT: Follow automatic processing workflow

If SPECT-CT, process CT in soft tissue (B30) and bone (B60) algorithm; should have attenuation corrected and non attenuation corrected SPECT tomo files

If SPECT only, should have reconstructed tomographic file and axial/coronal/sagittal lightboxes/savescreens

Items Required For Complete Study:

- Raw data and lightboxes/savescreens of all views at each time point to PACS (label anatomy and imaging time)
- SPECT (if obtained): 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 PELVIS).
- SPECT-CT (if obtained): Attenuation Corrected and Non Attenuation Corrected Tomo Reconstructions, CT (B30 and B60) (to Leonardo and PACS). Rename SPECT and CT files to include region imaged (e.g., Reconstructed Tomo- AC - PELVIS).
- Transfer of all digital images to PACS
- Complete the examination in RIS