

Division of Nuclear Medicine Procedure / Protocol University Hospital and The American Center

LYMPHOSCINTIGRAPHY (lymphangiogram, not sentinel node imaging)
UPDATED: SEPTEMBER 2021 (minor update March 2022)

CPT CODE: 78195

Indications:

- Evaluation of chronic lymphedema of a swollen extremity, where scan is used to differentiate primary or secondary lymphedema (primary has neither lymphatic nor proximal LN visualization, secondary has interstitial lymphatic uptake but poor visualization of proximal lymph channels and nodes).
- Determination of lymph node drainage.
- Evaluation of lymphatic blockage (e.g. by tumor or trauma) or leak.
- Identification of patent lymphatic channels prior to lympho-venous anastomosis.

Patient Prep:

If the patient wears compression stockings these should be removed from Upper or Lower extremities 3-4 hours prior to the study. If this cannot be done, it should be noted and considered in the interpretation.

Scheduling:

This study is comprised of 3 visits on the same day. Imaging is scheduled for 4-6 hours. Initial imaging post injection is scheduled for 2 hours, with patient returning approximately 3 hours post injection for 1 hour of imaging, and then returning approximately 5 hours post injection for approximately 60 minutes of imaging. Consider delayed imaging at 24 hours.

Radiopharmaceutical & Dose:

Tc-99m sulfur colloid suspension (filtered) with a particle size ≤ 220 nm (small particle size prepared by passing through a 220 nanometer Millipore filter).

Adults: 520 μ Ci/0.12 mL (+/-20% dose) dispensed in each of four 1cc TB syringe. This injection has a validated retention of ~300 μ Ci in the hub of the syringe; the actual administered dose per syringe used is ~200 μ Ci. One injection per syringe and two injections are made per extremity. Those validating the doses will enter into NMIS that actual reading from the dose calibrator without accounting for retention.

Children: Use same dose as for adults.

Pre-Injection:

Once patient arrives to the department apply EMLA cream to the appropriate area and allow patient to sit for 15-20 minutes. Ice may also be used. **Precautions: mandate face shield and precautions to patient reflexes with aid of a second person to immobilize feet or hands.**

Injection:

A Nuclear Medicine attending physician, Nuclear Medicine resident, or a Radiology resident will perform the radiopharmaceutical injection(s) as following:

Identify the patient using two approved methods. Fully explain the procedure to the patient and answer all their questions. Obtain patient's verbal approval. Identify the area to be injected, with the patient's confirmation.

Inject tracer subcutaneously in two web spaces of each extremity to be imaged:

- Feet: subcutaneous injection in web spaces between the 1st and 2nd toes, and between the 3rd and 4th toes (4th and 5th toes if allowable).
- Hands: subcutaneous injection in web spaces between the thumb and index finger, and between the 4th and 5th fingers.

Imaging Device:

The preferred cameras include the GE Infinia I, II, III or the GE Optima 640 with the LEHR collimators.

Imaging Procedure:

Select predefined Lymphedema imaging protocol under lymphoscintigraphy acquisition.

Dynamic imaging: Starts immediately post injection; 1 field of view from injection site (for hand injections this includes hands and forearms; for feet injections this includes feet and lower legs); 1 min/frame, for 15 minutes (15 frames). There will be a zoom of 1.46 x (40.9 cm), matrix size of 128x128, and a Tc window.

Semi-body scan: Starts immediately post dynamic imaging, depending on the injection site, a semi-body scan of either the Lower extremity or the Upper extremity will be performed as stated below. Place table extension.

Lower extremity:

Infinia I, II & III: Patient will be in the head-first supine position. A semi-body scan will be performed starting from the feet, going up to the bottom of liver, at a constant table movement rate of 5 cm/min. A marker should be placed at the ankle, knee and anterior iliac crest for anatomic reference. Make sure to enter the appropriate FROM and TO parameters. Ex. FROM 110, TO 0.

Optima: Patient will be in the feet-first supine position. A semi-body scan will be performed starting at the liver, going to the feet, at a constant table movement rate of 5 cm/min. A marker should be placed at the ankle, knee and anterior iliac crest for anatomic reference. Make sure to enter the appropriate FROM and TO parameters. Ex. FROM 110, TO 0.

****Note:** Head-first whole body imaging cannot be obtained on the Optima due to factory settings/patient safety concerns.

Upper extremity:

All Cameras: Patient will be in a feet-first supine position with hands over the head (check with physician if patient unable to raise arms). A semi-body scan will be performed starting from the hands, going down to the top of liver, at a constant table movement rate of 5 cm/min. Markers should be placed at the wrist, elbow and shoulder. Make sure to enter the appropriate FROM and TO parameters. Ex. FROM 195, TO 60.

Note: When both upper and lower extremities are ordered and performed in the same imaging appointment, do the lower extremities first and complete the flow. Then inject the upper extremities followed by the second flow. Then continue with the semi/whole body scan and statics.

Upon completion of the semi-body images, images will be checked with the NM physician to determine if additional projections are needed.

Static spot views: Additional spot views with and without cobalt spot views can be obtained as needed per discretion of nuclear medicine staff or residents.

If delayed images are requested at the discretion of the NM physician, they are typically performed at hourly intervals post injection, for up to 5 hours to include semi body scans or static spot views as needed. Patient will be encouraged to perform hand exercises (for upper extremity injections) or to walk (for lower extremity injections) prior to each set of delayed images.

Display:

Use factory whole body display for processing with dual intensities. Properly annotate the Semi-body images with accurate time of acquisition post time of injection. Make Screen Cap with appropriate time stamp.

PACS: All raw data and screen captures should be sent to the PACS.

Interpretation: Radiopharmaceutical should promptly ascend up the appropriate lymph node chains. Asymmetry in lymph node uptake may indicate obstruction.

Reviewed By:

Steve Cho, MD
Chief, Nuclear Medicine

Derek Fuerbringer, CNMT
Manager, Nuclear Medicine

Sandy Zarada, RT
Manager, TAC Nuclear Medicine

Tyler Bradshaw, PhD, DABR
Medical Physicist

Scott Knishka, RPh, BCNP
Radiopharmacist