

LYMPHOSCINTIGRAPHY
UPDATED: MARCH 2006

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)
- Identification of patent lymph channels prior to lymphovenous anastomosis
- Determination of lymph node drainage and sentinel lymph node identification in malignancies such as truncal or head and neck melanomas and breast cancer.
- Evaluation of inguinal pelvic and periaortic lymphatic drainage for blockage by tumor (or trauma) and sentinel node identification, e.g., rectal, prostatic, cervical, or vulvar cancer.

Patient Prep:

If the patient wears elastic stockings for lymphedema, these should generally be removed 3-4 hours prior to the study. If this cannot be done, it should be noted and considered in the interpretation.

For breast lymphoscintigraphy, or other sites anticipated as painful, lidocaine 4% cream should be placed on the area to be injected a minimum of 10 minutes before the injections are made.

Scheduling:

Allow 1½ hours for breast imaging (3 hours for most other imaging). Check with NM physician after initial study to determine if delayed images may be needed. Allow 60 minutes for each delayed imaging set. See shorter protocol for breast imaging.

Radiopharmaceutical

& Dose:

Radiopharmaceutical: Tc-99m sulfur colloid suspension with a particle size ≤ 100 nm (small particle size prepared by boiling twice and passing through a 100 nanometer Millipore filter per the Package Insert Deviation procedure). Doses are injected by NM physician, or radiology or nuclear medicine resident subcutaneously into feet or hands (flow pattern), or about region of tumor (either intradermally for melanoma, vulvar cancer, or over tumor with subdermal and a subareolar plexus injection in breast cancer), or into the posterior rectus abdominis muscle sheath (for evaluation of internal mammary chain).

- Adults (≥ 18 yr) up to 1.5 mCi/region
- Children (< 18 yr) up to 1.5 mCi/region

* Note: Dose in children is determined by the Nuclear Medicine physician on a case by case basis.

Anesthetic cream: Lidocaine Cream 4% applied on the area to be injected a minimum of 10 minutes before the injections are made (for breast lymphoscintigraphy and any other sites anticipated as painful). Apply liberally and allow to sit on the surface. Do not rub cream in all the way.

Injection:

Fully explain the procedure to the patient. Dose/injection for all except cervical: Dispense 200 $\mu\text{Ci}/0.05\text{ mL}$ in each syringe along with enough excess to fill the dead space in the syringe hub and needle (0.08 mL). Total dose dispensed is 520 $\mu\text{Ci}/0.13\text{ mL}$.

LYMPHEDEMA: Inject tracer subcutaneously in the webs between toes and fingers as desired (2 sites per limb).

MELANOMA: Inject tracer intradermally around the tumor or excision site. Four (4) injection sites are used. It is important to be as close as possible (within 5 mm) to the tumor excision scar site without injecting scar tissue.

BREAST CANCER: Inject one (1) intradermal over lesion and two-three (2-3) subdermal in the subareolar plexus oriented to the tumor site.

CERVICAL CANCER: Inject 1 mCi in 2.5 mL dispensed in 3 mL syringe with leur tip cap.

VULVAR CANCER: Inject 2-3 sites intradermal about lesion.

OTHER SITES: 4 injections at the discretion of NM physician.

Imaging Device:

Gamma camera with LEHR collimator. For several scans, use of Hawkeye scanner with CT anatomic localization is required (e.g. vulvar, cervical).

Imaging Procedure:

Static of injection site post injection. Check with NM staff or resident physician to determine if additional views are indicated.

FOOT INJECTION: Inject both feet subcutaneously in the webs between 1st-2nd or 2nd-3rd toes. Immediate post-injection, acquire 2-minute static of injection sites. At 15, 30, and 90 minutes acquire anterior whole body image from feet to head at 12 min/meter. Acquire all images with the oldest cobalt sheet transmission source under the table to outline the body.

HAND INJECTION: Inject hand between 2nd-3rd and 3rd-4th fingers as per pedal injection. Position camera over axilla. Acquire dynamic images 128 x 128 for 1 minute/frame for 1 hour. Repeat imaging procedure at 2 hours. Check with a NM staff or resident physician to determine if additional views are indicated.

MELANOMA INJECTION:

Lymphatic Flow Study: Immediately post injection (very rapid injection required) acquire 30-second frames for 20 minutes to identify lymphatic drainage and interval and sentinel lymph nodes. Include ALL potential drainage sites in the images.

Regional Lymph Node Study: At 20 minutes, obtain 5-minute images of the expected regional nodal sites beyond the area imaged in the flow study. Often the patient flow study will demonstrate two or more lymphatic draining channels. Obtain transmission scan obtain images with Co-57 markers on appropriate sites.

- A. Axilla: Anterior and lateral views to coordinate localization, using skin markers.
- B. Neck: Anterior, lateral, and oblique views as needed to identify anterior and posterior drainage.
- C. Pelvis: Anterior and posterior views.

Delayed Images: At 2 hours the patient returns for identical images and additional images where appropriate if drainage site(s) have not been successfully identified.

BREAST CANCER INJECTION: For breast injection place intradermal dose in skin over tumor site (near needle localization if in-situ). Skin preparation with anesthetic cream is recommended for breast cancer. Also, inject 2-3 subdermal doses on the subareolar plexus, and inject these on the side the tumor is, injecting the 2-3 appropriate cardinal points (2 or 3 at 6,9 and 12 o'clock, as appropriate).

Regional Lymph Node Study: At 20 minutes, obtain two-minute images of the expected regional nodal sites. Use the appropriate anterior oblique image (RAO on R, LAO on L) for delayed images if lesion is lateral to areola. Include the axilla and sternum/supraclavicular regions in the images. Repeat with transmission views also. If requested, mark sentinel node in operative position (arm abducted at 90°) if considered appropriate, do delayed images as required.

CERVICAL & VULVAR CANCER INJECTION: Intradermal injection at 3-4 points surrounding the known cancer. Skin preparation with anesthetic cream is recommended for vulvar cancer. For cervical (uterine) scanning, the injection is performed by appropriate medical staff off site. Four separate injections preferred, with perhaps one subdermally. If necessary, call resident/staff looking after patient if injecting staff is uncomfortable with injection.

Study: Start dynamic study (30 second images) immediately and at 20 minutes obtain 2-minute images of the groin. Delayed images at 2 hours are obtained of groin region. Transmission planar scan views are suggested, in addition. SPECT/CT images must be obtained with cervical, vulvar, and uterine injections.

Display: Conventional static images with and without transmission scans. With SPECT/CT, send appropriate images to ALI.

Interpretation: Radiopharmaceutical should promptly ascend up the appropriate lymph node chains. Asymmetry in lymph node uptake may indicate obstruction. The drainage pathways and the first lymph node(s) identified may be marked. In vulvar and cervical carcinomas, it is important to determine if both groins/ilic chains have sentinel nodes.

PACS: All images should be sent to the PACS, including the flow and static images, and images with and without transmission scans.

Comments: A Nuclear Medicine staff or resident physician should be consulted to determine if additional views are indicated.

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