

General Reference:

SNM Practice Guideline for Lung Scintigraphy 4.0

Common Indications:

Pulmonary embolus, chest pain, shortness of breath, elevated D-dimer levels, preoperative regional pulmonary quantitation

Pre-scan Clinical History:

Determine history related to stated clinical history. Locate any pertinent imaging results which describe related findings.

Patient Preparation:

None

Relative Contraindications (if present, consult with nuclear medicine physician prior to scan):

1. Right-to-left vascular shunt
2. Pulmonary hypertension
3. Recent nuclear medicine studies
4. Pregnancy

Radiopharmaceutical and Route of Administration:

10 to 20 mCi Xe133 inhaled, **or** 30 to 40 mCi Tc99m aerosol, inhaled
4.0 to 5.0 mCi Tc99m MAA IV.

Procedure:

At a minimum, patients must have a negative COVID test within the preceding 24hrs to be approved for ventilation imaging. Some facility requirements may be more restrictive. If the patient cannot be cleared for viral respiratory infection, perfusion-only imaging should be performed.

Xenon Ventilation Imaging:

Xenon ventilation imaging can **only** be performed in a negative pressure room with a Xenon alert monitor. Prepare and operate the Xenon delivery apparatus according to manufacturer's recommendations. Secure the mask over the patient's mouth and nose.

Acquire a dual-detector dynamic acquisition in anterior and posterior projections, 10 frames, 30 seconds per frame, 128x128 matrix, zoom nominally 1.5, according to the following schedule:

1. Acquire one frame of background at the beginning of the dynamic study.
2. At the beginning of the frame 2, inject the Xe133 into the mask and instruct the patient to breathe deeply and hold. Switch the xenon trap to single breath hold; the patient may exhale when the breath can no longer be held.
3. At the beginning of the frame 4, switch the xenon trap to washout. Do not remove the mask until the completion of the acquisition.

DTPA Aerosol Imaging:

DTPA aerosol imaging must *always* be performed *prior to* perfusion imaging.

DTPA dose must be low enough to ensure that the count rate (Kcts/second) in anterior and posterior projections is *no greater than 25% of the count rate of perfusion imaging* in the same projections. These rates should be documented on the formatted screen captures at the conclusion of the exam.

Using an aerosolized according to manufacturer's recommendations, deliver the aerosol through a mouthpiece with the nose occluded, while the patient is engaging in tidal breathing.

Acquire the following dual-detector static images, 128x128 matrix, count-based termination as follows:

1. Anterior/ Posterior, 175Kcts
2. RAO/LPO. 150 Kcts
3. Right Lateral/ Left Lateral, 125 Kcts
4. RPO/LAO. 150 Kcts

Perfusion Imaging:

After the patient has been told to cough and take several deep breaths, 99mTc-MAA is injected IV, slowly during 3–5 respiratory cycles with the patient supine. Inject the MAA through a butterfly or (as close as possible to the patient) through a well-flushed existing IV line. The tracer should not be administered in the distal port of a Swan–Ganz catheter or any indwelling line or port that contains a filter—for example, a chemotherapy line.

Acquire the following dual-detector static images, 128x128 matrix, count-based termination as follows:

1. Anterior/ Posterior, 700Kcts
2. RAO/LPO. 600 Kcts
3. Right Lateral/ Left Lateral, 500 Kcts
4. RPO/LAO. 600 Kcts

Review:

Prepare images and documents for clinical review as per **Nuclear Imaging Acquisition and Presentation Guidelines**.