



**Austin Radiological Association**  
**Nuclear Medicine Procedure**  
**LUNG PERFUSION STUDY**  
**(Tc-99m-Macroaggregated Albumin)**

**Overview**

- The lungs have a dual blood supply via the pulmonary and bronchial arteries. The Lung Perfusion Study demonstrates the distribution of lung perfusion via the pulmonary arteries in multiple projections.

**Indications**

- Diagnosis of pulmonary embolism, particularly when helical CT is contraindicated because of renal insufficiency or a history of a bona fide contrast reaction.
- Evaluation of regional pulmonary perfusion prior to lung reduction surgery.

**Examination Time**

- 45 minutes.

**Patient Preparation**

- None.

**Equipment & Energy Windows**

- Gamma camera: Large field of view, preferably a dual head camera.
- Collimator: Low energy, high resolution, parallel hole.
- Energy window: 20% window centered at 140 keV.

**Radiopharmaceutical, Dose, & Technique of Administration**

- Radiopharmaceutical: Tc-99m-macroaggregated albumin.
- Dose:  
5 mCi (185 MBq) - if performed alone or in conjunction with a gas ventilation study. Pedi dose by NACG chart.

2 mCi (74 MBq) - if performed before a Tc-99m-DTPA aerosol study.  
Pedi dose by NACG chart.

- Technique of administration: Standard intravenous injection with patient supine.

### Patient Position & Imaging Field

- Patient position: Sitting (supine if unable to sit).
- Imaging field: Entire lungs.

### Acquisition Protocol

- Imaging may begin immediately.
- Acquire images in the POST, LPO, L LAT, LAO, ANT, RAO, R LAT, and RPO projections.
  1. Acquire each image for approximately 500 K.
- SPECT images of perfusion may be substituted for planar imaging if approved by radiologist. SPECT/CT images may be wanted to evaluate for Zephyr valve placement.
- Always compare the results to a chest radiograph(s) obtained within the last 24 hours.

### Protocol Summary Diagram



### Data Processing

- None.

### Optional Maneuvers

- Quantification: Unilateral or regional pulmonary function may be quantitated using appropriate lung quantification workflow.
- SPECT/CT perfusion images may be performed upon request.

- Secondary xenon-133 ventilation studies: Xenon-133 gas ventilation studies may be done after the Tc-99m-MAA perfusion study, either as a reventilation study to obtain ventilation information in an additional view or as the sole ventilation study. If this approach is planned or likely, the dose for the perfusion study may be reduced.
- Functional images: Images of perfusion and ventilation information combined may be generated.

**Method for timely correction of Data Analysis and reporting errors and notification of referring parties**

- Data Analysis and reporting errors are reported to the interpreting physician and appropriate clinic manager for timely correction and notification of the referring physician via report addendum or STAT call if error is significant.

**Principle Radiation Emission Data - Tc-99m**

- Physical half-life = 6.01 hours.

Radiation	Mean % per disintegration	Mean energy (keV)
Gamma-2	89.07	140.5

**Dosimetry - Tc-99m-Macroaggregated Albumin**

Organ	rads/6 mCi	mGy/222 MBq
Lungs	1.32	13.2
Bladder wall		
2 hour void	0.18	1.8
4.8 hour void	0.33	3.3
Liver	0.11	1.1
Spleen	0.10	1.0
Total body	0.09	0.9
Kidneys	0.066	0.66
Ovaries		
2 hour void	0.045	0.45
4.8 hour void	0.051	0.51
Testes		
2 hour void	0.036	0.36
4.8 hour void	0.039	0.39