

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 (1-5).
- Evaluation of regional pulmonary perfusion prior to lung reduction surgery (6,7).

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:
 - θ 4 - 5 mCi (222 MBq) - if performed in conjunction with a gas ventilation study.
 - θ 1 - 2 mCi (37-74 MBq) - if performed before a Tc-99m-DTPA aerosol study.
- Technique of administration: Standard intravenous injection.

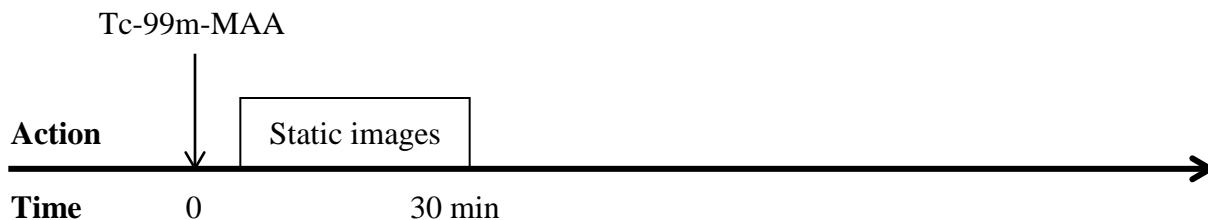
Patient Position & Imaging Field

- 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. (If a dual head camera is used, acquire RAO and LAO projections as well.). However, the minimal amount of images that should be taken are: POST, RPO, LPO, and ANT.
 1. Acquire each image for approximately 500 K or 5 minutes.
- SPECT images of perfusion and ventilation may be substituted for planar imaging (5).
- Always compare the results to a chest radiograph(s) obtained within the last 24 hours.

Protocol Summary Diagram



Data Processing

- None.

Optional Maneuvers

- As a general rule Xenon or DTPA should be done before the MAA procedure.
- Quantitation: Unilateral or regional pulmonary function may be quantitated (7,8).

- (I do not recommend this) 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 (9,10).
- Functional images: Images of perfusion and ventilation information combined may be generated (11).

Principle Radiation Emission Data - Tc-99m (12)

- Physical half-life = 6.01 hours.

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

Dosimetry - Tc-99m-Macroaggregated Albumin (13)

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

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Normal Findings

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