PERFUSION LUNG IMAGING
Radiology Associates of Clearwater

INDICATIONS:

Diagnosis of pulmonary embolism  Tachycardia, arrhythmia
Dyspnea                              Abnormal EKG
Chest pain                           Hypoxia
Hemoptysis                           Quantitation or preoperative
evaluation

SCHEDULING:

1. Instructions to Patient:

   No special preparation needed. The patient should know that the exam will take approximately one hour or more. If "preop", schedule as quantitative lung scan when indicated.

2. Labs:

   No specific labs necessary.

3. Image Correlation:

   Obtain any prior VQ scan. A recent chest X-ray (ideally less than 24 hours) is necessary. If it has not been performed already, the VQ scan can be done first to avoid unnecessary delays.

   The study is usually performed in concert with a ventilation study.

4. Comments:

   a. In patients with pulmonary hypertension or ventricular shunts, particle number must be kept to a minimum. In some of these patients, the use of MAA may be relatively contraindicated. Consult the nuclear medicine physician before proceeding.

   b. Perfusion lung imaging limited view must be available on an emergency basis at all times. If necessary, a perfusion lung scan (without ventilation) can be performed.

   c. Patients from intensive care units and those deemed medically unstable must be accompanied to the department by a nurse, who has confirmed stable vital signs before transport.

   d. Ventilation and perfusion lung images are usually obtained in sequence. Some physicians may request perfusion imaging only; such requests
should be checked with the nuclear medicine physician before proceeding.

e. When quantitative lung imaging is requested, make a copy of the patient's pulmonary function test report if available and attach it to the quantitative lung imaging work sheet. FEV1 - necessary for quantitative lung.

f. Inform the reading physician so the study may be read as STAT.

**RADIOPHARMACEUTICAL:**

Technetium-99m MAA (Macroaggregated Albumin), 4 mCi IV.

**PATIENT PREPARATION:**

For combined Xe-133 ventilation/perfusion lung imaging, the ventilation study must be completed before the perfusion study.

**EQUIPMENT AND PREPARATION:**

Gamma Camera:

1. Use a wide field of view camera for all studies.

2. 20% window centered around 140 keV.

3. High resolution, low energy parallel-hole collimator.

**PROCEDURE:**

1. Inject the dose slowly over several respiratory cycles with the patient in a supine position. To avoid "hot spot" emboli, minimize blood draw back into the syringe, and do not flush with blood after injection.

2. Imaging can begin immediately after injection, and may be done with the patient upright or supine. With patients who can maintain an upright posture on the swivel stool, positioning and resolution are improved. LABEL THE FILMS "SUPINE" OR "UPRIGHT".

3. Obtain 400k counts per image in the anterior, posterior, right and left lateral, 45° right and left posterior oblique, and 45° right and left anterior oblique projections.

4. For supine studies, angle the camera to obtain the anterior oblique images. Use a 45° wedge for the posterior oblique images, with the camera under the table, or use SPECT TABLE. Acquire the lateral images with the camera under the table, above the table, or with a wedge. Label any departure from this protocol.
**COMPUTER PROCESSING** (Quantitative lung study):

- Process upper, middle and lower third regions using geometric mean (Perfusion and ventilation).

**REFERENCES:**


**Note:** This protocol is in agreement with the Society of Nuclear Medicine Procedure Guidelines Manual, 1999, and ACR Standards 1999-2000.