Lung Scan

Version History, Similar Studies & Variations

- v 1.0 - 11/29/04 - Initial Writing

Indications

- Diagnosis of pulmonary embolism, pulmonary hypertension, or unexplained dyspnea and chest pain.
- Evaluation of regional pulmonary perfusion or ventilation.
- Evaluation of patients with emphysema.
- Carcinoma of the lungs.
- Follow-up after a positive perfusion scan for PE.

Contraindications

- If PO_2 is lower than 40 or the patient is cyanotic, check with the doctor before proceeding.
- The presence of severe hypoxia is a contraindication to the injection of MAA.
- A right-to-left shunt is a contraindication to the injection of MAA.
- Patients with severe functional impairment may not be able to tolerate breath holding and rebreathing well enough topermit optimum evaluation with Xenon.

Equipment & Supplies

- Angiocath, saline flush x2, Xe ventilation machine & tubing/mask assembly
- Co57 sheet source
- 2-5 mCi Tc99m MAA
- 5-30 mCi Xe-133 gas

Preparation

- Explain the entire test to the patient. Patient co-operation is increased during the ventilation portion by complete explanation of what to expect.
- Place angiocath in a peripheral vein.
- Ensure the study is to be performed in a room with negative pressure capability.

Administration and Acquisition

- A Co57 sheet source is positioned to provide a transmission image of the thorax
  - This step is omitted for portable studies.
  - 100k, 256x256x16 matrix, 120 sec, labeled CO57
  - Acquiring for time alone may improve image quality for larger patients

- Xe-133 Ventilation
  - This step is omitted for portable studies.
  - Ensure the negative pressure vent is turned on and the Xe ventilation machine has sufficient O_2
  - Attach disposable tubing with a bacteria filter and a mouth and nose mask to the machine.
  - Set up the camera for ventilation images, with the images labeled VENT.
  - 10 sec/fr, 1 frame 128x128x16 matrix, followed immediately by 30 sec/fr, 7 frames, 128x128x16
  - Place the mask tightly on the patient's face, and ensure they are not having difficulty breathing.
  - Place the ventilation machine in "Rebreathe".
  - Start the camera, and quickly inject the Xe133 into the tubing. Have the patient take in a deep breath and hold it immediately afterward
  - Have the patient hold thier breath as long as possible (10-30 sec).
  - After ~60 seconds, switch the ventilation machine to "Washout" while continuing to image.
  - Leave the mask in place until the count rate drops (usually near the end of the acquisition).

- Tc99m MAA
    - Invert the dose before injecting to break up any clumps.
    - Inject the dose slowly with the patient supine so gravity does not affect the MAA distribution.
    - Have the patient take three deep breaths and briefly clench the fist of the arm injected 5-10 times .
    - DO NOT draw blood into the syringe or flush with blood after injection. (This can cause hot spots).
    - IV tubing may be used for the injection, but avoid central lines and ensure that 10-20 mL of NS flush is used.
    - Acquire six static images, labeled ANT, POST, LAO, RAO, LPO, and RPO
    - 500k, 300 sec, 256x256x16 matrix
    - If performing a portable scan, do as many of the above views as possible.
    - Perfusion images should be acquired on the same camera as ventilation images.

Required History

- Prior pulmonary embolus or stroke
- Hypertension
- Recent surgery
- Recent travel, > 4hr in a car or any travel in an airplane
- Diabetes mellitus
- Tobacco abuse
- Lung or heart disease (COPD, CHF, CAD, emphysemia, asthma, pulmonary hypertension)
- Doppler US report
- Swelling of extremities
- Use of chemical contraceptives or hormone replacement therapy

Processing

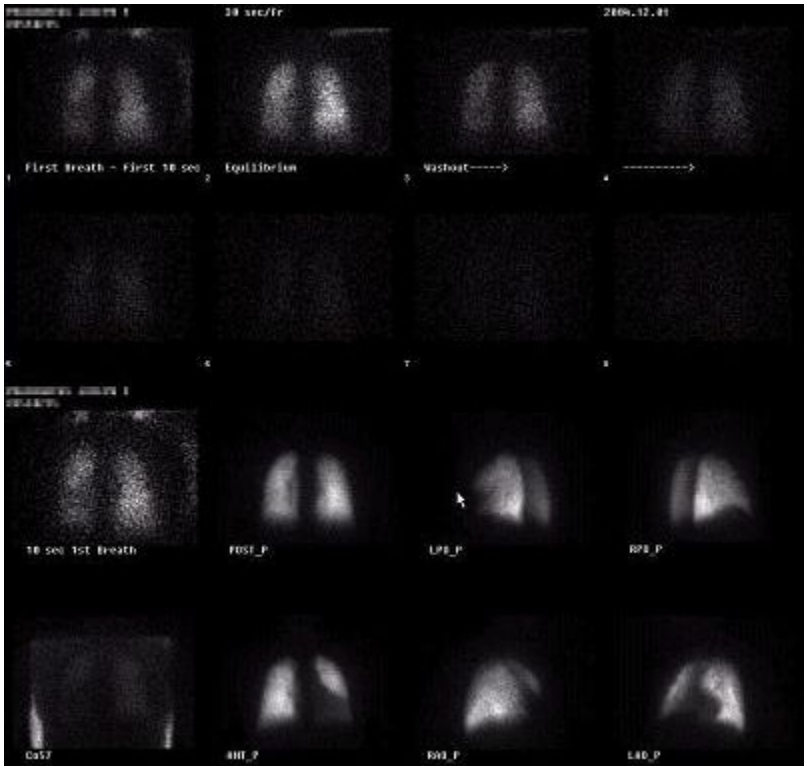
- Perform **Patient Rename** to ensure that the study has an associated accession number.
- Select the entire study, and click the User Protocol **MVH Lung.**
- Enter your initials when requested.
- Adjust intensities using the **Intensify**, **Deintensify**, and background buttons.
- Perform a screen capture of the result screen. Exit.

Differential (Quantitation)

- A computer differential should be completed on all patients it is ordered on and any study done as part of a pre-op evaluation for lung surgery.
- Select the entire study and click on the factory default **Lung Analysis** (All Applications -> Pulmonary).
- Click on the left-most lung image, **Perfusion**.
- Click on **Quant Perfusion Analysis** and follow the onscreen instructions.
- Perform a screen capture of the results.
- NON-Xeleris processing is not addressed in this protocol.

Hand in Study

- Send the Co57, VENT, and perfusion images to the Inbox via **MVH Lung**.
- If quantification was performed, send the snapshot to the Inbox via **Load to New**.
- Send all screen captures to PACS



Xenomatic with respirator patients

- On REBREATHE - fill the machine to 2.5 liters of air, place in ACCLIMATE.
- In the right side door, attach the exhalation valve before the bacteria filter. The valve has an arrow that points to the bacteria filter when it is installed correctly.
- Place a disposable bacteria filter at the roomair port in the back of the machine and one in the front where the mask normally goes. A short piece of blue vent tubing will go from the bacteria filter in the front to the patient.
- The Y of the vent tubing attaches to the bacteria filter on the back at the roomair port.
- RESPIRATORY THERAPY:

    a.) The patient must have trach care tubing attached. The Xenon gun attaches to the blue port for delivery of the Xenon.
    b.) The patient should be on a pulse-ox moniter. The O_2 SAT could drop some as the patient is first put on the Xenomatic due to the increased dead space in the tubing.
    c.) You may need to increase the vent settings if the O_2 SAT drops significantly.

- When the patient is set up, proceed as normal. Start the camera. Place the machine on REBREATHE and shoot the Xenon into the port.
- After one or two good frames of equilibrium, put the Xenomatic in WASHOUT until the film is complete.
- When all the gas has washed out, the patient may be removed from the Xenomatic.
- Throw away both disposable bacteria filters.
- Remove the exhalation valve inside the right door. Reattach the clear tubing directly to the blue bacteria filter.
- EVACUATE the machine.
- Proceed with the MAA