Lung scans, ventilation/perfusion scans

There are two phases of lung scans:
- ventilation, to assess regional ventilation
- perfusion, to assess pulmonary vascular supply.

**Indications**
- Rule out pulmonary emboli.
- Assess chest pain and respiratory distress.
- Pre- and postoperative evaluation of lung transplants. Pretest scan used to quantify lung function for transplant.
- Quantify lung function.
- Provide an estimate of regional pulmonary blood flow.
- Evaluate chronic obstructive pulmonary disease (COPD) and fibrosis.

**REFERENCE VALUES**
**Normal**
Normal functioning lung: Normal pulmonary ventilation and normal pulmonary perfusion.

**Clinical implications**
- A study with normal ventilation and segmental perfusion defects indicates pulmonary embolism (PE). Other diseases may be detected: lung tumors and cancer, pneumonia, atelectasis, asthma, inflammatory fibrosis, and COPD.

**Interfering factors**
- False-positive results may occur in patients with vasculitis, mitral stenosis, pulmonary hypertension, and when tumors obstruct a pulmonary artery with airway involvement, fatty tissues, and presence of parasites.
- False negatives are associated with partially occluded vessels.

**Clinical Alert!**
Pulmonary perfusion imaging is contraindicated in patients with primary pulmonary hypertension.

**Procedure**
- The patient is asked to inhale a radioactive gas through a mask or mouthpiece, using a commercial aerosol delivery system for about 1 to 4 minutes through a closed, nonpressurized ventilation system. During this time, a small amount of radioactive gas ($^{99m}$TcDTPA or xenon$^{133}$ gas with O$_2$) is administered into the system. The ventilation phase requires residual air in the lungs.
Radioactive technetium macroaggregated albumin (MAA) particles are slowly injected intravenously while the patient is in a supine position. The perfusion scan visualizes blood supply to the lungs.

The procedure lasts from 30 to 60 minutes.

NURSING INTERVENTIONS

Pretest
- Explain the procedure and its purpose.
- Alleviate the patient’s fears concerning the procedure.

Intratest
- Provide encouragement and support.
- Make sure that the patient can follow directions for breathing and holding his breath.

Posttest
- Evaluate procedure outcomes, and counsel appropriately.


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