Vasculature Physiologic Disturbances

Blood Flow Studies
Heart And Vessels

- X-ray plain film for pulmonary vessels only
- Nuclear Medicine – V/Q Scan
- Angiography
- CT angiography
- Magnetic resonance angiography
- Ultrasound (doppler)
Pulmonary Vascularity

- Pulmonary arteries
- Pulmonary veins
- Bronchial arteries and veins
- Interstitium
- Lymphatics

Abnormal Pulmonic Circulation

Increased Pulmonary Circulation
- Conditions causing increased pulmonary flow
  - Pulmonary hypertension.
  - Left-to-right shunt (VSD, ASD, PDA).
Abnormal Pulmonic Circulation

Increased Pulmonary Circulation

- Pulmonary venous stasis and venous hypertension
- Left heart dysfunction
- Left heart failure, etc

Abnormal Pulmonic Circulation

Decreased Pulmonary Circulation

- Right ventricle outlet stenosis or obstruction
  - Pulmonary stenosis
  - Tetralogy of Fallot (VSD, Pulmonary stenosis, Overriding Aorta, RV hypertrophy)
  - Tricuspid valvular atresia, etc
- Pulmonary artery stenosis or obstruction
  - Pulmonary infarct
  - Pulmonary embolism, etc
Pulmonary Emboli

- PA chest
- Essentially normal chest findings

Pulmonary Emboli

- Lung scan
- Ventilation scan with Xenon or particulate
- Perfusion with multiple small emboli
Pulmonary Emboli

- Multiple defects in the perfusion examination
- Overall decreased perfusion in the right lung

Pulmonary Emboli

- CT with contrast
- Large low density filling defect in the right pulmonary artery
- Exam of choice today
Pulmonary Emboli

- Pulmonary angiogram
- Catheter in left pulmonary artery from right femoral vein
- Filling defect (thrombus) in the inferior interlobar branch of the left pulmonary artery

MRI Angiography

- Non contrast technique possible
- Visualize all of the vascular structures
Doppler Ultrasound

- Doppler principles similar to that of the moving locomotive
- Determine direction of flow and speed by the doppler (frequency) change of moving blood
- Color assignment determined by direction of flow with respect to the transducer

Popliteal Vein Thrombus

- Color doppler US
- Axial image through popliteal
- Flow in artery (red)
- No flow in vein
- Echogenic thrombus in vein (arrowhead)