

APPEDIX

The Ultrasound Machine

A basic ultrasound machine has the following parts:

- **transducer probe** - probe that sends and receives the sound waves
- **central processing unit (CPU)** - computer that does all of the calculations and contains the electrical power supplies for itself and the transducer probe
- **transducer pulse controls** - changes the amplitude, frequency and duration of the pulses emitted from the transducer probe
- **display** - displays the image from the ultrasound data processed by the CPU
- **keyboard/cursor** - inputs data and takes measurements from the display
- **disk storage device** (hard, floppy, CD) - stores the acquired images
- **printer** - prints the image from the displayed data

ULTRASOUND MACHINE



FIGURE 1. Duplex ultrasound technique for lower limbs veins examination



FIGURE 2. Linear array transducer used for lower limb duplex ultrasound

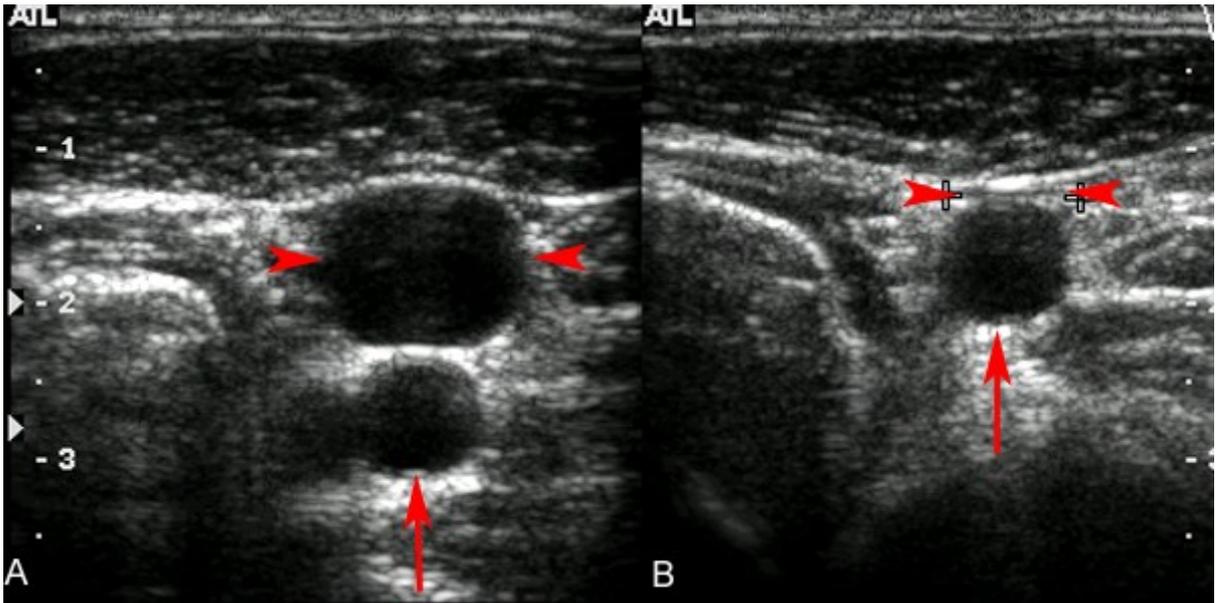


FIGURE 3. B-Mode ultrasound showing normal compressible superficial femoral vein

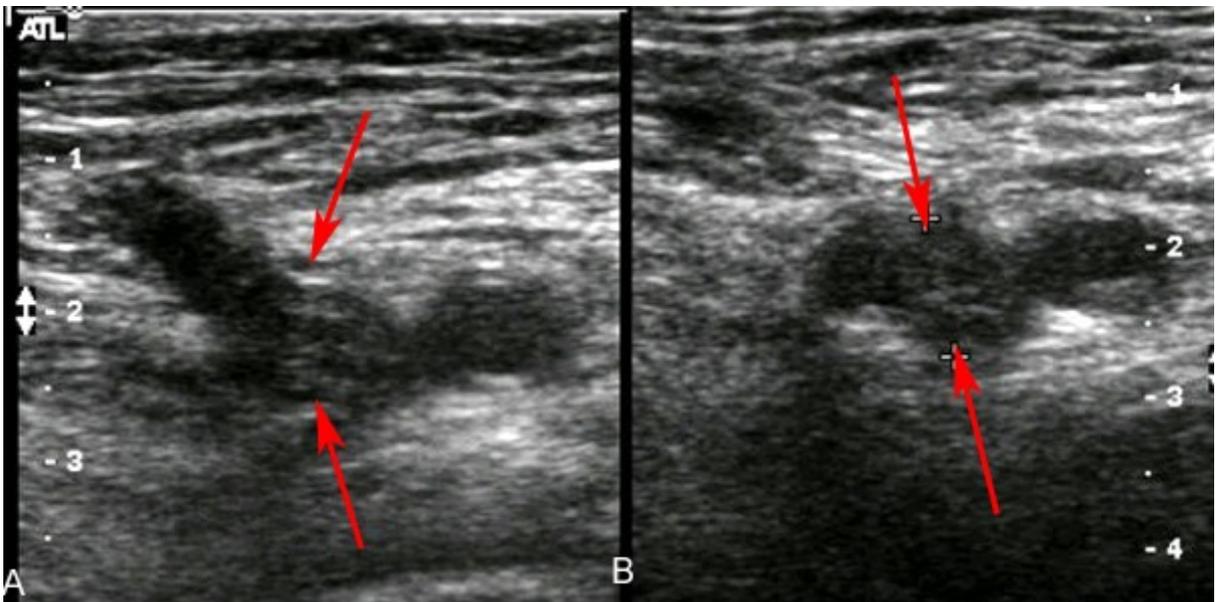


FIGURE 4. B-Mode ultrasound showing non compressible common femoral vein due to thrombosis

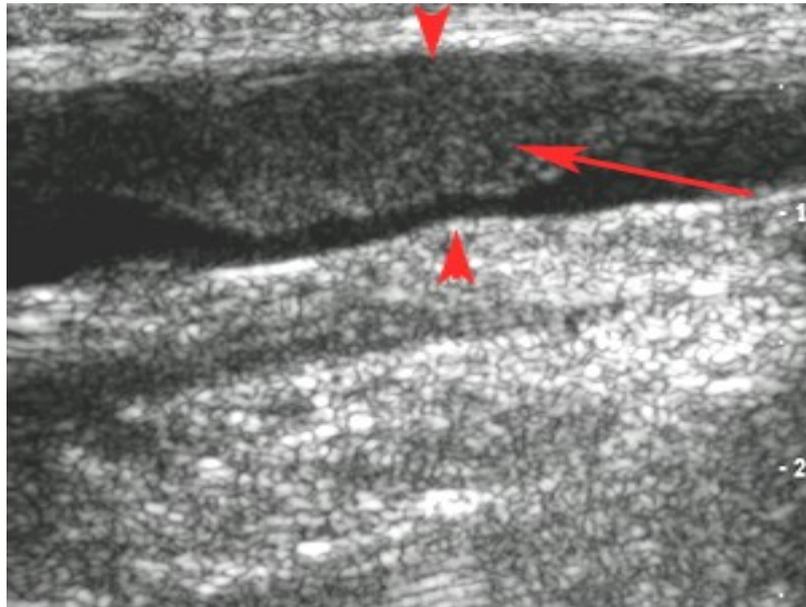


FIGURE 5. B-Mode ultrasound showing superficial femoral vein thrombosis in longitudinal

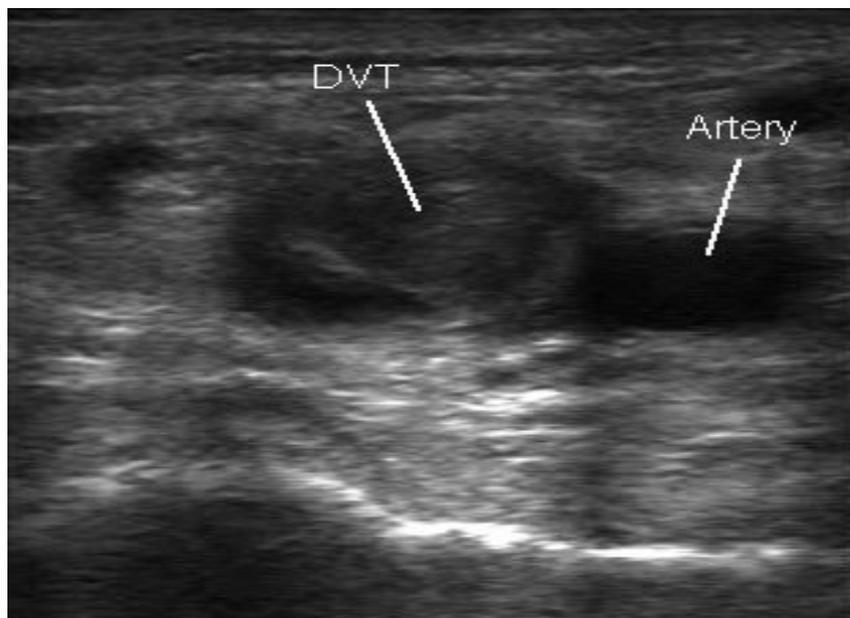


FIGURE 6. B-Mode ultrasound showing superficial femoral vein thrombosis in transverse

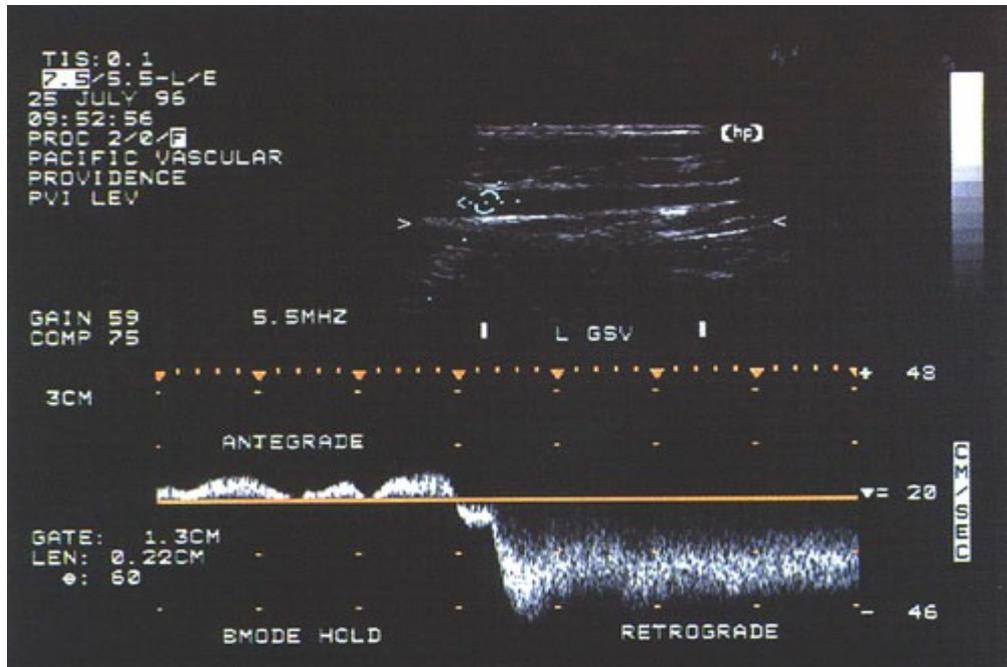


FIGURE 7 . Doppler spectral waveform demonstrating marked venous reflux in greater saphenous vein

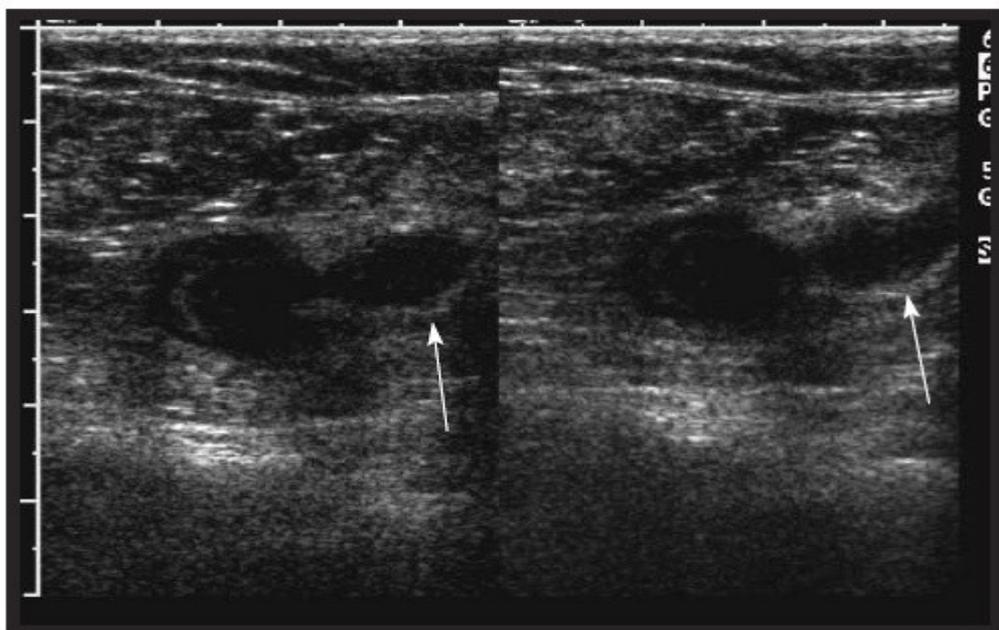


FIGURE 8 .Ultrasound image showing minimal compression of the common femoral vein

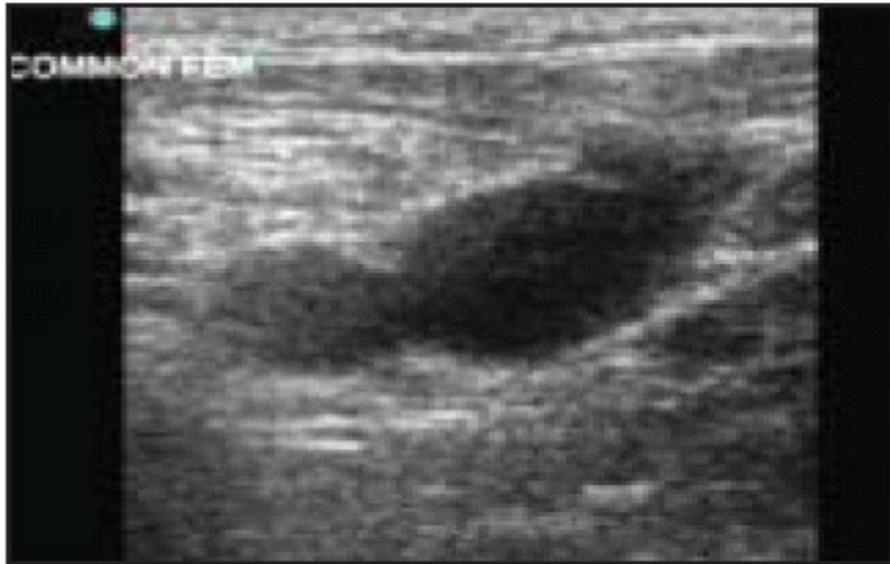


FIGURE 9 . Common femoral vein with medial entry of the great saphenous vein

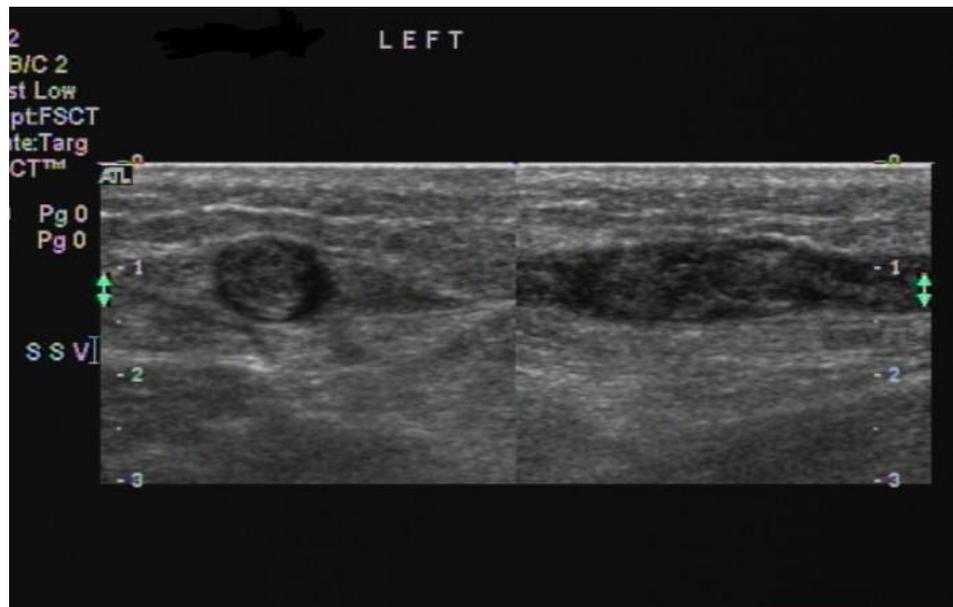


FIGURE 10 . Thrombosis in the short saphenous vein transverse &longitudinal

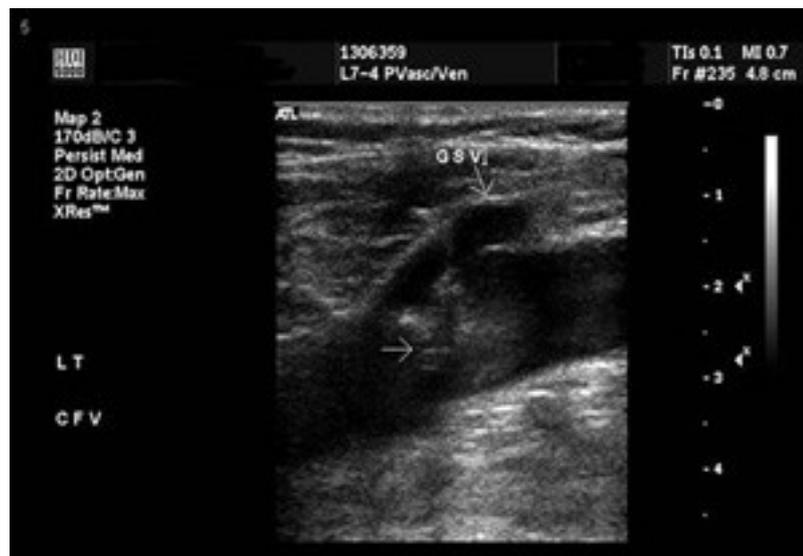


FIGURE 11 .Thrombosis in the common femoral vein longitudinal



Figure 12. Duplex examination of the right GSV with the US probe placed over the SFJ and manual compression of the distal vein

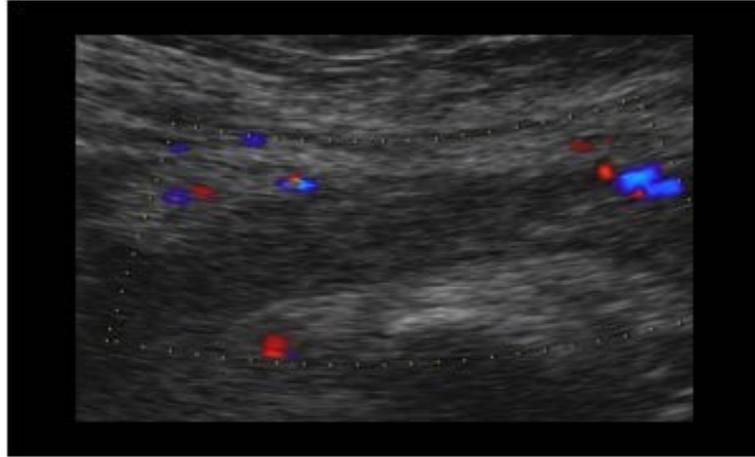


FIGURE13 .Thrombosis in the common femoral vein longitudinal

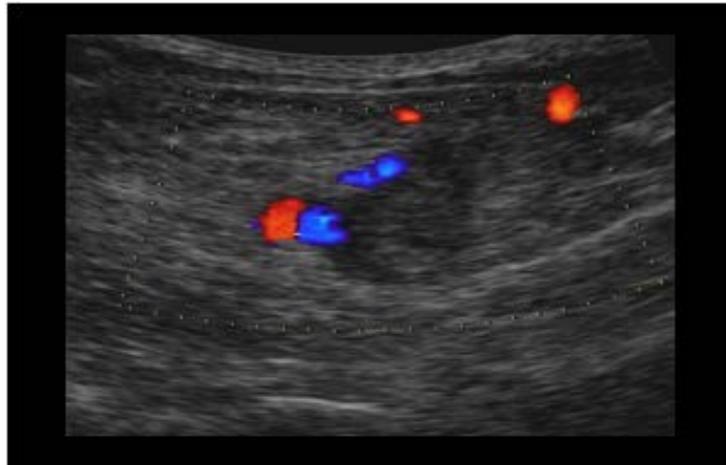


FIGURE 14 . Thrombosis in the common femoral vein transverse



FIGURE 15 .CT MACHINE



FIGURE 16 . CTPA Technique for the examination of the pulmonary artery



FIGURE 17 .—42-year-old man who was hypoxic on room air; patient was paraplegic from spinal cord injury due to high-speed motorcycle crash. CT scan shows bilateral central pulmonary embolism (*long thick arrows*), subsegmental emboli (*long thin arrow*), and right lower lobe superior segment pulmonary infarct (*short arrows*). Note "tram-track" sign in inferior segmental artery of lingula (*arrowheads*)



FIGURE 18. 67-year-old woman with glioblastoma multiforme and right-sided chest pain. Sagittal CT reformation image shows subsegmental pulmonary emboli (*long arrows*) and large wedge-shaped pulmonary infarct posteriorly (*short arrows*).

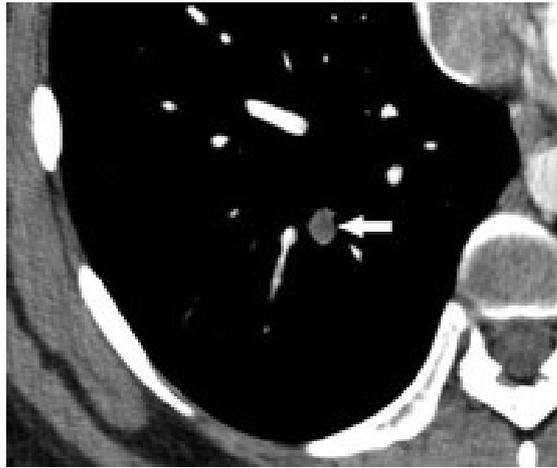


Figure 19. Acute occlusive pulmonary embolism in a 32-year-old woman who presented with chest pain. CT scan shows a pulmonary embolus within the posterobasal segment of the right lower lobe artery (arrow). The artery is enlarged compared with adjacent patent vessels.

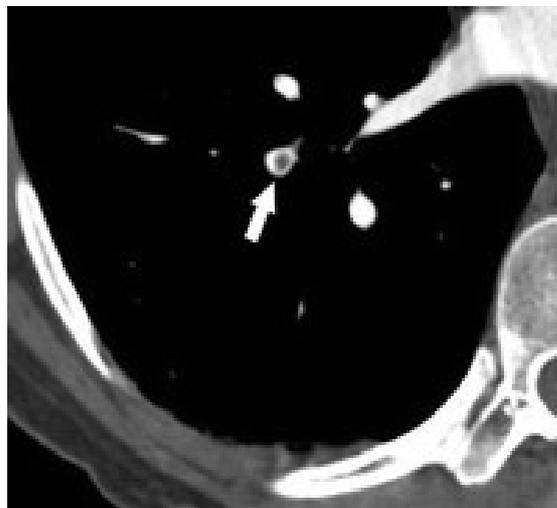
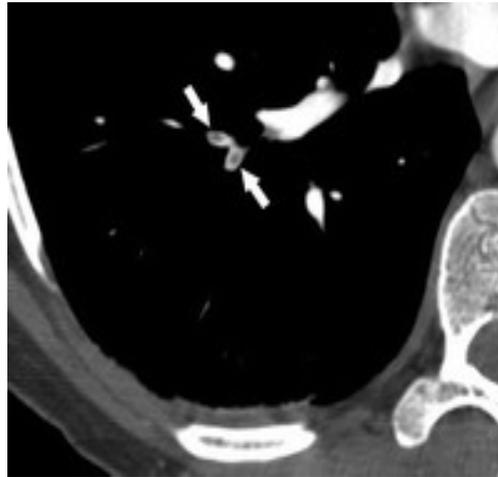


Figure 20a. Acute pulmonary embolism in a 45-year-old woman who presented with chest pain. (a) CT scan shows a pulmonary embolus that affects the segmental artery of the laterobasal segment of the right lower lobe. This partial filling defect surrounded by contrast material produces the polo mint sign (arrow). (b) CT scan shows acute emboli that affect subsegmental arteries of the laterobasal segment (arrows).

Figure 20b. Acute pulmonary embolism in a 45-year-old woman who presented with chest pain. (a) CT scan shows a filling defect in the laterobasal segment of the right lower lobe. This partial filling defect surrounded by contrast material produces the polo mint sign (arrow). (b) CT scan shows acute subsegmental emboli that affect the laterobasal segment (arrows).



pulmonary embolism woman who presented CT scan shows a filling defect in the laterobasal lower lobe. This partial filling defect surrounded by contrast material produces the polo mint sign (arrow). (b) CT scan shows acute subsegmental emboli that affect the laterobasal segment (arrows).



Figure 21. Acute pulmonary embolism in a 66-year-old man who presented with chest pain and dyspnea. CT scan shows an acute pulmonary embolus that causes a partial filling defect surrounded by contrast material (railway track sign) (arrow). Another acute pulmonary embolus affects the left main pulmonary artery

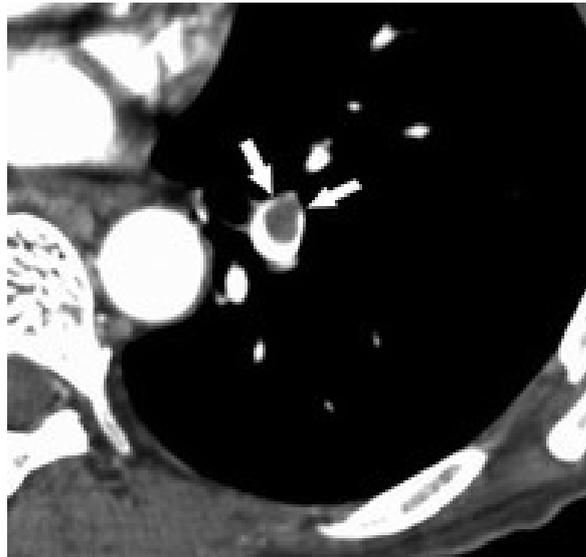


Figure 22. Acute pulmonary embolism in a 58-year-old woman who presented with chest pain and dyspnea. CT scan demonstrates a pulmonary embolus that results in

an eccentrically positioned partial filling defect, which is surrounded by contrast material and forms acute angles with the arterial wall (arrows).



Figure 23. Acute pulmonary embolism in a 58-year-old woman who presented with chest pain and dyspnea. CT scan shows an acute pulmonary embolus with ancillary findings of a peripheral wedge-shaped area of hyperattenuation in the lung (arrow), a finding that may represent an infarct, as well as a linear band (arrowhead).

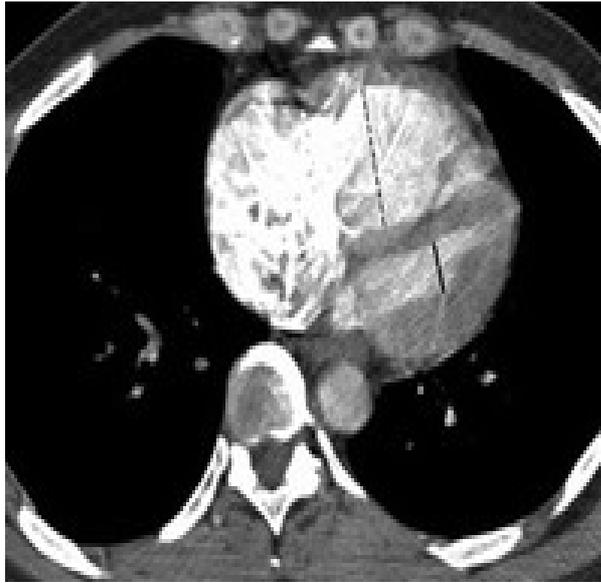


Figure 24. Acute pulmonary embolism in a 42-year-old man who presented with chest pain and severe dyspnea. CT scan reveals that the short axis of the right ventricle (dashed line) is wider than that of the left ventricle (solid line), a situation .that was caused by acute pulmonary embolism and created right ventricular strain

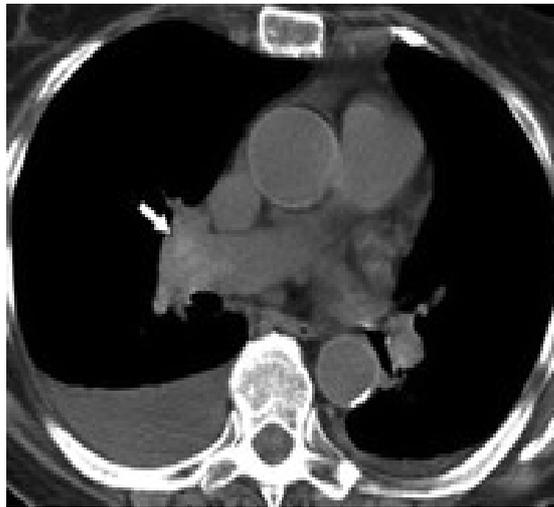


Figure 25a. Acute central pulmonary embolism in an asymptomatic 87-year-old woman. (a) Unenhanced CT scan demonstrates subtle regions of hyperattenuation (arrow). (b) Confirmatory CT pulmonary angiogram demonstrates acute pulmonary embolism within the right main and left interlobar pulmonary arteries.

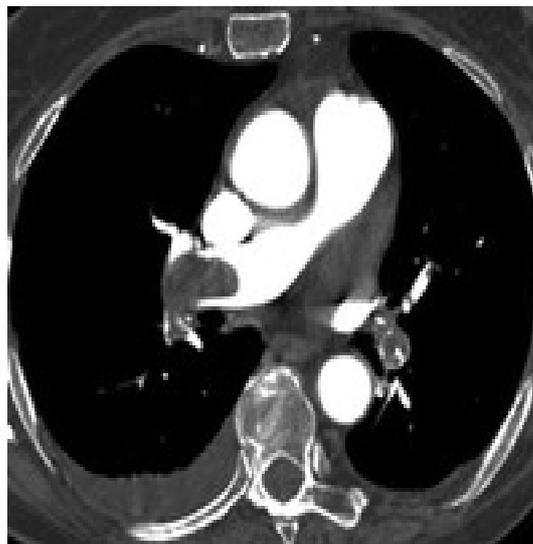


Figure 25b. Acute central pulmonary embolism in an asymptomatic 87-year-old woman. (a) Unenhanced CT scan demonstrates subtle regions of hyperattenuation (arrow). (b) Confirmatory CT pulmonary angiogram demonstrates acute pulmonary embolism within the right main and left interlobar pulmonary arteries.



Figure 26. Chronic pulmonary embolism in a 27-year-old man with dyspnea. CT scan shows complete occlusion of vessels in the left lung (arrowheads) that are smaller than adjacent patent vessels. Note the collateral blood supply from a branch of the right hemidiaphragmatic artery (arrow).

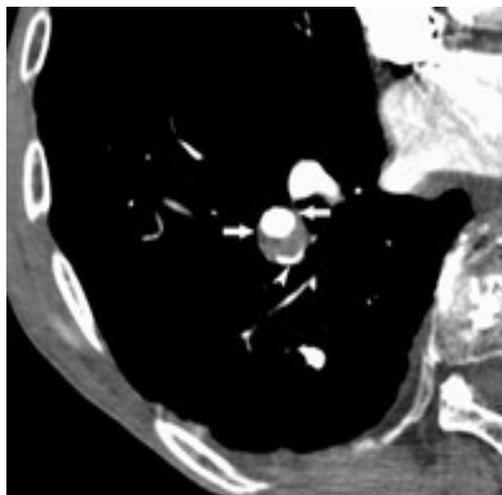


Figure 27. Chronic pulmonary embolism in a 62-year-old man with dyspnea. CT scan shows an eccentrically located thrombus that forms obtuse angles with the vessel wall (arrows). Note the dilated collateral bronchial artery (arrowhead).



Figure 28. Chronic pulmonary embolism in the same patient as in [Figure 26](#). CT scan reveals a small, recanalized pulmonary artery with contrast material in the central lumen (arrow).



Figure 29. Chronic pulmonary embolism in a 56-year-old man with dyspnea. CT scan shows a flap (arrow) within a small right interlobar pulmonary artery. Collateral bronchial artery dilatation is also noted (arrowhead).

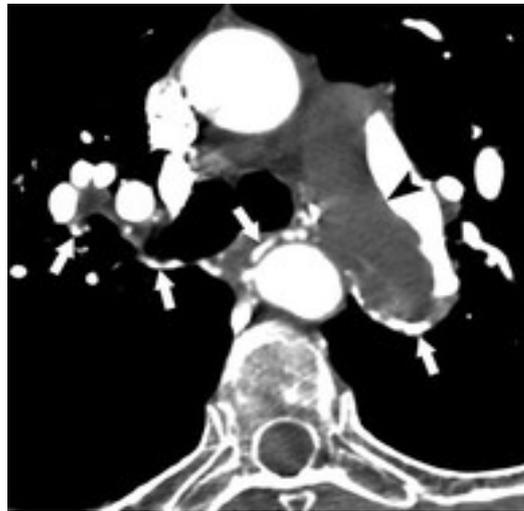


Figure 30. Chronic pulmonary embolism in the same patient as in [Figure 27](#). CT scan shows a large chronic pulmonary embolus in the main and left main pulmonary arteries (arrowhead). Arrows indicate collateral bronchial arteries.

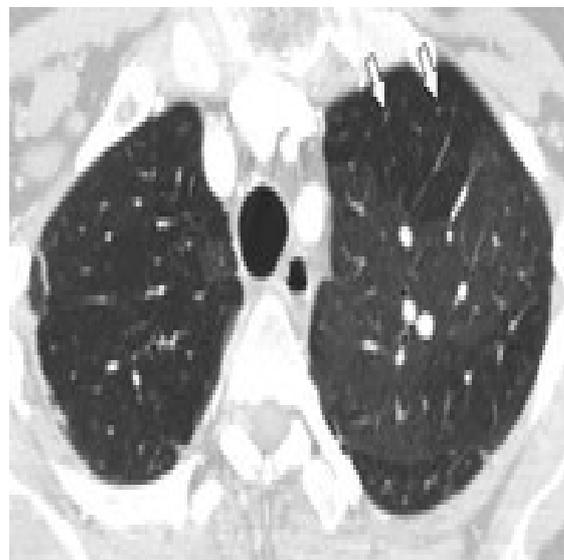


Figure 31. Chronic pulmonary embolism in a 60-year-old woman with dyspnea. CT scan demonstrates a mosaic perfusion pattern. The dark regions of underperfused lung are seen to contain vessels (arrows) that are smaller than the adjacent patent vessels in the normally perfused lung.



Figure 32. Pulmonary arterial hypertension secondary to chronic pulmonary embolism in the same patient as in [Figure 27](#). On a CT scan, the pulmonary artery .measures 41 mm in diameter (black line), a finding that indicates hypertension

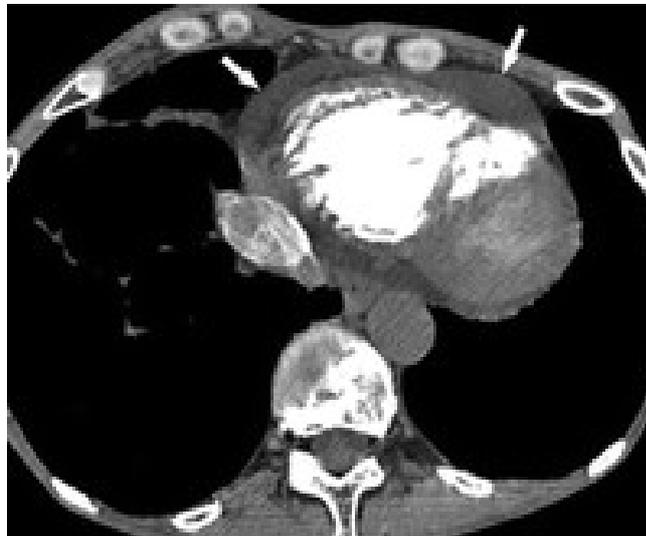


Figure 33. Chronic pulmonary embolism in the same patient as in [Figure 27](#). CT scan demonstrates pericardial fluid (arrows) associated with pulmonary arterial hypertension secondary to chronic pulmonary embolism.

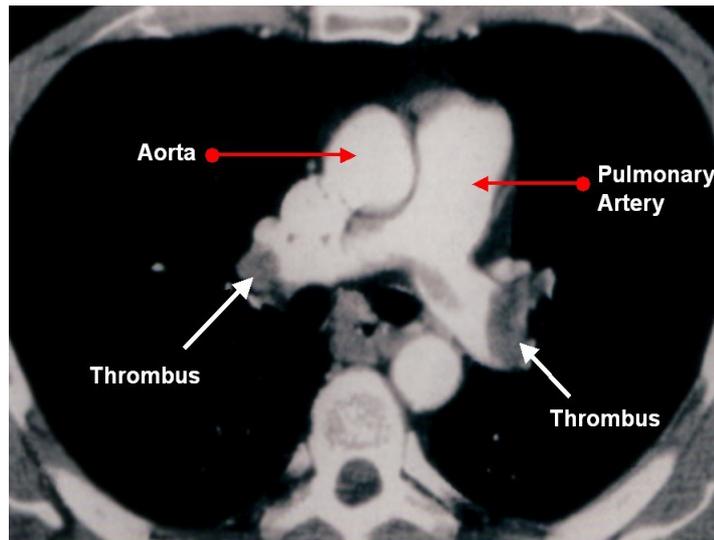


Figure 34 Bilateral Pulmonary Embolism

DATA COLLECTION WORK SHEET

PATIENT NO.	
PATIENT NAME	
SEX:	AGE:
CLINICAL SIGNS& SYMTOMS	

CTPA &DUS RESULT	
NEGATIVE	POSITIVE

TABLE1 SHOWING DATA COLLECTION WORK SHEET