

The Handbook of *Ultrasound*
in Trauma and
Critical Illness



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CHAPTER 4

PRACTICAL SCANNING

TERMINOLOGY

Ultrasound pictures are imaged on a gray scale. Areas where no echoes have returned are black, while the strongest echoes appear white. *Anechoic* refers to a structure without echoes. *Hypoechoic* refers to a structure with echoes of a weaker amplitude than the surrounding tissues. *Hyperechoic* refers to a structure with echoes of a stronger amplitude than the surrounding tissues. *Isoechoic* refers to a structure with echoes of similar amplitude to the surrounding tissues (Figure 30).

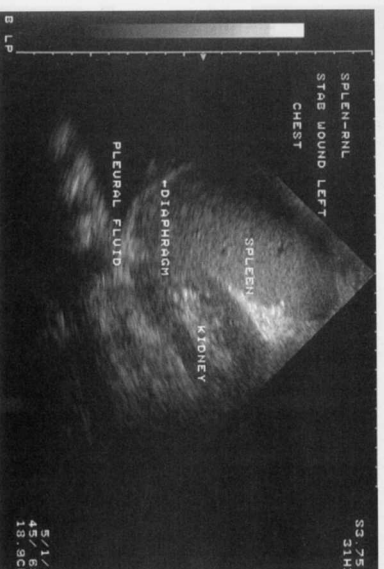
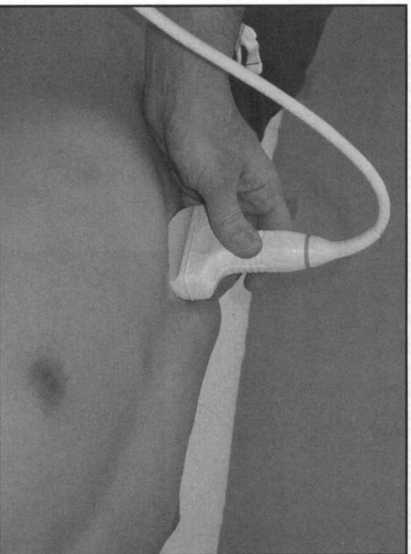


Figure 30. Pleural fluid is anechoic, the diaphragm is hyperechoic to splenic parenchyma, and the splenic and renal parenchyma are relatively isoechoic.

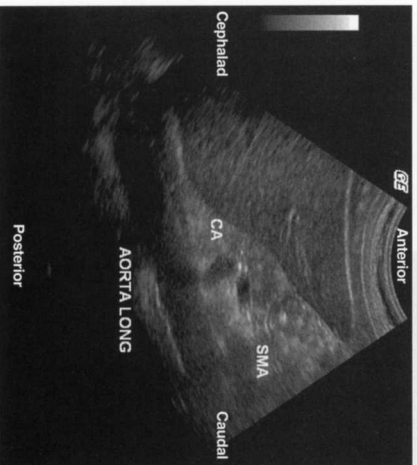
ORIENTATION

Sagittal scanning - The probe indicator is directed toward the head (Figure 31A). Even when oblique to the sagittal plane, but still scanning the organ in long-axis, the probe indicator should be closer to the patient's head. The resultant image on the screen will have the following orientation (Figure 31B):

- Left side of the screen – cephalad
- Top of screen – anterior
- Bottom of screen – posterior
- Right side of screen – caudal



Figures 31A. Position of the probe indicator for sagittal scan.



Figures 31B. Screen orientation with sagittal scanning.

Transverse scanning - The probe indicator is directed toward the patient's right. Even if you are oblique to the transverse plane but are still scanning the organ in short-axis, the probe indicator should be toward the patient's right (Figure 32A). The resultant image on the screen will have the following orientation (Figure 32B):

- Left side of the screen – patient's right
- Top of screen – anterior
- Bottom of screen – posterior
- Right side of screen – patient's left



Figure 32A. Position of the probe indicator for transverse scanning.

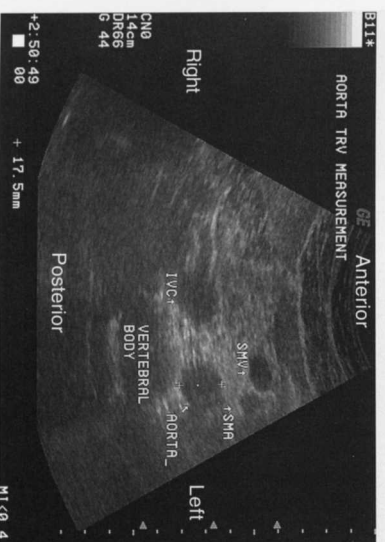


Figure 32B. Screen orientation with transverse scanning.

TECHNICAL SKILLS

The development of good hand control with the transducer is essential for successful scanning. Easy scans may be obtainable with poor technique but difficult scans will always be unobtainable unless good technique is utilized. Emphasize the development of good hand control with the transducer from the beginning.

Perform drills such as scanning the aorta in long and short-axis from the diaphragm to the bifurcation. Even in young healthy people there is some degree of ectasia, so gentle rocking and gliding will be needed.

When scanning a patient, always have a comfortable grasp of the transducer and maintain hand-contact with the patient. Holding the transducer too close to the cable will limit fine-motor control.

Avoid quick, gross movements of the transducer. Rather, start at one spot on the body and maximize visualization by gently rotating and angling the transducer. If the desired structure is not visualized, then gently slide the transducer to another spot and repeat the process (Figures 33A, 33B and 33C).



Figure 33A. Common scanning technique

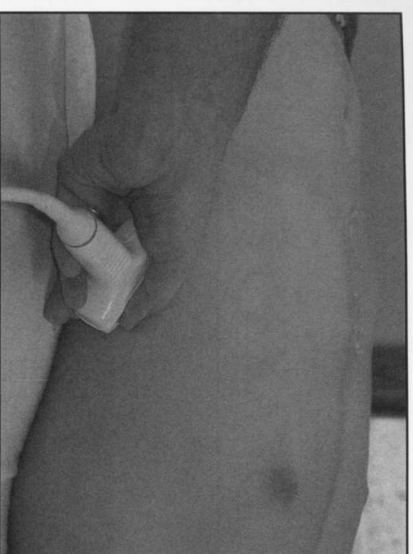


Figure 33B. Common scanning technique

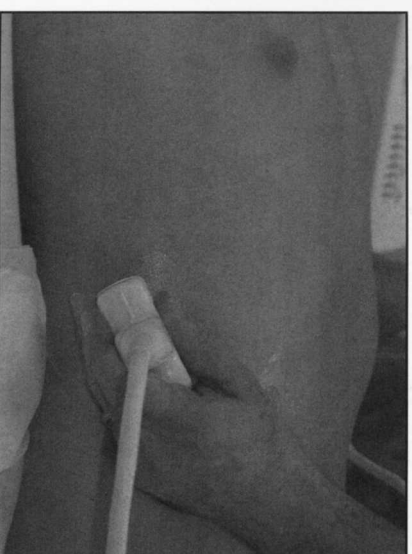


Figure 33C. Common scanning technique

