Ultrasound for Critical Care Physicians: 50 Ways to Line Your Liver

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A 54-year-old man with a past medical history significant for traumatic brain injury and aspiration pneumonia presented with hypoxic respiratory failure secondary to foreign body aspiration.

On presentation, the patient was found to be hypoxic and tachypneic, requiring endotracheal intubation and mechanical ventilation. Bronchoscopy was performed with removal of extensive food particles throughout both lungs. The patient subsequently developed sepsis secondary to aspiration pneumonia. He became hypotensive, requiring central venous catheter placement for vasopressor therapy. A right subclavian central line was attempted under ultrasound guidance. A bedside ultrasound was subsequently performed (Video 1).

Video 1. Sagittal view of the liver and heart at the level of the mid-abdomen and slightly right of mid-line.

What does the video obtained of a longitudinal view of the IVC at the level of the liver demonstrate?

1. Endocarditis
2. Guidewire in the hepatic vein
3. Hemopericardium
4. Pneumothorax

Correct!
2. Guidewire in the hepatic vein

The longitudinal view of the liver and IVC demonstrates the guidewire clearly visible within the hepatic vein (Figure 1).

Figure 1. Still image of video 1. The guidewire (white arrow) is seen within the Hepatic vein of the liver (L) .

Additionally, the careful observer will notice at the beginning of the video clip, the wire was being slightly withdrawn. This is not known to cause complications. However, this does reassure the individual placing the central line that the catheter will track toward the right atrium when advanced. As the video demonstrates, not all guidewires traveling thru the right atrium will track into the right ventricle, some will pass into the IVC.

Therefore, the absence of premature ventricular contractions during wire insertion does not preclude proper guidewire position during catheterization of the internal jugular or subclavian.

The central venous catheter was placed using ultrasound guidance. Images of the wire in the subclavian vein are presented below (Figures 2 and 3).

Figure 2. Transverse view of the subclavian vein with guidewire (arrow).

Figure 3. Longitudinal view of the subclavian vein with guidewire (arrow).

While technically more difficult than ultrasound-guided internal jugular catheterization, ultrasound guided subclavian catheterization has been shown in a large, randomized trial to reduce mechanical complications (1).

In conclusion, ultrasound guidance can be used to determine the location of the guidewire in central venous catheterization, in conventional locations, as well as others.

Reference

1. Fragou M, Gravvanis A, Dimitriou V, et al. Real-time ultrasound-guided subclavian vein cannulation versus the landmark method in critical care patients: a prospective randomized study. Crit Care Med. 2011;39(7):1607-12. [\[CrossRef\]](#) [\[PubMed\]](#)