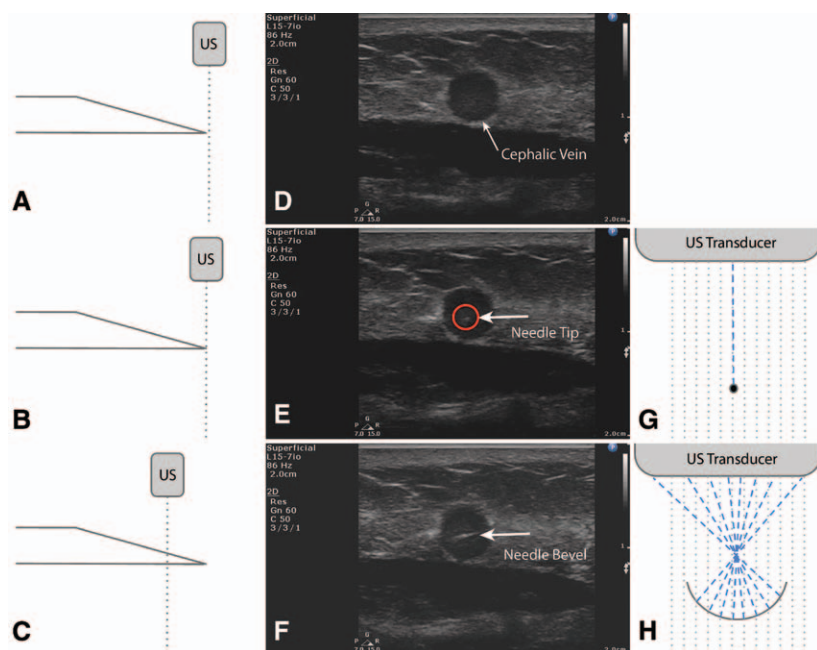


Ultrasound-guided Vascular Access

Visualizing the Tip of the Needle

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ULTRASOUND (US) devices are widely used to visualize the anatomy for peripheral venous, central venous, and arterial vascular access procedures.^{1–3} Optimizing the ultrasound image of the needle and its relation to the targeted vascular structure is critical to improve chances of success. It is important to identify the tip of the needle and distinguish it from the bevel. The images demonstrate cross-sectional or transverse ultrasound visualization of the needle tip (fig. E) and bevel (fig. F) located within the vein of a child (fig. D).

It is possible to differentiate the tip of the needle (white dot in red circle; fig. B and E) from the bevel or needle shaft (larger, irregular white structure; fig. C and F). When the ultrasound beam intersects the tip of the needle, only a small fraction of the beam reflects

back to the probe (fig. G). The tip of the needle can be identified as a small, mildly hyperechoic structure (fig. E).

In contrast, the bevel has a concave surface, and it reflects a larger portion of the ultrasound beam, resulting in scatter and increased ultrasound signal received by the transducer (fig. H).^{2,4} The bevel appears as a bright, irregular hyperechoic structure (fig. F). When the bevel or shaft is identified, scanning proximally in small increments will allow visualization of the actual needle tip (fig. E). Confirmation of tip visualization can be accomplished by scanning beyond the tip until it disappears (fig. A and D).² The ultrasound-guided needle tip visualization technique can be replicated in most accessible vascular structures.⁴

Competing Interests

The authors declare no competing interests.

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