

# Vascular Access Imaging Technique



## Imaging

### Peripheral Access

Ultrasound can greatly support successful peripheral cannulation in a patient with difficult IV access, for example in some patients with a history of IV drug use, renal patients or those undergoing chemotherapy.

### Choosing a vein to access

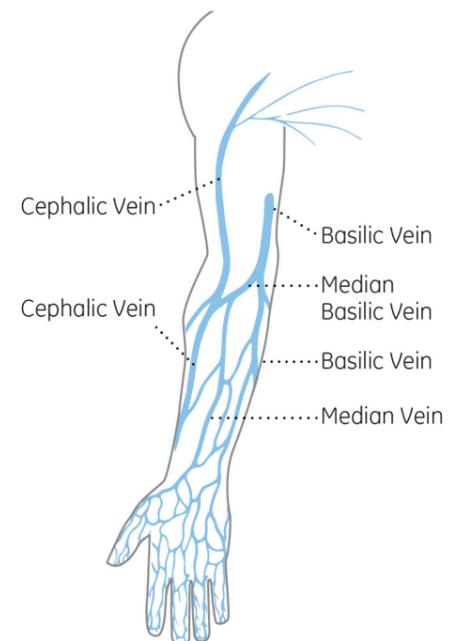
It is important to choose a good vessel in the first instance to access peripherally. With a tourniquet up and sufficient ultrasound gel, take your time with the patient to find a suitable vein. Veins are compressible and non-pulsatile compared to arteries. Choose a vein that is large, relatively straight and free from thrombus. Deeper veins (e.g. basilic) have usually not had prior attempts and are often a good place to start.

Remember, when choosing a deeper vein make sure you are using an extended length cannula so a sufficient length of tubing will still be fed into the vessel.

### Central Access

The same techniques apply when using ultrasound for central access.

The internal jugular and femoral veins may be preferred because of easy accessibility with the ultrasound.



## Sterile Technique

Sterile probe cover kits are available when a sterile field is necessary.

To use, first ensure you have donned the appropriate sterile barriers (for example mask, gown and gloves), and that you have prepared your equipment tray for the procedure. Putting the cover on the ultrasound is easier once the patient is fully prepped and draped. To place the sterile cover, first place the folded sleeve in your hand and open the end so it can receive the ultrasound probe.

An assistant will need to place the probe into the opening of the sleeve and you can then extend the sleeve over the transducer and the cord without contaminating yourself or your field. Use the rubber bands to secure the sleeve at the transducer as well as further along the cord.



Contents of most sterile probe kits

## Imaging Guidance Techniques

Short and long axis techniques can be used to gain vascular access.

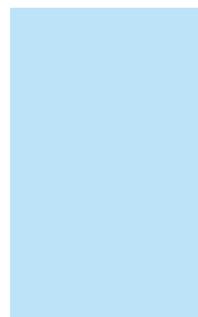
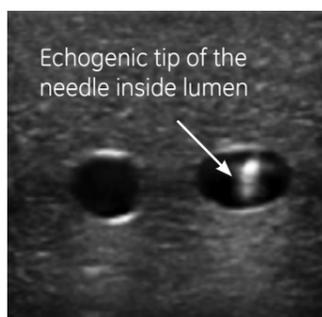
The longitudinal, or in plane approach, has the advantage of being able to visualise the length of the needle for the entire procedure; however, not all veins are amenable to this approach. The short axis, or out of plane approach, is probably employed the most frequently. You should be familiar with both techniques.

Note: Beam Steering & Needle Recognition Technology is available on many ultrasound systems.

This technology helps to improve the visualization of the needle during procedures. It uses two different types of ultrasound: one for tissue and one for metal. This makes the needle stand out and allows separate control of its appearance.



Sterile cover applied to probe



### Short Axis (Out of Plane) Approach

- Position the vein in the center of your screen in the transverse orientation
- Aim to enter the skin the same distance behind the probe as the center of the vein is deep
- Ensure your needle is centered exactly in the middle of the probe
- At a 45° angle, slowly advance your needle
- Gently rock the needle back and forth to give you an impression of whether you are on the correct line – remember in the short axis the needle will only be visible when it crosses the visualizing beam and even then it is only seen as a point
- Feel for the give of the needle on entering a vein and watch for flashback as usual
- Once vein is entered, flatten the needle angle and advance slightly further before feeding off cannula into vein
- If a guide wire is placed, use the ultrasound to confirm correct location

### Long Axis (In Plane) Approach

- Position the vein in the center of your screen in the longitudinal orientation
- Be mindful to keep the transducer very steady so it doesn't roll off the vein – secure with your hand rested on the patient
- Ensure your needle is centered exactly in the middle of the probe but enter from the marker end longitudinally
- The needle will be seen entering the image from the top left corner. Where the needle is seen will always depend on the way you orient the probe to the anatomy
- You should be able to see the needle enter the vein as the flashback occurs
- Once vein is entered, flatten the needle angle and advance slightly further before feeding off cannula into vein

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References: 1. Noble VE, Nelson B and Sutingco AN. 'Manual of Emergency and Critical Care Ultrasound' 2007, Cambridge University Press, Melbourne