

# POCUS Club

## Vascular access

### Venous access

#### Probe selection

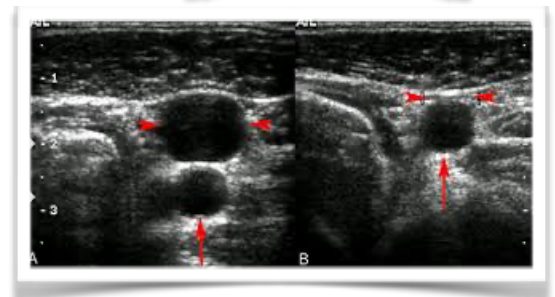
Linear (high-frequency) probe, optimal for superficial structures. Choose **appropriate depth** according to depth of vein and **vascular preset** for best resolution.



#### Vein vs. artery

Vein is **thin-walled**, easily **compressible** and **non-pulsatile**.

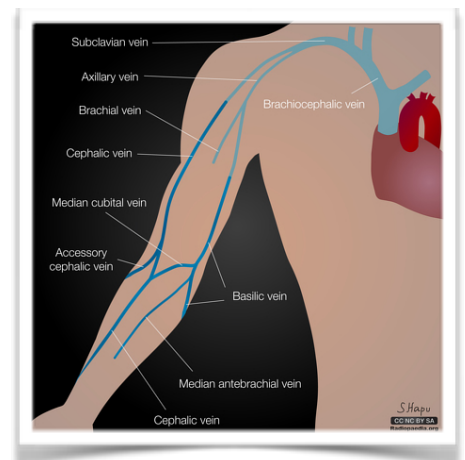
Can also use Colour Flow/PWD to differentiate.



#### Where to look?

**Antecubital fossa or medial upper arm** usually the best (basilic vein often missed by IVDUs).

|                              |   |
|------------------------------|---|
| <b>SCANNING FOR VEINS...</b> | <ol style="list-style-type: none"><li>1. ANTECUBITAL FOSSA</li><li>2. MEDIAL UPPER ARM (BASILIC)</li><li>3. FOREARM</li><li>4. NECK (EJV)</li></ol> |
|------------------------------|---|



#### Key equipment

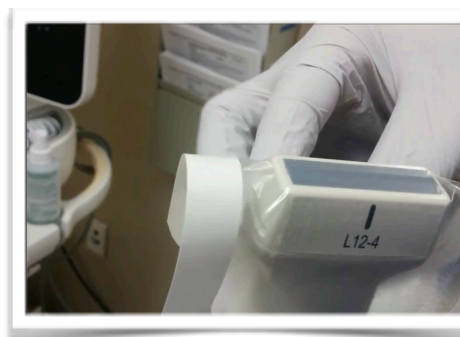
**Tegaderm or cannula dressing** (but remove straight after use to avoid damage to probe from sticky residue), alternatively probe cover or sterile glove cuff!



**IV cannula** - size appropriate to size/depth of vein, 18G (green) or larger generally for proximal veins (larger cannula better visualised with US).

**Sterile gel** (Optilube is sterile!)

Rest of IV equipment - Chlorprep, flush, extensions, etc.



## Technique - "Tracking the Tip" and "Two-axis"

**Step 1.** Identify vein in cross-section and centre on the screen. Check vein is in the **correct axis** to the probe (some lie obliquely!). Rotate probe accordingly and scan up and down vein so that it stays in the centre of screen.

**Step 2.** Insert needle through skin proximal to US probe (out-of-plane) and identify needle tip. **Track the needle tip** by advancing the probe followed by needle till needle tip seen, and repeat until vessel puncture. Ensure needle tip is always visualised - this will prevent puncture through back wall of vein.

**Step 3.** Once needle tip is seen within the lumen of vein, **reduce needle angle and advance slightly** before threading over catheter. Alternatively, **rotate probe 90 degrees** to visualise needle and vein in longitudinal plane (in-plane), check needle bevel is completely within vein so the cannula threads (**two-axis technique**).

### Same principle for central venous access (IJV or femoral)

### Common pitfalls

- Vein **too deep** (>1cm) - standard IV cannulas more likely to fail, consider long lines in this case.
- Failure to track needle tip - leads to puncturing back wall and blowing the vein.
- Needle bevel only partially in vein - cannula unable to thread as a result, flatten angle and advance a bit further or use two-axis technique.

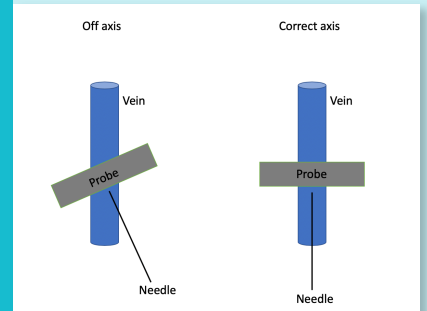
## Consider US-guided arterial line/ABG!

Consider US as first line, particularly useful in shocked/larger patient. Be kind - use lidocaine!

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### AXIS

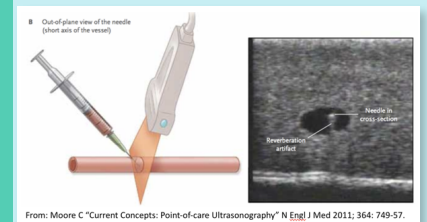
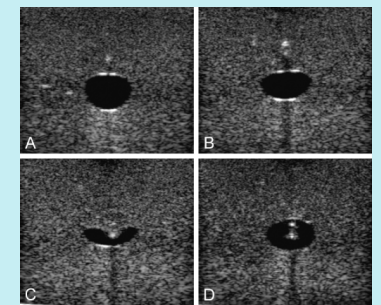
Scan up and down the vein to check axis



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### TIP

Identify and track needle tip

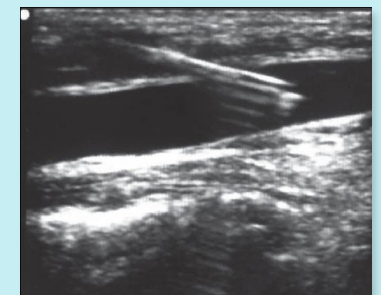
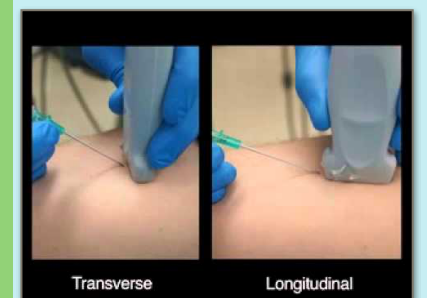


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### ANGLE

Adjust needle angle before threading cannula.

**Consider 2-axis technique**



### RESOURCES

5 Min Sono: <http://blog.5minsono.com/2-axis/> <http://blog.5minsono.com/diva2/>  
 SAEM: <https://www.saem.org/cdem/education/online-education/m3-curriculum/bedside-ultrasonography/venous-access>  
 EMCurious: <http://www.emcurious.com/blog-1/2014/12/14/ultrasound-leadership-academy-peripheral-iv-placement>