American College of Physicians - Internal Medicine Meeting 2025
New Orleans, LA

Ultrasound-Guided Peripheral IV Placement

Faculty Information

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Ultrasound Guided Peripheral IV Placement

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Disclosures

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Learning Objectives

- Discuss ultrasound guided peripheral IV placement indications
- Review supplies needed for ultrasound guided peripheral IV placement
- Describe vein characteristics and artifacts
- Identify appropriate veins and catheters for IV placement
- Place peripheral IVs using in-plane and out-of-plane techniques

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Indications

Peripheral IV Placement
Emergency care
Blood product transfusion
Intravenous drug administration
Intravenous hydration

- Use of ultrasound in patients predicted to have difficult intravenous access can increase first attempt success by 50%*

*Tada M et al. Cochrane Database Syst Rev, 2019

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Contraindications

Peripheral IV Placement
Infection, burns, phlebitis
Infiltration
AV fistula in the extremity
Predicted IV duration of >6 days

- Use of ultrasound in patients predicted to have easy intravenous access can decrease first attempt success by 11%*

*Tada M et al. Cochrane Database Syst Rev, 2019

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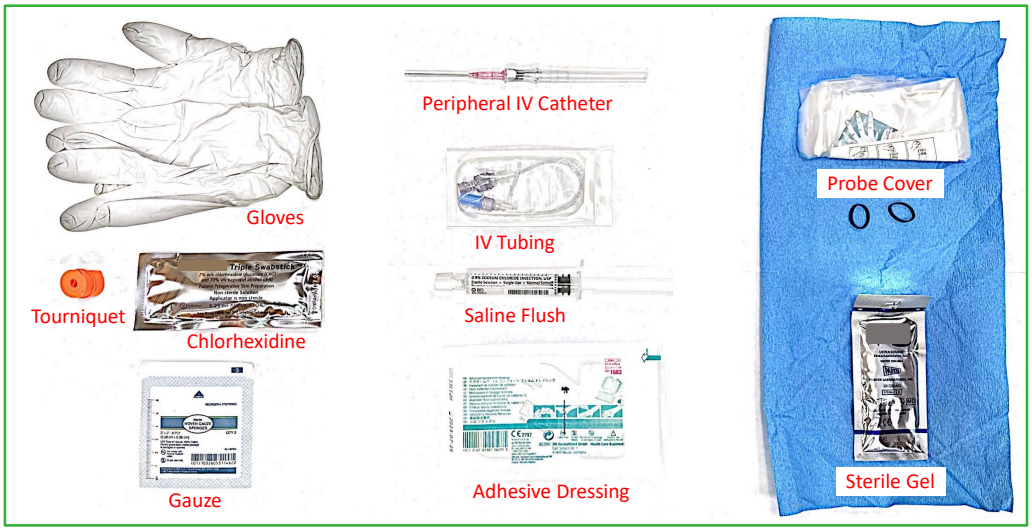
Supplies Needed for Ultrasound Guided PIV Placement



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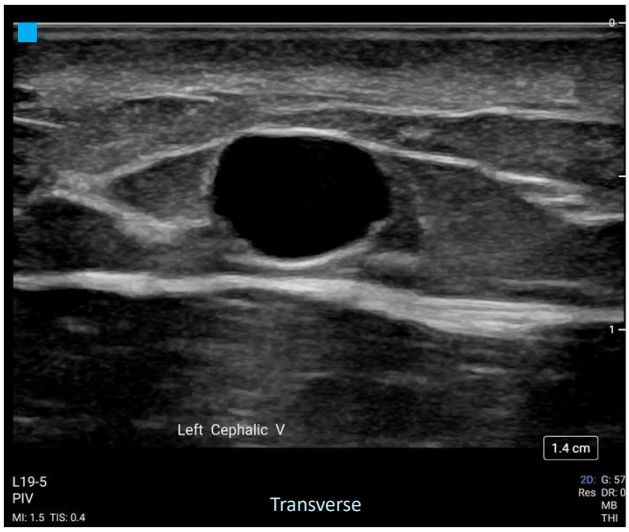
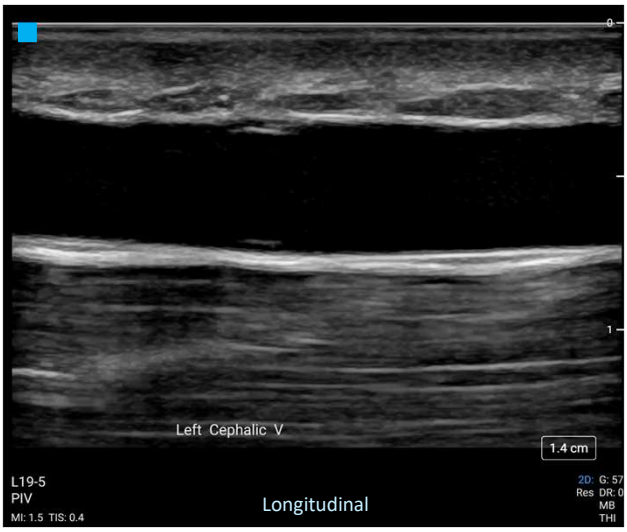
Peripheral Vein Ultrasound Characteristics

Venous Anatomy and Ultrasound Characteristics





Venous Anatomy and Ultrasound Characteristics

- Slide the probe to map out the vein
- Assess for adequate vein length
- Avoid branching vessels

Netter Atlas of Human Anatomy 8th ed. Elsevier; 2022.

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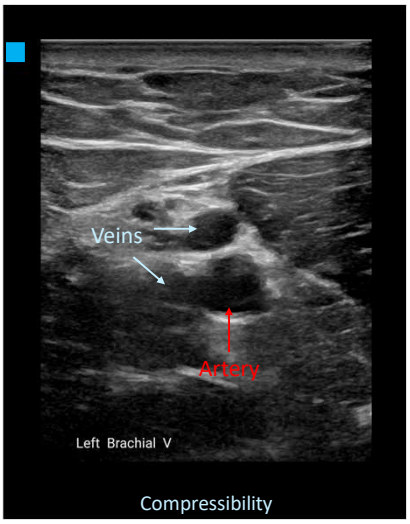
Venous Anatomy and Ultrasound Characteristics



Compressibility

Reverberation Artifact

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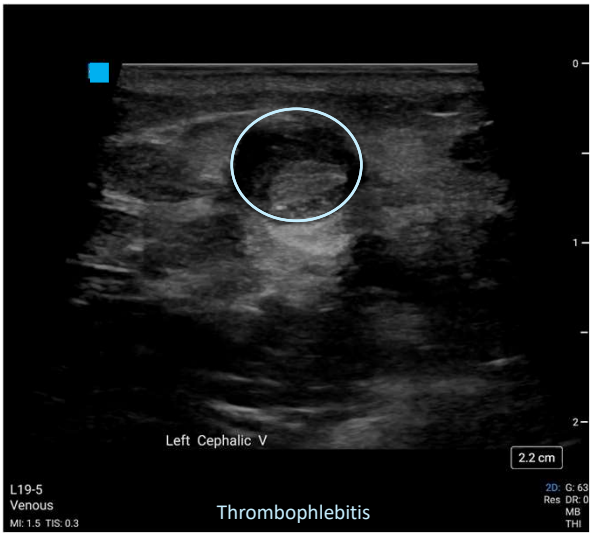
Venous Anatomy and Ultrasound Characteristics



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Peripheral IV Insertion Site and Catheter Selection

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Site and Catheter Selection

- *Moderate depth*
  - **0.3-1.5 cm** from skin surface
  - Shallower = difficult with US
  - Deeper = high failure rate, less sustainable
- *Big enough*

  Diameter ≥ 0.3 cm

  Smaller = high failure rate

  Ideal catheter to vein ratio < 0.4
- *Practical/Useable*

  Basilic, median cubital, cephalic, deep brachial*

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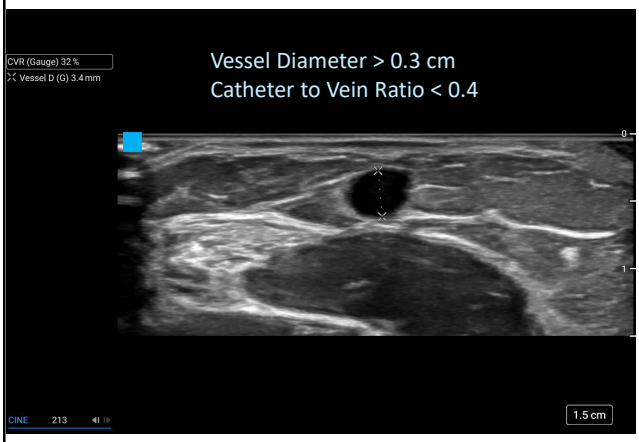
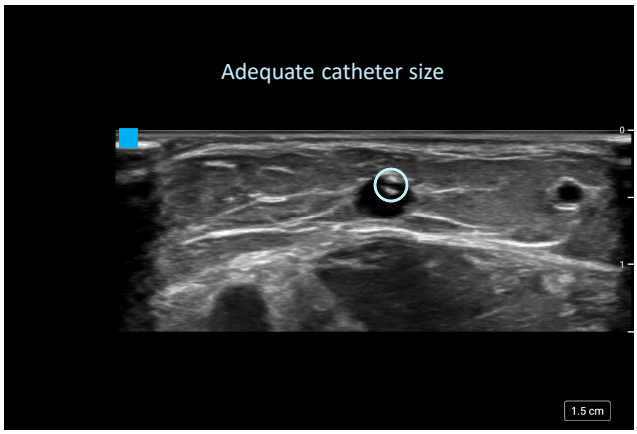
Site and Catheter Selection





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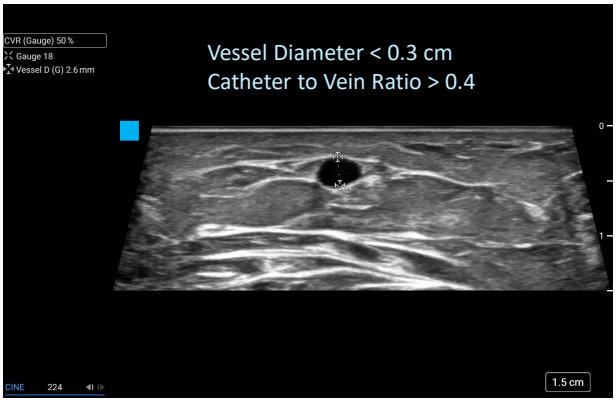
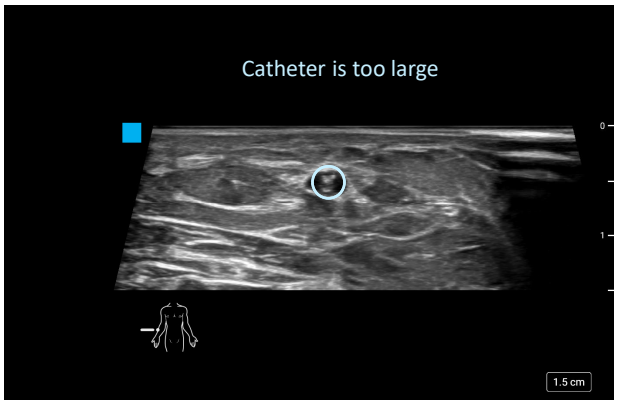
Site and Catheter Selection





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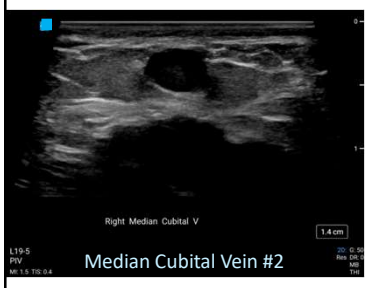
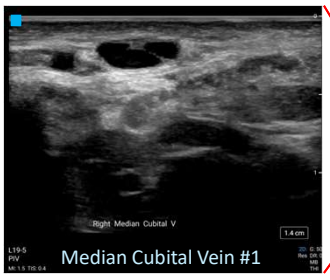
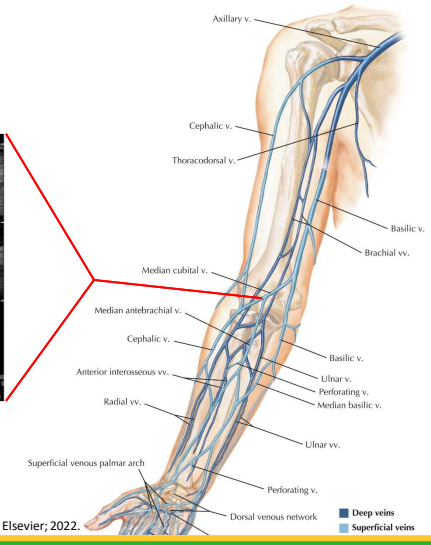
Site and Catheter Selection







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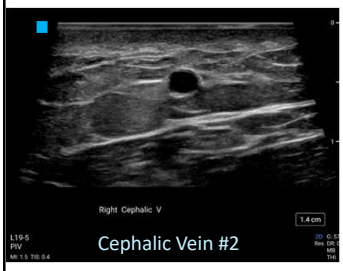
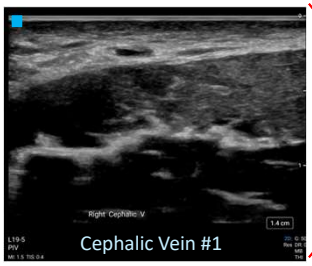
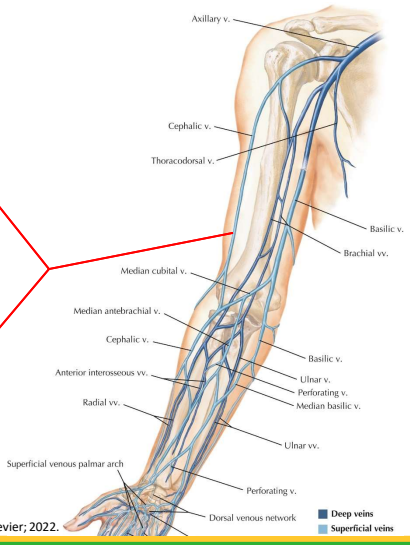
Site and Catheter Selection







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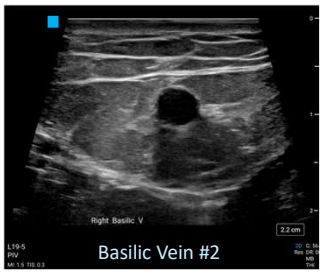
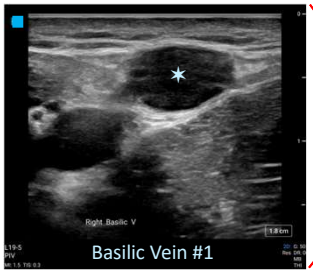
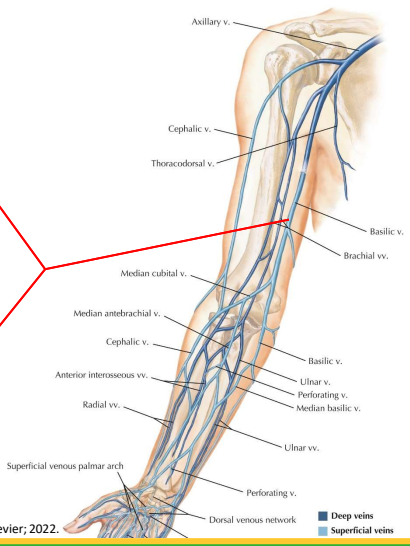
Site and Catheter Selection







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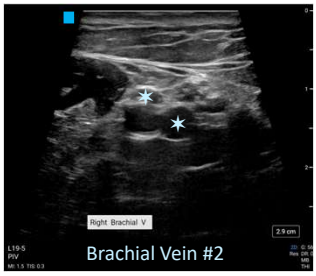
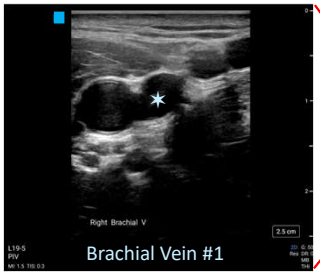
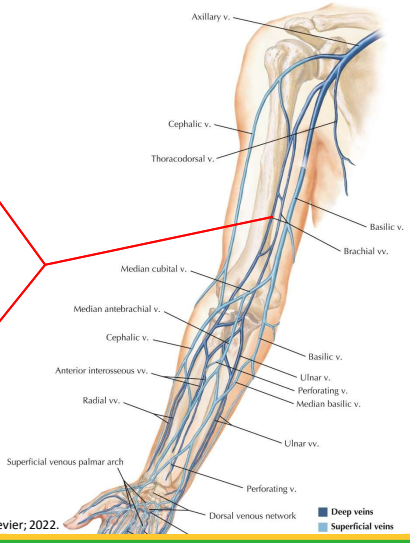
Site and Catheter Selection







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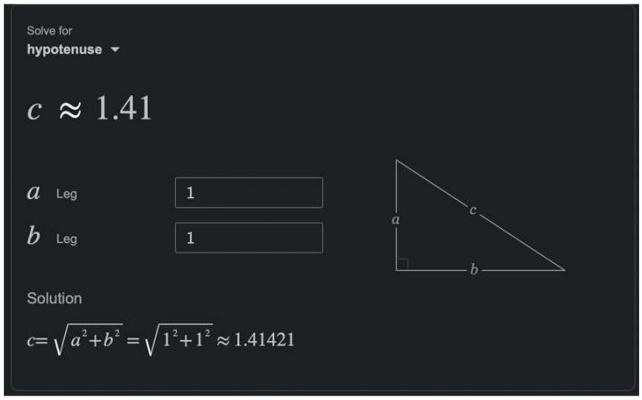
Site and Catheter Selection

- Identify by color (18-20G preferred)
- Use longest catheter available (with extra 1 cm+ to keep in lumen)



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Ultrasound Guided Peripheral IV Placement Technique

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Ultrasound Guided Peripheral IV Placement: Steps

1. Review contraindications
2. Gather supplies
3. Apply tourniquet
4. Prepare skin with chlorhexidine or other antiseptic solution
5. Utilize probe cover, sterile gel during the procedure
6. Place peripheral IV
7. Apply sterile dressing and secure the peripheral IV

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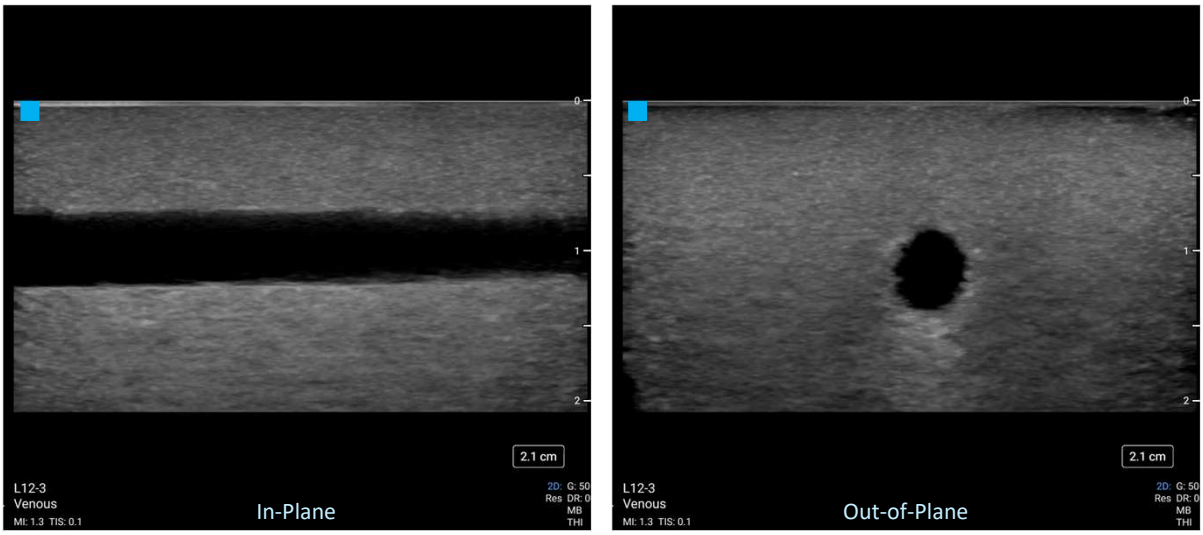
Ultrasound Guided Peripheral IV Placement: Technique



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Take Home Points

- Scan to identify appropriate IV placement site
- Compress or place color flow to differentiate veins from arteries
- Target veins that are at least 0.3 cm in diameter and 0.3 cm to 1.5 cm from the skin
- Longer length IV catheters are preferred (1.75 in or 1.88 in)
- Once the needle enters the vein, lower the angle and advance 1 to 2 mm prior to advancing the catheter

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Please break into groups of 3 for the practical session

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