

**American College of Physicians - Internal Medicine Meeting 2024
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Ultrasound-Guided Peripheral IV Placement

Director:

Woo J. Moon, DO, FACP

Shane Kinard, MD, FACP

Damien Ricklis, MD, FACP

Ian Ross, MD, FACP

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Ultrasound Guided Peripheral IV Placement

Shane R Kinard MD. *Pennsylvania State University*

Woo J Moon DO. *Mercy Hospital St. Louis & Saint Louis University School of Medicine*

Damien L Ricklis MD. *University of Kansas*

Ian R Ross MD. *Washington University in St. Louis*



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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

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

Contraindications

Peripheral IV Placement

Infection, burns, phlebitis

Infiltration

AV fistula in the extremity

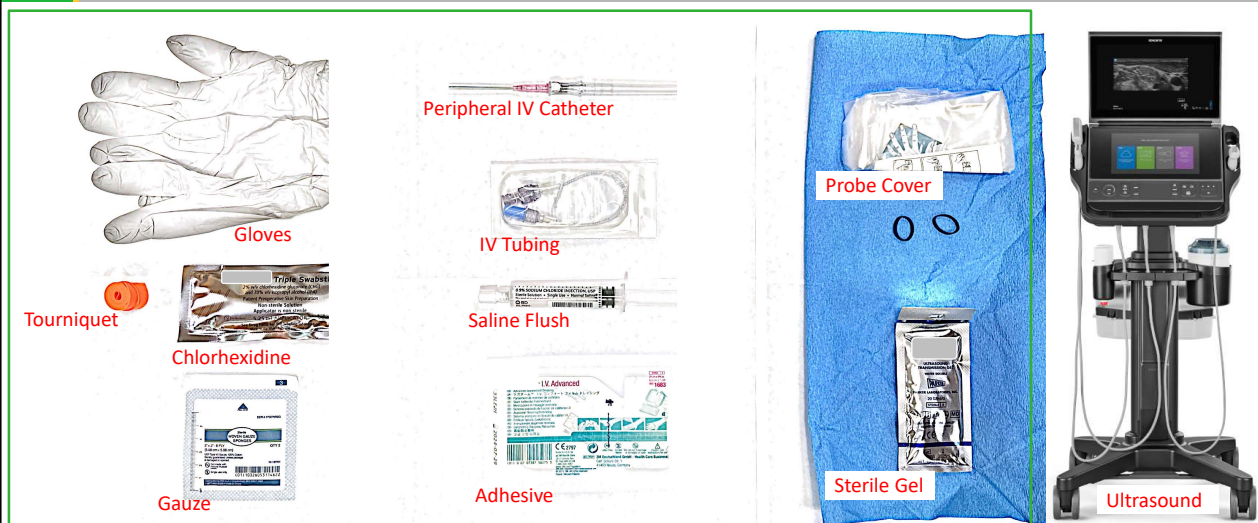
Mastectomy, lymph node dissection

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

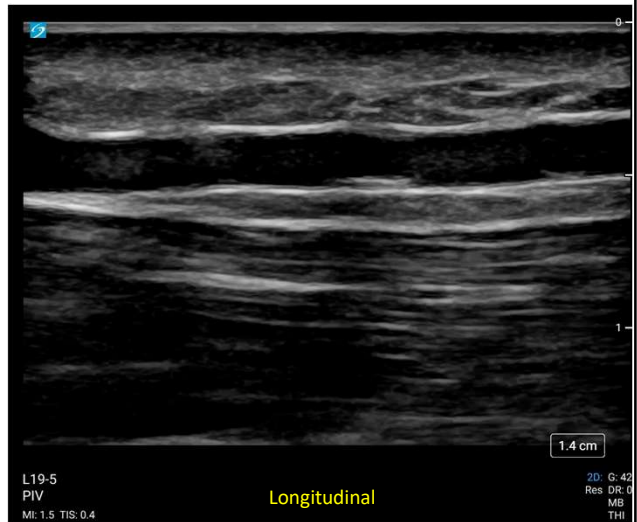
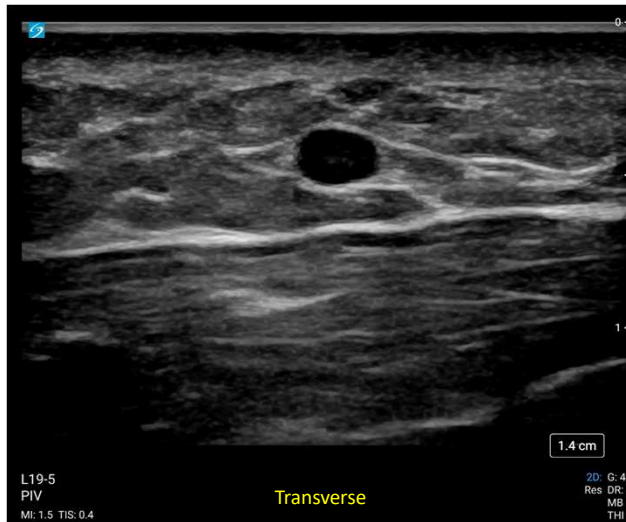
Supplies Needed for Ultrasound Guided PIV Placement



Peripheral Vein Ultrasound Characteristics

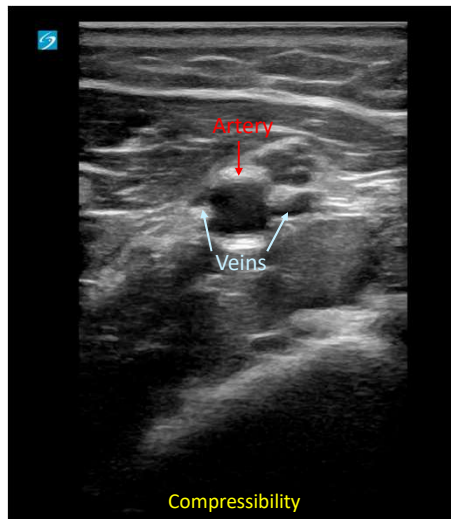
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Ultrasound Characteristics



8

Ultrasound Characteristics

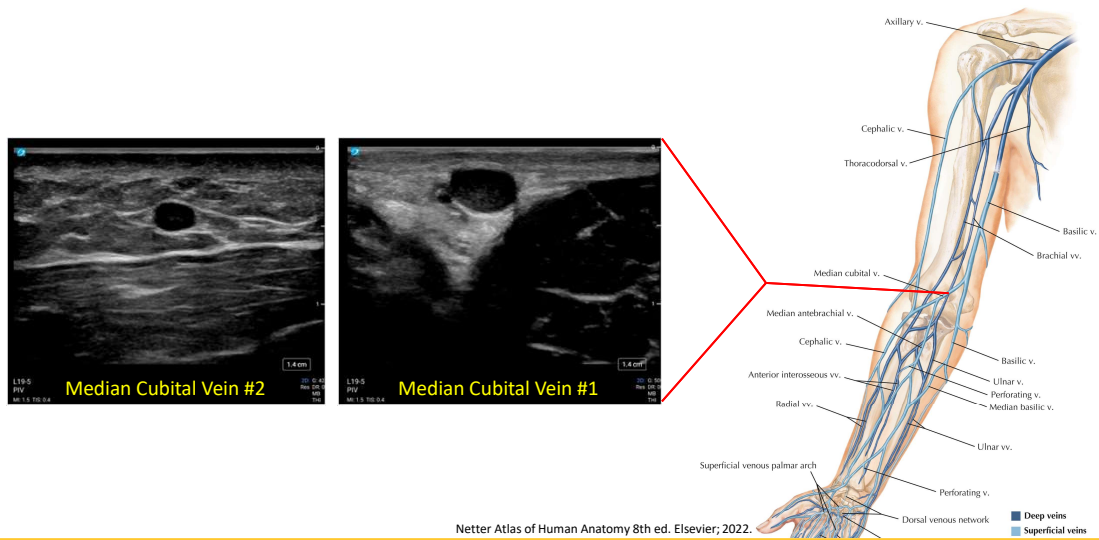


Peripheral IV Insertion Site and Catheter Selection

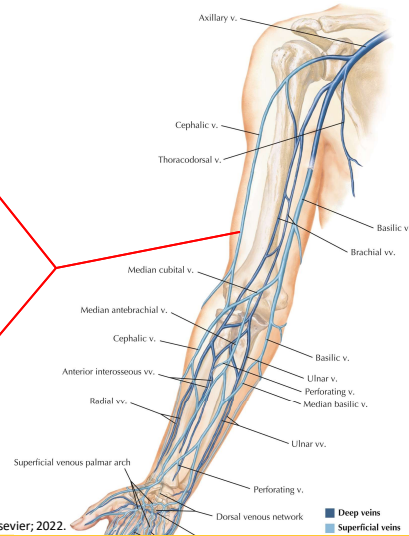
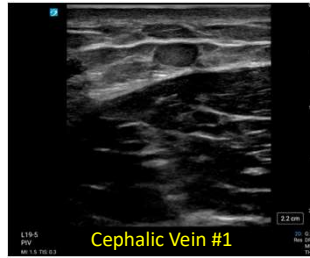
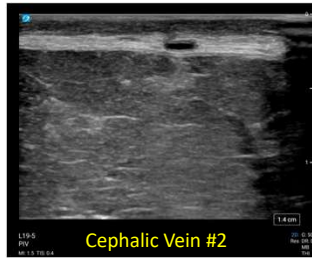
Site and Catheter Selection

- *Moderate depth*
 - **0.3-1.5 cm** from skin surface
 - Shallower = difficult with US
 - Deeper = high failure rate, less sustainable
- *Big enough*
 - **Diameter ≥ 0.5 cm**
 - Smaller = high failure rate
- *Practical/Useable*
 - Basilic, median cubital, cephalic, deep brachial*

Site and Catheter Selection



Site and Catheter Selection



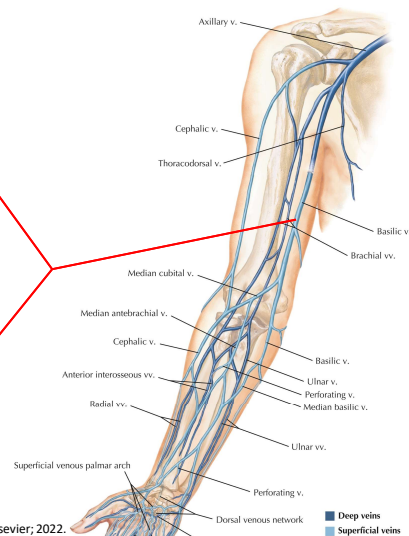
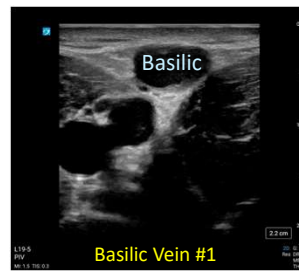
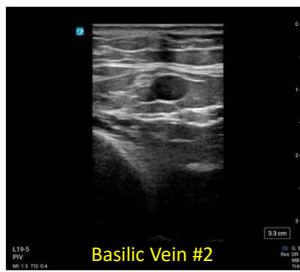
Netter Atlas of Human Anatomy 8th ed. Elsevier, 2022.

■ Deep veins
 ■ Superficial veins



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Site and Catheter Selection



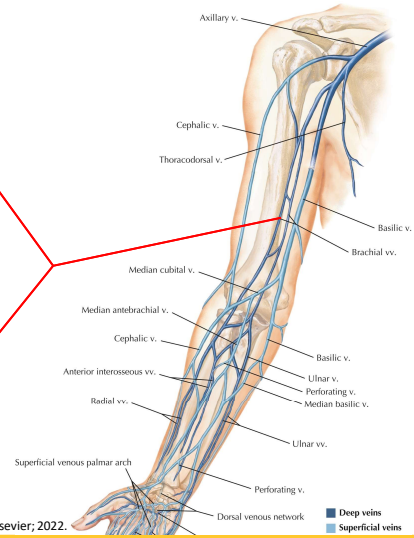
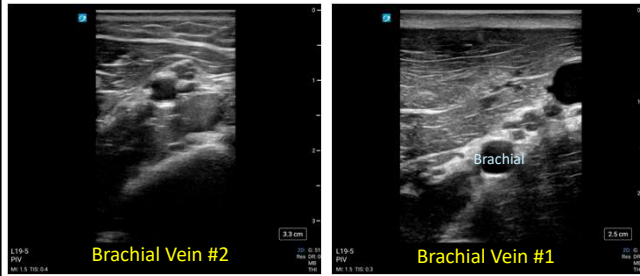
Netter Atlas of Human Anatomy 8th ed. Elsevier, 2022.

■ Deep veins
 ■ Superficial veins



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Site and Catheter Selection



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

Site and Catheter Selection

- Slide the probe to map out the vein
- Assess for adequate vein length
- Optional: Mark the vein trajectory prior to placing the IV



Site and Catheter Selection

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



<https://b2b.sharedomaha.com/item/1911-382287?catlist=10088;parent=7>

Solve for
hypotenuse ▾

$$c \approx 1.41$$

a Leg

b Leg

Solution

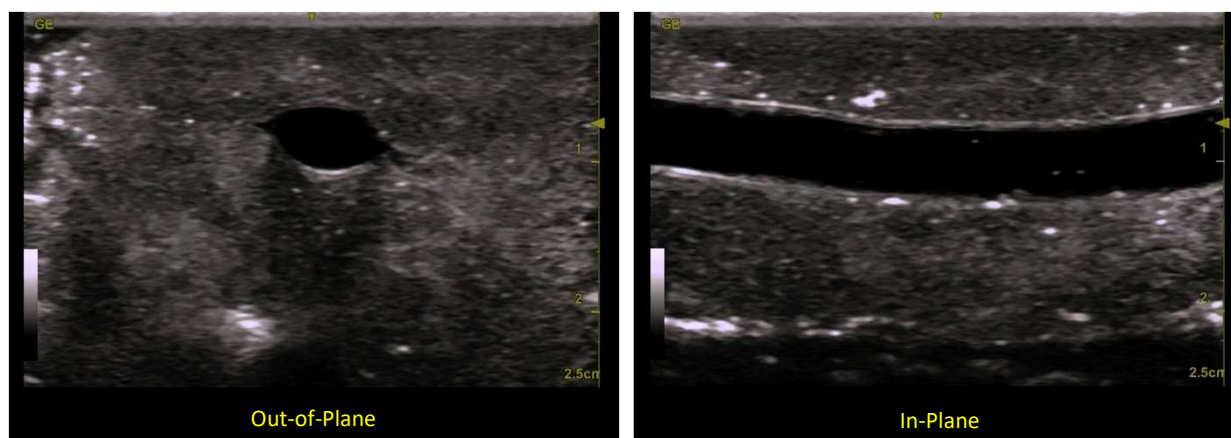
$$c = \sqrt{a^2 + b^2} = \sqrt{1^2 + 1^2} \approx 1.41421$$

Ultrasound Guided Peripheral IV Placement Technique

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

Ultrasound Guided Peripheral IV Placement: Technique



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 0.5 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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