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Ultrasound-Guided Peripheral IV Placement

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Ultrasound Guided Peripheral IV Placement

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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

<table>
<thead>
<tr>
<th>Peripheral IV Placement</th>
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<tbody>
<tr>
<td>Infection, burns, phlebitis</td>
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<tr>
<td>Infiltration</td>
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<tr>
<td>AV fistula in the extremity</td>
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<tr>
<td>Mastectomy, lymph node dissection</td>
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<tr>
<td>Predicted IV duration of &gt;6 days</td>
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</tbody>
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- 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

- Gloves
- Tourniquet
- Chlorhexidine
- Gauze
- Peripheral IV Catheter
- IV Tubing
- Saline Flush
- Adhesive
- Probe Cover
- Sterile Gel
- Ultrasound
Peripheral Vein Ultrasound Characteristics

Ultrasound Characteristics

Transverse

Longitudinal
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*

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**Site and Catheter Selection**

[Image of ultrasound scans labeled Median Cubital Vein #1 and #2]

Site and Catheter Selection

Cephalic Vein #1
Cephalic Vein #2

Basilic Vein #1
Basilic Vein #2

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)

14G
16G
18G
20G
22G
24G

https://b2b.sharedomaha.com/item/1911-382287?catlist=1008&parent=7

Ultrasound Guided Peripheral IV Placement Technique

Solution for hypotenuse:

\[ c \approx 1.41 \]

\[ a \quad \text{Leg} \quad 1 \]

\[ b \quad \text{Leg} \quad 1 \]

Solution:

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

Out-of-Plane

In-Plane
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

References

10. AIUM Official Statement: Guidelines for Cleaning and Preparing External- and Internal-Use Ultrasound Transducers and Equipment Between Patients as Well as Safe Handling and Use of Ultrasound Coupling Gel. J Ultrasound Med 2023;
Please break into groups of 3 for the practical session