A Retrospective Look at Ultrasound Guided Peripheral IV Insertion in the Pediatric Population

Kacey Wiseman BSN, RN, CPN, VA-BC
John Pilcher BSN, RN, VA-BC, CRNI
Learning Objectives

Summarize current literature on Ultrasound Guided PIV’s

Identify potential benefits and drawbacks of Ultrasound Guided PIV’s.

Evaluate the potential for Ultrasound Guided PIV’s in your institution.
Financial Disclosures

Disclosure of Relevant Financial Relationships

We have the following financial relationships to disclose:

John Pilcher
• No Disclosures
• Employee of: Boston Children’s Hospital, Brigham and Women’s Hospital

Kacey Wiseman
• No Disclosures
• Employee of: Boston Children’s Hospital

Disclosure of Off Label and/or Investigative Uses

We will not discuss off label use and/or investigate uses in this presentation.
A little bit about us…

John
- Case Manager in many aspects of social services
- Attended nursing school at John’s Hopkins University
- 11 years of nursing experience
- Specialized in Vascular Access in Adults and Children for past 6 years

Kacey
- RN on a Surgical/Trauma/Burn Unit for 6 years
- Began travel nursing
- Specialized in Vascular Access in Pediatrics for past 3 years
Why Ultrasound (AGAIN...)?
Skill Level & Training

**Literature**
- RN’s, Residents, Anesthesia
  - Mostly Novice
- **Short Didactic and Practice**
  - Blue Phantom

**Boston Children’s Hospital**
- Novice to Expert RN’s
- **Computer Didactic**
  - PICC Excellence
    - Computer based modules

**Hands on Practice**
- Blue Phantom

**1:1 Instruction**
- Successfully place 3 PIV’s in all age groups
  - with Preceptor

**Step 1 and 2**

**Step 1**

**Step 2**

**Step 3**
Definition of success – each article defines success in a different way.

Mixed results, indications from literature.

Vessel preservation – planning for future PIV placement.
### SUCCESS RATES & INSERTION ATTEMPTS

**Literature**

<table>
<thead>
<tr>
<th>Success Rate</th>
<th>Avg. Attempts</th>
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<tbody>
<tr>
<td>80%</td>
<td>68%</td>
</tr>
<tr>
<td>60 – 100%</td>
<td>53 - 85%</td>
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<tr>
<td>1-4 Attempts</td>
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**Boston Children’s Hospital**

<table>
<thead>
<tr>
<th>Success Rate</th>
<th>Avg. Attempts</th>
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<tbody>
<tr>
<td>87%</td>
<td>76%</td>
</tr>
<tr>
<td>2018</td>
<td>21% 2 Attempts</td>
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<tr>
<td>1.28 Attempts</td>
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Technique & Catheter Size

**Literature**
- Dynamic Needle Tip Positioning vs. Static
  - One person self guided
  - Two person self guided
  - Two Person peer guided
- Short Axis vs. Long Axis
- Variety of catheter sizes and lengths

**Boston Children’s Hospital**
- One person self guided DNTP
- Short Axis
- Hold and Positioning
- Skin Marker
- 1.25” 24g and 1.75” 22g
Holding Techniques

- Prop up Extremity Distal & Proximal Traction!
Dwell Times
A Multi-Factorial Statistic...

Literature Vs. Boston Children’s Hospital

- BCH: 4 Days
- LITERATURE: 2 Days
Dwell Times Per Unit

- **ED**
  - 1 Day: 19hrs, 26min

- **ICU**
  - 3 Days: 19hrs, 16min
  - 6 Days: 8hrs, 36min

- **General Inpatient**
  - 2 Days: 5hrs, 57min
  - 3 Days: 4hrs, 2min
A Closer Look…

Dwell Times for USG PIVs

- > 24 Hrs: 69
- 1 Day: 57
- 2 Days: 47
- 3 Days: 40
- 4 Days: 29
- 5 Days: 31
- 6 Days: 20
- 7 Days: 9
- 8 Days: 9
- 9 Days: 9
- 10 Days: 8
- 11 Days: 6
- 12 Days: 4
- 13 Days: 4
- 14 Days: 3
- 15 Days: 1
- 16 Days: 2
- 17 Days: 2
- 18 Days: 3
- 19 Days: 1
- 22 Days: 1
- 43 Days: 1
Clinical Indication to D/C PIV

- Insufficient Documentation: 36%
- Other Complications: 22%
- Functioning PIV D/C: 42%
Technological “Wow Factor”

Satisfaction and Perception

Studies and anecdotal experience at Boston Children’s hospital show overall increased satisfaction when using Ultrasound Guidance to place PIV’s from patients, families and multidisciplinary team.
Complications and Drawbacks

**Literature**
- Arterial Puncture
- Failure rate 25% 1st 48 hours
- Infiltration, Leaking, Phlebitis

**Boston Children’s Hospital**
- Potential complication
- Infiltration, Phlebitis, Leaking, Unable to flush
- Non-Compressible Vessels
- Decrease central line placement - Service or Disservice?
Here’s why ultrasound...

- Decrease Central Lines
- Line holidays
- Lab Drawing PIVs
- Emergent Access
- Otherwise unobtainable patients
Continued Data Collection

Does a blood draw coinciding PIV placement affect dwell time?

Do catheter gauge and length influence overall survival time of PIV?

Will concurrent central access with a PIV alter the total time a PIV functions without complication?
Thank you


