Peripheral Venous Access

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Objectives

- Identify important components of the **NEW** Peripheral Venous Access Clinical Pathway
- Summarize P-L-E-A-S-E
- Discuss behavioral interventions and age specific considerations
- Outline the topical anesthetics available and how they are best used
- Describe the DIVA score and how it is useful
- Demonstrate use of the Peripheral Venous Access Clinical Pathway
What is a Clinical Pathway?

Evidence-based guideline that decreases unnecessary variation and helps promote safe, effective, and consistent patient care.
Why is this Pathway Necessary?

- Venous access is most common source of pain for patients in the hospital
- Currently there is inconsistent analgesic use for peripheral venous access
- Current nursing protocol is interpreted differently by different staff members
- There is often inaccurate or absence of documentation for venous access procedures
- To provide a guideline for a standard approach to venous access procedures
- To improve the patient and family experience
Objectives of Pathway

- Standardize and increase use of topical anesthetics for venous access procedures
- Reduce number of venous access attempts
- Identify patients with difficult venous access
- Standardize and increase use of child life /behavioral support techniques for venous access procedures
- Improve documentation of venous access procedures
What is Peripheral Venous Access?

- Accessing vein to obtain blood work and/or infuse medications, hydration fluids, nutrition, blood products
  - Peripheral IV placement
  - Venipuncture
- Most common procedures performed on children in hospital

Pediatric patients rate pain from needle sticks as the “worst pain” they experience in hospital
Prior to our interventions, 10% of patients on Medical Surgical Floors were receiving topical anesthetics prior to PIV placement.
Change is possible!

University of Minnesota implemented a hospital-based, system wide initiative, Children’s Comfort Promise

• They implemented a new standard of care for needle procedures that includes:
  o topical anesthetics
  o sucrose or breastfeeding for infants 0-12 months
  o comfort positioning (including swaddling, skin to skin, tucking for infants, sitting upright for children)
  o age appropriate distractions

• After implementing this protocol, overall pain prevalence significantly reduced at their institution

University of Minnesota’s Children’s Comfort Promise

NOTE: By implementing the comfort bundle, the percentage of time topical anesthetics, sucrose/breastfeeding, comfort positioning, and distraction were used increased from baselines as low as 0% to 75-100% of the time in most locations in the hospital.

This is the Venous Access – Emergency Room Care Clinical Pathway.

We will be reviewing each component in the following slides.
This is the Venous Access – Inpatient Care Clinical Pathway.

The two pathways - Emergency Department Care and Inpatient Care - are similar in many ways. We will point out a few key differences while going through them.
**Inclusion Criteria:****
Provider determines patient requires peripheral venous access for PIV placement or venipuncture; ≥ 37 weeks GA; patient clinically stable

**Patient location: ED**

**Exclusion Criteria:** Unstable patient; < 37 weeks GA; documented allergy to topical anesthetic agents; emergent procedures; patient sedated; parental refusal

**Patient location:** Inpatient, Ambulatory clinics, Perioperative, PICU, Sedation, Radiology (CT/MRI)

(please refer to Venous Access Pathway)

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**The Emergency Room care pathway is intended for patients physically in the ED**

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**Inclusion Criteria:****
Provider determines patient requires peripheral venous access for PIV placement or venipuncture; ≥ 37 weeks GA; patient clinically stable

**Patient location: ED**

**Exclusion Criteria:** Unstable patient; < 37 weeks GA; documented allergy to topical anesthetic agents; emergent procedures; patient sedated; parental refusal

**Patient location:** NICU, ED (refer to ED Venous Access Pathway)

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**The Inpatient Care pathway is intended for patients located on inpatient floors, ambulatory clinics, perioperative areas, PICU, sedations suite, and Radiology.**
Patient safety comes first! Both pathways are intended for Clinically Stable patients.

Exclusion criteria includes:
- Patients who are unstable or for whom labs, medications, and/or fluids are emergent.
- Infant less than 37 week GA
- Sedated patients
- Parent or patient refusal
- Allergy to topical anesthetic agents
Nursing will document the procedure within EPIC including number of attempts and DIVA score
P: Place

Treatment Room
- Private, calm, soundproof
- Keeps bedroom safe place
- Isolation patients can go to the treatment room (ensure room is appropriately cleaned after use)
- Treatment room monitor can be used (not central monitoring)
- Call bell in room for emergency
- Limit # of people present
L: Local Anesthesia

Why do we need this?
• To reduce unnecessary pain and suffering from procedure
• Pain experiences early in life can have long term physiological, psychological and behavioral effects
• To improve procedural success rate and decrease procedure time

LMX  Pain Ease  Sucrose
# L: Local Anesthesia

<table>
<thead>
<tr>
<th>Who?</th>
<th>LMX</th>
<th>Pain Ease</th>
<th>Sucrose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children ≥ 37 weeks GA</td>
<td>Age ≥3yo</td>
<td>Developmentally able to understand cooling sensation to skin</td>
<td>Infants &lt; 6 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When?</th>
<th>LMX</th>
<th>Pain Ease</th>
<th>Sucrose</th>
</tr>
</thead>
<tbody>
<tr>
<td>• First line when clinically able to wait 30 minutes</td>
<td>• Not enough time to use LMX (&lt; 30 minutes)</td>
<td>• Any painful procedure</td>
<td>• In combination with a topical analgesic</td>
</tr>
<tr>
<td>• Preference for LMX Over Pain Ease (LMX more effective than Pain Ease)</td>
<td>• Not as effective as topical LMX</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>How?</th>
<th>LMX</th>
<th>Pain Ease</th>
<th>Sucrose</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Requires an order</td>
<td>• Requires an order</td>
<td>• Requires an order</td>
<td></td>
</tr>
<tr>
<td>• &lt;4 years: 1 g applied to site</td>
<td>• Spray treatment area continuously for 4 to 10 seconds from a distance of 8 to 18 cm (3 to 7 inches) until skin just turns white. Do not frost skin/area. Avoid spraying of target area beyond this state. With skin taut, quickly introduce needle. Reapply as needed</td>
<td>• Administer 2ml of 25% solution by syringe into the infant’s mouth (1ml each cheek) or allow infant to suck solution from a nipple (pacifier) for no more than 2 minutes before start of painful procedure</td>
<td></td>
</tr>
<tr>
<td>• 4 to 17 years: 1 to 2.5 g applied to site</td>
<td></td>
<td>• May be given for &gt;1 procedure within a relatively short period of time, but it may not be effective if administered more than twice in 1h</td>
<td></td>
</tr>
<tr>
<td>• Note: For peripheral IV cannulation, some have recommended application to 6.25 cm² of skin</td>
<td>• Concerns with use</td>
<td>• More effective when given in combination with a pacifier; nonnutritive suck also contributes to calming infant and decreasing pain-elicited distress</td>
<td></td>
</tr>
<tr>
<td>• 1 tube contains net 5g</td>
<td>• Requires appropriate technique</td>
<td>• Hypersensitivity to lidocaine or any component of formulation</td>
<td></td>
</tr>
<tr>
<td>• Should not exceed 3-4 topical doses per day</td>
<td>• Expensive</td>
<td>• Hypersensitivity to another local anesthetic of amide type</td>
<td></td>
</tr>
<tr>
<td>• Can be in two different places at the same time</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Contraindications</th>
<th>LMX</th>
<th>Pain Ease</th>
<th>Sucrose</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hypersensitivity to lidocaine or any component of formulation</td>
<td>• Hypersensitivity to pentfluoropropane, tetrafluoroethane or any other component of formulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Hypersensitivity to another local anesthetic of amide type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Traumatized mucosa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bacterial infection at site of application</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>MYTH</td>
<td>CURRENT EVIDENCE</td>
<td></td>
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<tr>
<td>------</td>
<td>-----------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Myth #1**  
  • LMX causes systemic vasoconstriction |  
  • Compared to EMLA cream, LMX causes less skin blanching and vasoconstriction  
  • Data shows increased rates of cannulation on first attempt  
| **Myth #2**  
  • LMX can only be used for insect bites |  
  • LMX is used as a local anesthetic |
| **Myth #3**  
  • EMLA is on formulary at Connecticut Children’s |  
  • LMX is on formulary at Connecticut Children’s  
  • EMLA is NOT available |
| **Myth #4**  
  • LMX is not appropriate for infants or patient’s with difficult IV access |  
  • Shorter IV cannulation time and higher procedure success rate compared to placebo  
  • Less stress and trauma  
E: Education
S: Support

- Child life consult/support
  - Available during business hours (unit based)
  - In-house pager on weekends during business hours
- Age appropriate preparation for procedure
- Training for coping skills
- Comfortable environment
- Distraction
- Education for parents of how they can support their child
- Includes breastfeeding/skin to skin contact for infants
Say “PLEASE” for Procedure Planning:

- **Place**: treatment room, limit # of people present
- **Local Analgesia**: LMX preferred
- **Education**: See Appendix A – Child Life, Appendix B – Scripting
- **Analgesics or Sedatives**
- **Support**: Coping Skills via Breathing techniques, Comfort positioning, Diversion/Distraction (BCD); See Appendix A – Child Life, Appendix B – Scripting
- **Equipment**: Ultrasound or transilluminator, if available

Nurse to document procedure planning components in EPIC (should also include DIVA Score and total number of attempts)

Appendix A: is a document with developmentally appropriate education and support information sorted by age group.
Appendix B: is a document with some scripting ideas for nurses to help them talk to patients and families about IV placement

See next slides
### Peripheral Venous Access Pathway: Behavioral Recommendations

**Child Life/Developmental Considerations by Age Group:**

<table>
<thead>
<tr>
<th>Infant (0-12 months)</th>
<th>Toddler (12 months-3 years)</th>
<th>Pre-School (3-6 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental involvement and support</td>
<td>Parental involvement and support</td>
<td>Parental involvement and support</td>
</tr>
<tr>
<td>Comfort Positioning (swaddle)</td>
<td>Comfort Positioning (sitting on a parent’s lap, chest to chest, chest to back hug/hold)</td>
<td>Comfort Positioning (sitting on a parent’s lap, chest to chest, chest to back hug/hold)</td>
</tr>
<tr>
<td>Creating a calm soothing environment (music, dim lighting if possible)</td>
<td>Limit unnecessary caregivers/providers</td>
<td>Limit unnecessary caregivers/providers</td>
</tr>
<tr>
<td>If parents unavailable, consider child life as calming/supportive presence</td>
<td>Topical pain management</td>
<td>Offer choices</td>
</tr>
<tr>
<td>Consider Sucrose/topical pain management</td>
<td>Provide distraction (Page child life)</td>
<td>Topical pain management and/or buzzy</td>
</tr>
<tr>
<td>Best Techniques: Skin-to-skin contact, pacifier, singing, talking, rattles &amp; toys, stroking the baby’s head, patting &amp; positive touch</td>
<td>Best techniques: bubbles &amp; pinwheel, singing, counting, reading, visual block</td>
<td>Page child life: basic preparation, distraction/coping techniques</td>
</tr>
<tr>
<td>Distraction Items: interactive apps iPad/phone, music, videos, flap books, wands, toys/books that light up</td>
<td>Language-use familiar words and phrases</td>
<td>Best techniques: bubbles &amp; pinwheel, singing, counting, reading, visual block</td>
</tr>
<tr>
<td>Treatment Room Use</td>
<td>Treatment Room Use</td>
<td>Distraction Items: interactive apps iPad/phone, music, videos, flap books, wands, toys/books that light up</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School-Age (7-12 years)</th>
<th>Teen/Young Adults (13 years and older)</th>
<th>Other considerations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental involvement and support</td>
<td>Provide choices/participation</td>
<td>Consider developmental age vs. chronological age</td>
</tr>
<tr>
<td>Comfort positioning</td>
<td>Education/Preparation</td>
<td>Avoid use of “almost done”</td>
</tr>
<tr>
<td>Education/preparation</td>
<td>Page child life for anxious patients: preparation, distraction/coping</td>
<td>Avoid use of “it’s only” or “it’s just”</td>
</tr>
<tr>
<td>Provide choices to child (would they like to watch, look away, can they “help”)</td>
<td>Topical pain management and/or buzzy</td>
<td>Never says ALL DONE until you are actually all done/no need for any final steps</td>
</tr>
<tr>
<td>Topical pain management and/or buzzy</td>
<td>Best techniques: Breathing/blowing, talking about something else, Distraction Items: iPad/phone, music (with or without headphones), videos, relaxation/guided imagery</td>
<td>Timing</td>
</tr>
<tr>
<td>Page child life: preparation, distraction/coping</td>
<td>Distraction Items: iPad/phone, music (with or without headphones), videos, relaxation/guided imagery</td>
<td>Debrief/Process</td>
</tr>
<tr>
<td>Best techniques: Breathing/blowing, counting, talking about something else, joking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction Items: iPad/phone, music, videos, I-Spy book, relaxation/guided imagery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language/careful word choice- abstract thinkers</td>
<td></td>
<td></td>
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<tr>
<td>Treatment Room Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debrief</td>
<td></td>
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</tbody>
</table>
Appendix B

E: Education
S: Support

Topical Talk 101:
Are you tongue tied telling to patients and families about topical anesthetics? Here is some scripting to guide you.

FOR PATIENTS
(Based on developmental age/previous experience/knowledge of patient)

LMX:
- "The nurse will put a special cream on your arm/cheek that makes your skin numb."  
- "Do you know what ‘numbness’ means?" "So you won’t feel it so much" (use examples)
- Most kids tell me that it helps so the (injection/puncture) won’t hurt (LMX) much.
  (IMPORTANT: Do not promise no pain or no feeling of needle insertion)
- "Most kids say they still feel brushing/bubbling/pressure but the cream is a helper that makes it easier."
- "First, the nurse may need to find the right spot for your cream."
- "They may use the light orange band/ribbed/teal/purple band on your arm, feel with your fingertips to the area, then put small amount of cream on top of it."  
- The cream will stay on for 30 minutes or long as one --- (3-5 min TV show, or other "time" example they can understand)

PAIN EASE:
- "We can use a cold/hot/cold spray (BISOJiff for preschool/young school age) to help make your skin numb (so you won’t feel it as much)."
- "Most kids tell me that it helps so the (injection/puncture) won’t hurt (LMX) much."  
  (IMPORTANT: Do not promise no pain, no feeling of needle insertion)
- "Most kids say the cold is REALLY cold (like holding an ice cube/ice cube freezer for a long time), some kids say the cold is uncomfortable, but is easier than feeling prickly/poked/pinched.”
- "The nurse will check your skin first, spray it for 10 seconds (you can count together) or until your skin turns white and then do the IV/pulse/blood test right away."  

FOR PARENTS

LMX:
- "Cream that helps to numb the skin/area for IV, may not take all pain away, but is helpful."
- "Patient will still feel pressure/shutting."
- "Cream must stay on for 30 minutes to be most effective."  
- "We can provide preparation for support for all of the steps."

PAIN EASE:
- "COLD spray that can be used to numb the site/area for IV."
- "The spray itself is uncomfortably cold, but most children prefer this to feeling of needle insertion, (needs to be sprayed for up to 10 seconds—or until skin turns white to work)."
- "We can provide preparation for support for all of the steps."
Distraction is a great way to support children through IV placement

A Coping toolkit will be available in every treatment room.
Before Painful Procedures

Say:

E: Equipment

- Transilluminator and Ultrasound are available
- Some pediatric residents are being trained in placing PIVs using ultrasound-guidance
- You can ask residents for help if traditional methods are unsuccessful or for patients with difficult venous access
In both pathways nurses will evaluate the patient’s Difficult Venous Access (DIVA) Score. This will help guide the next steps taken.
The **Difficult Venous Access score** aka The DIVA score

What is it? and why do we use it?

- Easy clinical predictive rule
- Average failure rate of 25% on 1st attempt for IV access
- DIVA score 4 or greater = more than 50% likelihood of failed first attempt
- Allows staff to utilize appropriate resources
Nursing will document the procedure of PIV placement.

**COMPLETE!!!!**

**COMPLETE!!!!!!**

**COMPLETE!!!!**
Emergency Room and Inpatient pathways differ on how many attempts a unit based provider is allowed.

The pathways also differ in steps to take following unsuccessful attempts.
Considering alternatives:

- If unable to obtain venous access after initial unit based attempts, there should be a discussion between nurse and providers to consider alternative options.

Consider:
- Rehydration with NGT or G-tube
- Alternative blood draw (heel, finger, or arterial stick)
- Alternative route of medication administration
- Is there problematic incompatibility (ie. with IV medications, fluids, TPN)

Discuss options and establish action plan with medical team

- Consider whether:
  - Able to change medication route to PO, NGT, GT, IM
  - Able to rehydrate via NGT or GT
  - Able to obtain labs via heel/finger/arterial stick
  - There is problematic incompatibility (ie. with medications, IVF, TPN)

Contact primary Attending to discuss if unsure

No appropriate alternatives, venous access urgently needed?
In the ED, if IV access is determined to be urgently needed, unit based providers may try 2 more times.

If still unsuccessful there must be a discussion of next steps with the primary Attending.

- Discuss options and establish an action plan with medical team
  - Consider whether:
    - Able to change medication route to PO, NGT, GT, IM
    - Able to rehydrate via NGT or GT
    - Able to obtain labs via heel/finger/arterial stick
    - There is problematic incompatibility (i.e. with medications, IVF, TPN)
  - Contact primary Attending to discuss if unsure

- Skilled provider for a max 2 additional attempts

- Attempts unsuccessful and access urgently needed?
  - Discuss with primary Attending
  - Order must be placed for additional attempts
  - Consider Anesthesia consult (Attending to Attending discussion)
  - Consider CVL or PICC placement, if appropriate
Anesthesia Consults:

- Need an order for additional attempts
- **MUST** be discussed with primary attending
- **MUST** be an attending-to-attending discussion
- Last resort when all other options have failed to work

Discuss options and establish action plan with medical team:
- Consider whether:
  - Able to change medication route to PO, NGT, GT, IM
  - Able to rehydrate via NGT or GT
  - Able to obtain labs via heel/finger/arterial stick
  - There is problematic incompatibility (i.e., with medications, IVF, TPN)
- Contact primary Attending to discuss if unsure

No appropriate alternatives, venous access urgently needed?

Skilled provider for a max 2 additional attempts

Attempts unsuccessful and access urgently needed?

- Discuss with primary Attending
- Order must be placed for additional attempts
- Consider Anesthesia consult (Attending to Attending discussion)
- Consider CVL or PICC placement, if appropriate
Using the Inpatient Pathway, if IV access is determined to be urgently needed, nursing first contacts an alternative resource:

Recommend calling ONE of the alternative resources below for max additional 2 attempts. Consider in the following order:

1. Transport team
2. Periop (6AM - 11 PM)
3. Emergency Department
4. Sedation
5. PICU

If feasible, patient to be transported to assisting unit (EXCEPT PICU)
Similar to in the ED, Anesthesia Consults:

- **MUST** be discussed with primary attending
- **MUST** be an attending-to-attending discussion
- *Last resort when all other options have failed to work*

**Discuss options and establish action plan with medical team**
- Consider whether:
  - Able to change medication route to PO, NGT, GT, IM
  - Able to rehydrate via NGT or GT
  - Able to obtain labs via heel/finger/arterial stick
  - There is problematic incompatibility (i.e., with medications, IVF, TPN)
- Contact primary Attending to discuss if unsure

**Call ONE of the alternative resources below for max 2 additional attempts. Consider in the following order:**
1. Transport Team
2. Perioperative (6 AM – 11 PM)
3. ED
4. Sedation
5. PICU

If feasible, transport patient to assisting unit (except PICU)

**Attempts unsuccessful and access urgently needed?**
- Discuss with primary Attending
- Order must be placed for additional attempts
- Consider Anesthesia consult (Attending to Attending discussion)
- Consider CVL or PICC placement, if appropriate
Order Set

- Utilize standing order for topical anesthetics in all admission order sets

**Peripheral IV and Venipuncture Order Panel is found under facility list if you type in PIV or venipuncture**

- PIV is not pre-checked since this order panel is for venipuncture as well.
- The topical anesthetics that will be pre-selected are age appropriate for that specific patient.
Pathway adds:

- Procedure planning with standard use of topical anesthetics and behavioral support
- Stratification of patients with difficult venous access
- Process to utilize unit based resources, when to call alternative unit resources, and who to call
- Limitation in number of attempts at venous access
- Discussion with providers reviewing alternative options if venous access not able to be obtained
- Anesthesia consults for venous access will be an Attending to Attending conversation
Quality Metrics

• Average number of attempts per procedure (per week)
• Number of procedures with a documented attempt in nursing flowsheet
• Number of procedures with 3 or more attempts
• Percentage of patients with documentation of use of topical anesthetics
• Percentage of patients with documentation of use of comfort measures
• Percent utilization of LMX for IV placement
• Percent utilization of Pain Ease for IV placement
• Percent utilization of sucrose for IV placement
• Percentage of IVs placed for which any topical anesthetic used
  o Total, stratified by inpatient floor, stratified by day/night
• Number of patients/families offered and declined topical anesthetics
Pathway Contacts

- Ilana Waynik, MD
  - Connecticut Children’s Pediatric Hospital Medicine
- Stacy Elliot, RN
  - Connecticut Children’s Post Anesthesia Care Unit
- Bill Zempsky, MD
  - Connecticut Children’s Pain and Palliative Medicine
- Jill Herring, APRN
  - Connecticut Children’s Pediatric Hospital Medicine
- Ryan O’Donnell, RN
  - Connecticut Children’s Emergency Department
References

• Schecter NL. From the ouchless place to comfort central: The evolution of a concept. Pediatrics. 200;122(3). S154-S160.
Thank You!

About Connecticut Children’s Clinical Pathways Program

Clinical pathways guide the management of patients to optimize consistent use of evidence-based practice. Clinical pathways have been shown to improve guideline adherence and quality outcomes, while decreasing length of stay and cost. Here at Connecticut Children’s, our Clinical Pathways Program aims to deliver evidence-based, high value care to the greatest number of children in a diversity of patient settings. These pathways serve as a guide for providers and do not replace clinical judgment.

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