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   Appendix 1: Patient Teaching Pamphlet, Application of Topical Anaesthetic Prior to Cannulation of a Fistula or Graft
1.0 Scope

Pain related to cannulation is a significant concern for some patients. This guideline provides recommendations for the use of topical anaesthetics for the purposes of reducing pain associated with cannulation of fistulas and grafts.

This guideline applies to both adult and pediatric patient populations.

Related guidelines (BC, Canada, United States and Europe):


The national and international nephrology guidelines make little or no mention of the use of topical anaesthetics including those published by: Canadian Society of Nephrology, Canadian Association of Nephrology Nurses and Technologists, National (US) Kidney Foundation Kidney Disease Outcomes Quality Initiative and European Best Practice Guidelines on Vascular Access.
2.0 Recommendations & Rationale

Recommendation 1:

Consider using topical anaesthetics [lidocaine 2.5%/prilocaine 2.5% [EMLA®] or liposomal lidocaine 4% [Maxilene 4®]] in patients in which (1) cannulation has been attempted using intradermal lidocaine and the patient continues to complain of pain; or (2) cannulation has not been attempted because patient has a severe fear of needles; and in (3) children 19 and under.

Rationale for limiting the use of topical anaesthetics

Most patients do not report experiencing discomfort with cannulation and do not require a topical anaesthetic. Topical anaesthetics are expensive and there is no published evidence to support widespread or universal use. They have, however, been shown to be effective in patients where significant pain is a concern and intradermal lidocaine has not been effective or in patients with a fear of needles.

Topical anaesthetics that have been approved for use in Canada are (1) lidocaine 2.5%/prilocaine 2.5% [EMLA®]; (2) liposomal lidocaine 4% [Maxilene 4®]; and (3) tetracaine [Ametop™]. The first two are funded by BCPRA for patients that meet the specified criteria in an effort to support the goal of “fistula first.” BCPRA does not fund the use of tetracaine [Ametop™]; while it is effective, it is more costly than the other two.
**Table 1: Topical Anaesthetics and Intradermal Lidocaine 2%**

<table>
<thead>
<tr>
<th>Topical Anaesthetics &amp; Intradermal Lidocaine 2%</th>
<th>Liposomal lidocaine 4% (Maxilene 4®)</th>
<th>Lidocaine 2.5%/prilocaine 2.5% (EMLA®)</th>
<th>Intradermal Lidocaine 2% ampoule (Xylocaine®)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>When to apply</strong></td>
<td>30+ mins prior to cannulation</td>
<td>60 mins prior to cannulation</td>
<td>−2 mins prior to cannulation</td>
</tr>
<tr>
<td><strong>Duration of action</strong></td>
<td>1-2 hrs (&gt;30 mins after removal)</td>
<td>2-3 hrs (1-2 hrs after removal)</td>
<td>5 mins-1 hr</td>
</tr>
<tr>
<td><strong>Pre-cannulation dose</strong></td>
<td>0.5 in (~size of nickel) onto each needling site, with or without occlusive dressing</td>
<td>0.5 in (~size of nickel) onto each needling site with occlusive dressing</td>
<td>0.2 mL intradermal injection at each needling site</td>
</tr>
<tr>
<td><strong>Prescription required?</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>5 g &amp; 30 g tubes</td>
<td>5 g &amp; 30 g tubes</td>
<td>5 mL single use ampoule</td>
</tr>
<tr>
<td><strong>Use in children (cautions)</strong></td>
<td>Children &lt;2 yrs old: Consult a physician</td>
<td>Contraindicated in pre-term infants (gestational age &lt;37 weeks). Contraindicated in infants &lt;1 yr old if on concurrent drugs which increase risk for methemoglobinemia (e.g. sulphonamides, other drugs – see product monograph in CPS).</td>
<td>Yes – approved for use in children</td>
</tr>
<tr>
<td><strong>Base cost/g</strong></td>
<td>$1.20/g</td>
<td>$1.27/g</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Base cost/HD session</strong></td>
<td>$0.88</td>
<td>$0.93</td>
<td>$1.03 (0.95/5 mL amp + $0.08 for syringe and alcohol swab)</td>
</tr>
<tr>
<td><strong>Retail cost/3 mos</strong></td>
<td>$50-$60 for 30 g tube (30 g tube lasts −3 mos)</td>
<td>$48-$50 for 30 g tube (30 g tube lasts −3 mos)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

2. Base cost = cost with no mark-up (hospital cost).

References:
2. EMLA® Official FDA information, side effects and uses. www.drugs.com/pro/emla.html
Summary of the Literature

Most studies on the use of topical anaesthetics to reduce needling pain have focused on pain associated with venipuncture. Few have focused on pain associated with cannulation of fistulas and grafts. Most studies have involved children.

Two literature reviews were conducted in BC on the use of topical anaesthetics to reduce needling pain (2005 and 2008). A literature search conducted in April 2011 produced no new articles on HD patients.

Use of topical anaesthetics to reduce AV fistula/AV graft cannulation pain in HD patients (2008, St. Paul's Hospital):

The literature review concluded that EMLA® cream is effective at reducing cannulation pain if applied 60–90 minutes prior to needling. No direction was provided about the use of EMLA® cream over other topical anaesthetics.

Specifics of the literature review included:

- 7 articles were identified; 1 was published in 2007, 2 in the 1990s and 4 in the 1980s.
- Of the 7 articles, 5 were original studies, 1 reported on 4 different “mini” studies, and 1 reviewed case reports of contact dermatitis in hemodialysis (HD) patients using EMLA® cream. Two of the studies were only available as abstracts. The sample sizes in all articles were small (ranged from 25 to 47 patients).
- Of the 6 articles describing studies, 4 studied the effects of EMLA® cream and 2 studied the effects of lidocaine topical products (gel and patch; neither of these are available in Canada). There were no studies on the use of Maxilene cream.
- Of the studies using EMLA® cream, 3 out of 4 used placebos as comparators (one study used lidocaine injection as a “rescue drug”).
- In the 3 studies using comparators, patients using EMLA® cream reported significantly lower amounts of pain than those using placebos.
• In the study not using comparators, EMLA® cream was noted to significantly reduce cannulation pain. 87% of patients in one study and 90% in the other reported no pain when EMLA® cream was used.
• The most common side effect noted in the studies was topical dermatitis (mostly minor but occasionally required discontinuance of the EMLA® cream), with the occasional incidence of infection.
• All studies applied the cream 60–90 minutes prior to cannulation (most were closer to 90 mins).


Literature review concluded that the use of liposomal lidocaine would be safe and perhaps less expensive than EMLA® cream. Tetracaine was not suggested as it has a higher incidence of vasoconstriction and requires refrigeration.

Specifics of the literature review included:

• 4 randomized controlled trials were reviewed: 1 involved venipuncture, 1 meatotomy and 2 intravenous cannulation. Studies focused on children (ages 1–17).
• All trials found liposomal lidocaine to be as efficacious as EMLA® and only one found significantly more blanching of the skin with EMLA® when compared to liposomal lidocaine. The meatotomy trial found liposomal lidocaine to be more efficacious than EMLA® in the 30-minute study arm of one of the groups.
• Allergic reactions and localized adverse effects were similar for all the topical anaesthetics and included localized erythematic swelling and irritation.
• Risk of methehemoglobinemia with EMLA® if <3 months and in <1 year if on concurrent drugs which increase risk for methemoglobinemia (e.g. sulphonamides, other drugs – see product monograph in CPS).
• Tetracaine is the only product to require refrigeration and also has a higher incidence of vasoconstriction than liposomal lidocaine or EMLA®.
• Liposomal lidocaine has the shortest onset of action, followed by tetracaine, then EMLA®. Tetracaine has the longest duration of action.
Recommendation 2:

Provide teaching to patients about the correct application (how, how much and when to apply) and the side effects of topical anaesthetics.

Correct application of a topical anaesthetic maximizes the effectiveness of the medication in reducing needling pain. See Table 2 for a patient teaching pamphlet on the correct application of a topical anaesthetic.

Important points to include in teaching include:
- Timing of application and onset of duration.
- Correct application.
- Side effects: redness/rashes or whitening at the site of the application.

Recommendation 3:

For patients who meet the criteria, utilize the protocol in Tables 3 and 4 for ordering and filling orders for topical anaesthetics.
What is a topical anaesthetic cream?
A topical anaesthetic cream (e.g. EMLA® or Maxilene 4® cream) is used to create a temporary loss of feeling or numbness of the skin before putting in a needle.

Are there side effects?
Side effects are rare and may include whitening or redness of the skin and slight puffiness and initial burning or itching on the skin where the cream is applied. These are normal reactions and will disappear without treatment.

When should a topical anaesthetic cream be applied?
A topical anaesthetic cream is best applied at least one hour before dialysis. This allows it enough time to work before putting in a needle.

How is a topical anaesthetic cream applied?
1. Before you leave the hemodialysis unit, ask your nurse which sites she/he plans to needle on the next hemodialysis run.
2. At least one hour before your next hemodialysis run, squeeze about 1.25 cm (0.5 in) of cream or about the size of a nickel onto each of the sites to be needled. If you are not sure which site will be needled, place the cream above or below the last needle site (for site rotation).
3. Wrap a clear plastic wrap around the arm covering the areas that will be needled. Do not spread out the cream or try to rub it into your skin.
4. When it is time for dialysis, remove the plastic wrap, wipe off the cream and clean the entire area with chlorhexidine and alcohol.

DO NOT apply near eyes or on open wounds.

* If your nurse gave you a cap off the top of a heparin vial, substitute these steps for 2 & 3:
  2. Place a thick layer of cream on the back side of the cap.
  3. Place the cap over the areas that will be needled and secure with tape.

Adapted from the patient teaching pamphlet developed by Vancouver General Hospital Pharmacy Department, with thanks.
Table 3: Protocol for Ordering Topical Anaesthetic Cream (Algorithm)

Eligibility criteria:
- Cannulation has been attempted using intradermal lidocaine and the patient continues to complain of pain; OR
- Cannulation has not been attempted because patient has a severe fear of needles; OR
- Children 19 and under

Patient teaching:
- Correct application of the cream (how, how much and when to apply)
- Side effects (possible skin irritation and blanching)
- Provide patient teaching pamphlet (see Table 2)

Patient meets eligibility criteria for topical anaesthetic

Nephrologist orders topical anaesthetic using Topical Anaesthetic Pre-Printed Order Form (see Table 4)

HD RN provides patient teaching pamphlet (see Table 2)

HD centre faxes form to:
1) BCPRA pharmacy &
2) Vascular Access RN

BCPRA pharmacy provides patient with 1 x 30 g tube of topical anaesthetic and reinforces teaching re: appropriate application

Pharmacy continues to supply topical anaesthetic as per order

Is the cream usage in line with the expected amount [30 g tube = 3 mos]? yes

Pharmacy continues to provide topical anaesthetic to patient as per order

no

BCPRA pharmacist contacts HA pharmacist or patient’s HD unit

BCPRA pharmacist or HD unit contacts Vascular Access RN

Vascular Access RN or designate reviews teaching with patient
# Table 4: Topical Anaesthetic Orders: Easing Cannulation Pain

<table>
<thead>
<tr>
<th>Dialysis Modality</th>
<th>In-Centre HD</th>
<th>Community HD</th>
<th>Home HD</th>
</tr>
</thead>
</table>

**Rationale for ordering (check all that apply):**
- Cannulation has been attempted using intradermal lidocaine and the patient continues to complain of pain.
- Cannulation has not been attempted because patient has a severe fear of needles.
- Children 19 and under.

**Teaching completed:**
RN to provide teaching and teaching sheet to patient re: application of topical anaesthetic.

**Prescription:**
- Lidocaine 2.5%/prilocaine 2.5% (EMLA®), dispense 1 x 30 g tube.
- Liposomal lidocaine 4% (Maxilene 4®), dispense 1 x 30 g tube.

**Directions:**
Apply at least 1 hour before each hemodialysis run.

- 1. Squeeze about 1.25 cm (0.5 in) of cream or about the size of nickel onto each of the sites to be needled.
- 2. Wrap a clear plastic wrap around the arm covering the areas that will be needled.

OR

- 1. Place a thick layer of cream on the back side of a cap (provided by nurse).
- 2. Place the cap over the areas that will be needled and secure with tape.

**FAX order to the BCPRA pharmacy (fax #: [_____]_______ - [______________])**
AND send a copy to the Vascular Access Nurse at [________________________]
________________________ Hospital (fax #: [_____]_______ - [______________]).

**Enter medication into PROMIS.**
3.0 References


EMLA Official FDA information, side effects and uses.  www.drugs.com/pro/emla.html


4.0 Sponsors

This provincial guideline was developed to support improvements in the quality of vascular access care delivered to patients with chronic kidney disease in BC. Based on the best information available at the time it was published, the guideline relies on evidence and avoids opinion-based statements where possible. When used in conjunction with pertinent clinical data, it is a tool health authorities and health professionals can use to develop local guidelines.

Developed by a Vascular Access Working Group of multidisciplinary care providers from across BC, the guideline was approved by the Provincial Vascular Access Services Team, the BC Provincial Renal Agency Pharmacy & Formulary Review Committee and the Medical Advisory Committee. It has been adopted by BCPRA as a provincial guideline.

5.0 Effective Date

November 18, 2011
- This guideline is based on scientific evidence available at the time of the effective date; refer to www.bcrenalagency.ca for most recent version.