UCSF MEDICAL CENTER
DEPARTMENT OF NURSING
NURSING PROCEDURES MANUAL

PERIPHERAL INTRAVENOUS INFILTRATION AND EXTRAVASATION MANAGEMENT *FOR NON-CHEMOTHERAPUTIC AGENTS* (NEONATAL/PEDIATRIC)

PURPOSE

To guide RNs in the recognition, management, and documentation of infiltration and/or extravasation injuries resulting from a PIV. ***Infiltration*** is defined as the inadvertent leakage of a non-vesicant medication or solution into the surrounding tissue. ***Extravasation*** is defined as the inadvertent administration of a vesicant medication or solution into the surrounding tissue.

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Hazardous Medication Safe Handling - Part B Chemotherapy and Biotherapy Extravasation of Vesicants Med Center policy 6.09.04

Oral Sucrose for Procedural Pain in the Infant (Neonatal/Pediatric) Nursing Procedure

CRITICAL POINTS

A. For chemotherapeutic IV infiltrations or extravasations, refer to Hazardous Medication Safe Handling - Part B Chemotherapy and Biotherapy Extravasation of Vesicants Med Center policy.

B. **Infiltration** of non-vesicant solutions and medications typically does not cause tissue necrosis. However, it can result in local inflammation and/or compartment syndrome which can lead to tissue damage. Signs/symptoms of infiltration include puffiness, discomfort, shiny skin, tightness, and local redness.

C. **Extravasation** of vesicant/irritant solutions and medications produce progressive tissue damage. Signs/symptoms of extravasation include blistering, dark red, purple or necrotic appearing skin.

D. **Do not apply warm or cold compresses to the affected area unless under the direction of the provider or Clinical Nurse Specialist (CNS).**

E. **Hyaluronidase** is an enzyme that destroys tissue cement and helps to reduce tissue damage by allowing rapid diffusion of extravasated fluid and promotes drug absorption. It can be administered for extravasations caused by:

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- Amio acid solutions (TPN)
- Calcium salts
- Dextrose solutions ≥ 10%
- Mannitol
- Nafcillin
- Phentoin
- Potassium salts ≥ 20mEq

➢ For questions regarding use of Hyaluronidase for IV extravasations caused by fluids or medications NOT included in this list, contact a pediatric pharmacist or CNS.

F. **Phentolamine** is an antidote which competitively blocks alpha-adrenergic receptors and reverses effects of vasoconstriction caused by extravasation of vasopressor agents (e.g., dopamine, epinephrine, and norepinephrine) thereby mitigating tissue injury. It can be administered ONLY for extravasations caused by vasoactive medications:

- Dobutamine
- Dopamine
- Epinephrine
- Norepinephrine
- Phenylephrine
- Vasopressin

G. **Nitroglycerin 2% ointment** can be used when Phentolamine is not commercially available. Nitroglycerin produces a vasodilator effect on the peripheral veins and arteries. It can be administered ONLY for extravasations caused by:

- Dobutamine
- Dopamine
- Epinephrine
- Norepinephrine
- Phenylephrine
- Vasopressin

H. There may be medications that result in extravasation injury but do not have an antidote/medication for treatment.

I. For infiltrates that include vasoactive drugs and non-vasoactive drugs, consult with a CNS and consider reversal of the vasoactive drugs first which will resolve blanching. If swelling and discoloration persist, consider Hyaluronidase.

J. In the event of IV extravasation, notify the provider and CNS.

K. Complete an incident report for all extravasations.

SUPPLIES

- Provider order when an antidote/medication is indicated using *IP Pediatric NON-Chemotherapy Extravasation/Infiltrate Addendum*
- Clean gloves
- 2% Chlorhexidine for skin antisepsis
- Povidone-iodine for skin antisepsis when 2% chlorhexidine is contraindicated:
  - ❖ Documented sensitivity to chlorhexidine
  - ❖ Neonates < 27 weeks corrected gestational age, < 1000 grams, or < 7 days old
- Sterile gauze
- 25 gauge needle x 5

PROCEDURE

I. INITIAL TREATMENT

A. At the first sign of an infiltration or extravasation:

1. Stop administration of IV fluids and/or medications immediately and transfer to another IV site.
2. Disconnect IV tubing from catheter.
3. Attempt aspiration of residual drug/fluid from catheter using a 1 mL or 3 mL syringe.
4. Gently remove catheter – use saline or adhesive remover to reduce the risk of epidermal stripping that can occur with occlusive dressing removal if swelling is severe.
5. Notify provider immediately for any extravasation injury. When apparent tissue injury (dark purple/red, blisters) and/or any possibility of compartment syndrome (edema that compromises circulation to the affected area) are observed, obtain order for the appropriate antidote.
6. Notify CNS of any extravasation (in person, or via email or voice mail), after antidote administration.
7. Complete incident report, after antidote administration.

B. Consider elevation of affected limb to approximately 45 degrees for 24 – 48 hours, when feasible. Elevation may aid in reabsorption of the infiltrate or extravasated vesicant by decreasing capillary hydrostatic pressure. Securing the extremity with wraps may impair circulation and is not recommended.

C. Do not apply warm or cold compresses unless directed by provider or CNS.
   1. Clear benefit from warm or cold compresses has not been demonstrated; they are used for supportive care only (i.e., comfort, pain relief).
      - Warm or cold compresses should not be used in neonates and infants (up to one year of age).
      - When used, warm or cold applications should be applied for only 15-20 minutes, every 4 hours, for a total of 24-48 hours.
      - Warm compresses should be dry only.

D. Determine need for antidote/medication administration (Hyaluronidase, Phentolamine, or topical Nitroglycerin 2% ointment) with provider. Refer to *IP Pediatric NON-Chemotherapy Extravasation/Infiltrate Addendum* or contact a pediatric pharmacist.

II. HYALURONIDASE

A. Refer to the *IP Pediatric NON-Chemotherapy Extravasation/Infiltrate Addendum* for appropriate use of Hyaluronidase.

B. Obtain provider order for Hyaluronidase.

C. Consider pain management and procedural support as appropriate.
   - For infants, oral sucrose is recommended with provider order up to 4 months corrected age. (See Oral Sucrose for Procedural Pain in the Infant (Neonatal/Pediatric) Nursing Procedure.)

D. Administer within the first few minutes to one hour after extravasation has occurred. (Can be administered up to 12 hours after the extravasation, however early administration is recommended).

E. Hyaluronidase concentration is 150 units/mL.

F. Obtain Hyaluronidase from Pyxis. Draw up 1 mL in a 3-mL syringe. Drug lost with needle changes is insignificant.

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G. Provide skin antisepsis at site using 2% chlorhexidine, unless contraindicated, in which case povidone-iodine is used.
   - **Chlorhexidine**: Use a gentle back and forth motion to clean area over the infiltration for a minimum of 30 seconds. Allow to completely dry. ***Note:*** If there is an open wound, do not apply Chlorhexidine directly over open wound. *Apply around perimeter of the wound*.
   - **Povidone-iodine**: Start at center of site and move outward in a circular motion. Allow to dry for 2 minutes. Remove povidone-iodine with sterile normal saline wipes. ***Note:*** If there is an open wound, do not apply povidone-iodine directly over open wound. *Apply around perimeter of the wound.*

H. Inject 1 mL of Hyaluronidase (150 units) in 5 divided doses (0.2 mL each) SQ ***around*** **the area of infiltration/extravasation**, at the perimeter (Figures 1 & 2). Change needle with each new injection.

I. May repeat dose once, per provider order, 24 hours after first dose.

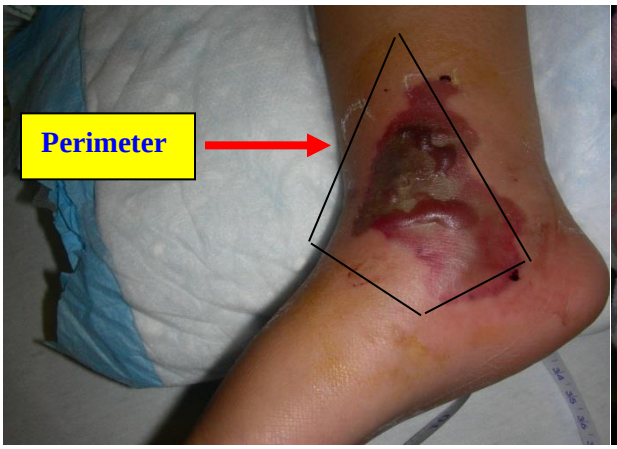

Figure 1.

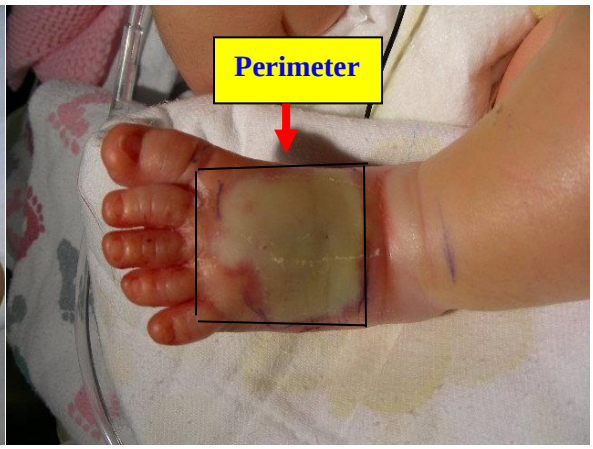

Figure 2.

III. PHENTOLAMINE

A. Refer to the *IP Pediatric NON-Chemotherapy Extravasation/Infiltrate Addendum* for appropriate use of Phentolamine.

B. Phentolamine concentration is weight dependent. (See *IP Pediatric NON-Chemotherapy Extravasation/Infiltrate Addendum.*)

C. Obtain provider order for Phentolamine.

D. Phentolamine is prepared in Pharmacy and delivered in a 3-mL syringe. Drug lost with needle changes is insignificant.

E. Administer within the first few minutes to one hour after extravasation has occurred. Consider a second dose if perfusion of site does not return to normal after the first administration within 12 hours of extravasation.

F. Provide skin antisepsis at the site using 2% chlorhexidine unless contraindicated, in which case povidone-iodine is used.
   - **Chlorhexidine**: Use a gentle back and forth motion to clean area over the infiltration for a minimum of 30 seconds. Allow to completely dry. ***Note:*** If there is an open wound, do not apply Chlorhexidine directly over open wound. *Apply around perimeter of the wound.*

- **Povidone-iodine**: Start at center of site and move outward in a circular motion. Allow to dry for 2 minutes. Remove povidone-iodine with sterile normal saline wipes. ***Note:*** If there is an open wound, do not apply povidone-iodine directly over open wound. *Apply around perimeter of the wound.*

G. Inject 1 mL of Phentolamine (dose is dependent on age/weight) in 5 divided doses (0.2 mL each) SQ ***into*** **the area of infiltration/extravasation.** Change needle with each new injection.
Note: Neonates may use fewer injections if adequate to cover area of extravasation.

H. Observe site. Blanching should reverse immediately. If blanching recurs, may repeat dose once.

IV. NITROGLYCERIN 2% OINTMENT

A. Obtain provider order for Nitroglycerin 2% ointment. Recommended dose is 4mm/kg, with maximum at 25.4 mm = 1 inch of ointment. See Table 1. Weight Dosing Chart.

Table 1. Nitroglycerine Weight Dosing Chart

Weight (kg)	Dose (mm) 4mm/kg	mL of Ointment
1	4 mm	0.09 mL
2	8 mm	0.19 mL
3	12 mm	0.28 mL
4	16 mm	0.38 mL
5	20 mm	0.47 mL
6	24 mm	0.57 mL
≥ 6.5	25.4mm Max	0.6 mL Max

B. Gently cleanse affected area of any oil, grease, or tape residue.

C. Don gloves.

D. Obtain Nitroglycerin 2% ointment packet from Pharmacy (1 gram) and place ointment into barrel of a 3 ml oral amber syringe. Push ointment up with the plunger to the volume ordered. Discard remainder.

E. Vasoactive medication infusion should be re-established to another IV site before applying Nitroglycerin 2% ointment.

F. Apply a thin layer of ointment on the affected site; do not rub into skin. It is not necessary to use the entire dose if affected area can be covered with less.

G. Cover lightly with gauze; do not use an occlusive dressing.

H. Monitor blood pressure (BP) and heart rate (HR) at 5, 15, 30 and 60 minutes after application. If significant hypotension occurs, remove ointment immediately and notify provider.

I. Assess site for return of normal perfusion at the above intervals with BP and HR.

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J. Wearing gloves, use gauze to remove ointment as soon as ischemia has resolved.

K. If ischemia has not resolved in one hour, continue to monitor BP and HR hourly until ischemia resolves and nitroglycerin is removed. If no hypotension occurs, ointment may be left on for 2-3 hours.

L. May repeat dose once, per provider order, 8 hours after the initial dose.

DOCUMENTATION / EDUCATION

A. Document in the medical record:

1. Date and time of infiltration/extravasation event.
2. PIV catheter insertion site.
3. Solution and/or medication resulting in infiltration/extravasation.
4. Appearance of wound: color, temperature, presence of edema, blisters, skin open or intact.
5. Notification of provider and CNS.
6. Treatment provided.
7. Outcome of treatment.
8. Additional consultation if treatment was not able to reverse tissue injury.
9. Notification of patient and family.

B. Patient and family notification:

1. Patient (when appropriate) and family should be notified of the infiltration/extravasation by the provider or RN.
2. Information regarding treatment plan should be reviewed with the patient and family.

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