

Newborn Critical Care Center (NCCC) Clinical Guidelines

Evaluation and Treatment of IV Infiltration or Extravasation

GOAL

Safely administer intravenous fluids/medications with minimal complications. In the event of an infiltration or extravasation, prompt and appropriate assessment and intervention will minimize the extent of tissue injury and patient discomfort.

DEFINITIONS

Infiltration

The leakage of a non-vesicant fluid from a vein.

Extravasation

The leakage of a vesicant from a vein into the surrounding tissue.

Irritant

Any agents that cause local inflammatory reactions with phlebitis at the insertion site or along the vein but do not cause tissue sloughing or necrosis.

Vesicant

Any agents that cause blistering or tissue necrosis.

Non-vesicant

Nonirritant fluids or medications such as D5W or normal saline.

Normal serum osmolality

The number of particles suspended in a solution between 280 and 295 mOsm/kg.

Hyperosmolality (hypertonic)

Substances with a serum osmolality >295 mOsm/kg. Because of the high osmolality hypertonic solutions draw fluid from endothelial cells to the serum, causing cells to shrink. Hypertonic solutions have a lower pH, making them more acidic and irritating to the vein.

Hypoosmolality (hypotonic)

Substances that have a low serum osmolality that results in an influx of fluid into the cell causing cell distention and possible rupture.

CONTRIBUTING RISK FACTORS

Mechanical Factors	Physiologic Factors	Pharmacologic Factors
<ul style="list-style-type: none">• Placement of catheter in areas of joint flexion or over bony prominences• Type of catheter• Poorly secured catheter• Poor visibility of insertion site• Occlusion, kinked or cracked catheter/tubing• Patient clinical status/activity level• Length of therapy	<ul style="list-style-type: none">• Decreased peripheral circulation• Poor venous circulation• Small vessel diameter• Flexibility of subcutaneous tissue• Inability to verbalize pain	<ul style="list-style-type: none">• Solutions with high pH• Hyperosmolality solutions

PROCEDURE

1. Stop infusion immediately if infiltration/extravasation occurs or is suspected
2. Disconnect IV tubing (including extension tubing) as close to the catheter hub as possible but leave the catheter in place until evaluated by the provider
3. Notify provider (nurse practitioner, fellow, or attending neonatologist) immediately
4. Avoid putting pressure to the affected site
5. Elevate the affected extremity
6. Providers:
 - a. **Attempt to aspirate** residual agent from the IV using a small 1-3mL syringe
 - b. **Remove catheter** (antidotes are not administered intravenously in the NCCC)
 - c. **Assess/stage** level of infiltration/extravasation (shared responsibility between the provider and the nurse)
 - d. **Treat** infiltration/extravasation per recommendations for assigned "Stage" (See Appendix A)
 - e. Any extravasation with a known vesicant should be treated per hospital guideline (See [Hospital Policy on Management of Non-Chemotherapeutic Intravenous Extravasations](#)).
 - i. Antidotes will be ordered in EPIC and administered by the provider
 - ii. The use of antidotes is not recommended for extravasations caused by blood products
 - iii. Optimally, antidotes should be administered immediately (max within 1-2 hours)
 - iv. Consultation with the pharmacist is recommended whenever there are questions regarding the use of antidote therapy
 - v. Once completed, antidote administration will be charted in EPIC by the nurse
 - vi. The provider administering the antidote must write a procedure note. It should include a description of the extravasation area; pictures of the site may be uploaded into EPIC
 - vii. Specific local therapy is empirical and may include the application of warm/cold compresses (See [Hospital Policy on Management of Non-Chemotherapeutic Intravenous Extravasations](#)).
 1. Cold compress application is recommended for most extravasations as it is thought to cause vasoconstriction, therefore limiting the spread of the drug and extent of the injury
 2. Warm compress application is sometimes recommended because it is thought that cold compresses will worsen the extent of the ulceration and warmth results in vasodilation, increased blood flow and enhanced drug removal
 - f. Consider WOCN consult for all Stage III & IV extravasations

- g. Consider Plastic Surgery consult (provider discretion) for Stage IV extravasations involving:
 - i. Development of blister necrosis
 - ii. Severe caustic infiltrate
 - iii. Large amount of agent involved/tissue affected
7. A report of occurrence will be completed for all extravasations requiring antidote therapy and for all Stage IV infiltrations. (See [Appendix A](#))

DOCUMENTATION & NURSING CARE

1. ALL extravasations requiring antidote therapy and ALL Stage IV infiltrations require full documentation of the following:
 - a. Assessment by "Stage"
 - b. Treatment provided
 - c. Consultations requested in EPIC
2. Following initiation of any therapy, the patient's skin condition and integrity and the movement of the affected limb will be assessed and documented by nursing 1 hour after initiation of therapy and then Q3-4 hours (with assessments) for the first 12 hours. Then every shift until the wound/site is completely healed.
 - a. Assess extravasated site for:
 - i. Erythema/blanching/necrosis
 - ii. Edema
 - iii. Drainage
 - iv. Temperature changes
 - v. Pain
 - b. Assess affected extremity for:
 - i. Sensation/response to touch of fingertips/toes
 - ii. Movement
 - iii. Distal pulses
3. **Consider** documentation of the wound appearance by photographing the site (using apps/cameras that can place the picture into the electronic medical record), if possible, at the following recommended intervals:
 - a. At the time of injury
 - b. 24 hours after injury
 - c. 48 hours after injury
 - d. 1 week after injury
4. **Elevate** the effected extremity above the level of the heart for the first 48 hours
5. **Avoid excess pressure** over the area of extravasation

6. The use of compresses (only if ordered by the provider) is recommended Q6 hours for 20 minutes x 24 hours
 - a. For a cool compress
 - i. Use a sterile gauze soaked in normal saline and gently laid over either intact skin or the intact dressing without applying pressure
 - ii. DO NOT USE ICE**
 - b. For a warm compress
 - i. Use a heel warmer on the effected extremity
 - ii. Do not place heel warmer in direct contact with the wound itself**

WOUND CARE

1. When tissue injury occurs/wound care is needed, moist wound-healing principles should be utilized:
 - a. Keep the wound bed moist using wound gel
 - b. Cover the site with thin silicone foam
 - c. Change the dressing at **minimum** Q24 hours

References:

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5. Maly, C, Fan, KL, Rodgers, GF, Mitchell, B, Amling, J, Johnson, K . . . Chao, JW. A primer on the acute management of intravenous extravasation injuries for the plastic surgeon. *Plast Reconstr Surg Glob Open*. 2018;6(4):e1743. doi: 10.1097/GOX.0000000000001743.
6. Lund C, Singh, C. Skin and Wound Care for Neonatal and Pediatric Populations. In: Doughty DB, McNichol LL. *Wound, Ostomy and Continence Nurses Society Core Curriculum Wound Management*. Philadelphia: Wolters Kluwer; 2016

APPENDIX A

Clinical Classification of Complications and Interventions

Stage	Infiltration/Extravasation	Intervention
I	<p>Assessment</p> <ul style="list-style-type: none"> • Skin blanched • Mild swelling/edema • None to slight induration • Cool to touch • With or without pain 	<p>Treatment</p> <ul style="list-style-type: none"> • Stop infusion • Disconnect IV tubing • Elevate extremity • Avoid putting pressure to the site • Notify provider
II	<p>Assessment</p> <ul style="list-style-type: none"> • Skin blanched • Mild swelling/edema • None to slight induration • Cool to touch • With or without pain 	<p>Treatment</p> <ul style="list-style-type: none"> • Stop infusion • Disconnect IV tubing • Elevate extremity • Avoid putting pressure to the site • Notify provider
III	<p>Assessment</p> <ul style="list-style-type: none"> • Skin blanched/translucent • Marked swelling/edema • Cool to touch • Mild to moderate pain 	<p>Treatment</p> <ul style="list-style-type: none"> • Stop infusion • Disconnect IV tubing • Elevate extremity • Avoid putting pressure to the site • Notify provider • Attempt to aspirate residual fluid from the IV using a 1-3 mL syringe • Give antidote treatment if indicated • Wound care per above directions • Consult WOCN • Complete Occurrence Report
IV	<p>Assessment</p> <ul style="list-style-type: none"> • Skin blanched/translucent • Skin tight, leaking • Skin discolored, bruised • Gross swelling/edema • Cool to touch • Circulatory impairment (absent distal pulse, capillary refill >4 seconds) • Mild to moderate pain • Necrosis, sloughing, blistering <p>Infiltration of any amount of blood product or vesicant</p>	<p>Treatment</p> <ul style="list-style-type: none"> • Stop infusion • Disconnect IV tubing • Elevate extremity • Avoid putting pressure to the site • Notify provider • Attempt to aspirate residual fluid from the IV using a 1-3 mL syringe • Give antidote treatment if indicated • Wound care per above directions • Consult WOCN • Consider consulting Plastic Surgery • Complete Occurrence Report