Extravasation of Vesicant: Protocol for Managing Suspected

Related Standards & Resources

1. Chemotherapy Administration (IV Infusions) on Acute Medical Units (SPH CTU Only)
2. Chemotherapy, IV Infusions in Medical Short Stay Unit (SPH only)
3. B-00-12-10111 - Extravasation Vesicant: Management, procedure
4. Preprinted Prescriber's Orders: PH084 Extravasation of Vesicant Chemotherapy
5. Patient & Family Care Instructions (available for Inpatients and Outpatients - ensure that you have printed off the appropriate instruction set) - obtain from ChartScan
    a. Extravasation - Patient Instructions: azacitidine, bendamustine, bortezomib, CISplatin, dacarbazine, doxorubicin liposomal, gemcitabine, ifosfamide, melphalan – Inpatient: FE.225.C18.PHC or Outpatient: FE.225.C18op.PHC
    b. Extravasation - Patient Instructions: DAUNOrubicin, DOXOrubicin, mitomycin, mitoxantrone – Inpatient: FE.225.C182.PHC or Outpatient: FE.225.C182op.PHC
    c. Extravasation – Patient Instructions: vinBLAStine, vinCRIStine, etoposide – Inpatient: FE.225.C183.PHC or Outpatient: FE225.C183op.PHC
5. Occupational Health and Safety Policies: Code Brown, Cytotoxic Handling
6. Parenteral Drug Therapy Manual: Policies: Cytotoxic Drugs

Skill Level:

Specialized: Registered Nurses who are experienced in giving chemotherapy or RN's who have completed the two-day chemotherapy workshop from BCCA or PHC and have successfully completed a PHC chemotherapy practicum (chemotherapy-certified).

Need to Know:

Extravasation of a vesicant is a medical emergency; early detection and prompt appropriate action is required to prevent necrosis and functional loss of the tissue or limb involved.

Consequences of vesicant extravasation include:

- Damage to tendons, nerves, and joints
- Impaired functional and sensory abilities of the affected area
- Disfigurement
- Loss of limb

Definitions:

Extravasation

- Unintentional escape of any vesicant liquid from a blood vessel into the tissue surrounding tissue venous access device (peripheral or central).

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- Extravasation can also occur in the mediastinum, lung, and other areas when the leakage is from a central venous access device.

Infiltration

- The inadvertent leakage of a non-vesicant liquid into the tissue surrounding a venous access device (peripheral or central).

Non-Irritant or Non-Vesicant (neutrals)

- Substances that do not cause local irritation or tissue damage when extravasated

Irritant

- Substances that cause stinging, aching, tightness, and phlebitis but without necrosis when extravasated
- Some irritants are classified as “irritants with vesicant properties”. These drugs are difficult to classify, but are capable of causing tissue damage.

Vesicant

- Any substance is capable of causing tissue damage when extravasated
- Vesicant substances are sub-classified according to the mechanism by which they cause cell damage: DNA-binding vesicants and non-DNA-binding vesicants.

DNA-binding Vesicant

- Have a direct effect on tissue when extravasated
- Cause progressive tissue destruction
- Bind to the DNA in healthy cells, causing cell death. When these cells die, complexes are released and taken up by the adjacent healthy cells. This process of cellular uptake sets up a continuing cycle of tissue damage as the DNA-binding vesicant is re-circulated in the tissue for a long time. Examples:
    - Daunorubicin
    - Doxorubicin
- Can cause severe tissue damage: destruction may extend into underlying tendons, ligaments, nerves, and bone
- The area of tissue necrosis becomes progressively larger in size and deeper in depth over time.

Non-DNA-binding Vesicant

- Does not bind to cellular DNA
- More easily metabolized by local tissue
- Tissue necrosis is local and improves over time
- Examples:
    - Vincristine

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- Vinblastine

Risk Factors

Severity of the extravasation injury is influenced by a combination of the risk factors identified below:

Agent related risk factors

- Vesicant potential of substance that has extravasated
- DNA-binding or non-DNA-binding
- Concentration and volume of substance that has extravasated
- Vasoconstrictive potential of the drug (ischemic necrosis)
- Extended infusion period

Patient related risk factors

- Small, fragile veins; sclerosed veins; prominent, but mobile veins
- Previous treatment with irritating or sclerosing drugs
- Obesity (obscures veins from view and palpation, difficult IV access)
- Diseases that impair or alter circulation (lymphedema, diabetes); compromised circulation
- Patient is receiving anticoagulants
- Sensory deficits
- Skin disease at the insertion site
- Patient movement
- Poor understanding of procedure related to:
    - Anxiety
    - Language and/or cultural barriers
- Communication difficulties:
    - Cognitive deficits
    - Is sedated

Clinician related risk factors

- Inexperienced or untrained staff
- Probing during peripheral IV (PIV) catheter insertion
- Multiple attempts at PIV catheter insertion Inadequate PIV catheter stabilization or fixation
- Distractions during PIV catheter insertion
- Unfamiliarity with central venous access device (CVAD) use and management

Device related risk factors

Peripheral IV extravasation

- Using rigid PIV devices (steel needles/catheters)
- Inadequate PIV catheter stabilization or fixation Inappropriate PIV catheter location at **point of flexion** (antecubital fossa, dorsum of hand or wrist)
- Same vein used for previous vesicant administration
- PIV catheters insitu for more than 24 hours.

Central venous access device extravasation

- Inappropriate technique of IV administration and flushing with a small barrel syringe
- CVAD fracture or tear in tunneled portion of body
- CVAD tip malposition or migration
- Fibrin sheath
- Inappropriate size (too short) of Huber needle for deep IVAD ports

Prevention

The risk of extravasation can be reduced if the following measures are taken:

- Instruct patients and/or family members to report any signs and symptoms of extravasation
- Administer vesicants into newly inserted PIV catheter; **ONE "clean" poke is ideal**
- Use the most appropriate vein in an appropriate location when inserting a new PIV:
    - Use healthy, palpable veins in the forearm (ideal); can use vein in the hand IF not near point of flexion at wrist
    - Avoid insertion over joints: the inner wrist, antecubital fossa, hand veins near wrist
    - Avoid areas of edema or where the skin is damaged
    - Do not insert a PIV distal to a previous venipuncture site
- Ensure that the PIV catheter is well-secured with a transparent dressing
- Do not inject against resistance and monitor for blood return during IV push administration
- When giving multiple drugs in a protocol, administer vesicants first
- If there is more than one vesicant drug to administer, administer DNA-binding vesicants first
- - During IV push or IV direct administration, assess PIV for blood return every 1-2 minutes

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Assessment and Interventions:

Before Giving Chemotherapy

The Chemotherapy Administration (IV Infusion) Checklist (NF215) helps guides the chemotherapy certified nurse in giving chemotherapies safely. As part of the checklist, the nurse must print off review relevant information about the drugs that are being given - particular attention must be given to whether the drug to be given is a vesicant, irritant, or a neutral drug.

To ensure that the nurse is prepared should an extravasation occur, the corresponding preprinted prescriber's order (PPO) form for the management of suspected extravasation must also be printed and reviewed by the nurse who is giving the chemotherapy.

Ensure that the patient is aware of the extravasation potential of the drug that they are getting and the symptoms to expect if there was an extravasation.

*****Review the PPO to ensure that you are prepared should an extravasation occur*****

Extravasation kits *are available on units where chemotherapy drugs are commonly administered and in the Pharmacy at SPH.*

Assessment:

Extravasation should be suspected if the following are observed:

- Patient reports discomfort, burning, stinging, tingling, itching, pain, or cold at the infusion site. If the patient has a CVAD, they may report thoracic pain.
- Lack or loss of blood return
- Slow or sluggish infusion flow
- Resistance when administering IV drugs
- Swelling, redness, or leakage at the site

The quality of the nursing assessment during administration can play a key role in minimizing the severity of the incident. If you need a second opinion, and one is recommended, do not hesitate to ask a colleague for some help.

Before administering chemotherapy, review the difference between vesicant extravasation, vein irritation, and a flare reaction.

	Vesicant Extravasation	Vein Irritation	Flare Reaction
Pain	*Immediate* – burning, stinging, coolness at and around administration site	Aching and tightness along peripheral vein, above the administration site, occurs as the drug infuses	No pain – skin over area may itch
Redness	*Immediate* – may be difficult to detect if the extravasation is occurring deeper in the tissue	Vein appears reddened or darkened	Immediate – blotches or streaks along the vein +/- wheals. Usually subsides within 30 minutes.
Swelling	*Immediate*; increases over time	Swelling does not occur	Swelling does not occur
Blood Return	*Immediate* loss of blood return from IV device occurs	Blood return should be present	Blood return should be present
Ulceration	Not immediate – If vesicant extravasation is not treated, blistering and sloughing begins in 1 to 2 weeks	Ulceration does not occur	Ulceration does not occur

Vein irritation and flare reactions may mimic some of the signs and symptoms of vesicant extravasation. However, note that vein irritation and flare reactions are unique to the peripheral administration of chemotherapy and DO NOT OCCUR when chemotherapy is administered via central venous access device.

If a suspected extravasation has occurred - refer to the extravasation procedure and to the corresponding preprinted prescriber's orders.

Patient /Family Education and Resources:

Patients and/or family should be provided with "Extravasation - Patient Instructions". There are 6 different instruction sets: one for the irritant group, one for the DNA-binding group, and one for the non-DNA binding group – each instruction set comes in inpatient or outpatient formats – use the appropriate instruction set. Review the following with the patient and family:

- explain what an extravasation is

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- explain what they might expect over the coming weeks
- review the care that is required at home
- ensure that they patient and/or family (if the patient is an outpatient) has contact information should there be any problems when at home
- consider a referral to TST for skin & wound care if appropriate

Following an extravasation, the patient should have the affected skin assessed (can be done over the phone if the patient/family is able) at the following intervals: Q2 Days x 3, then weekly for 6 weeks. Ensure that you have the patient's contact information.

Documentation:

Nursing documentation for a suspected extravasation should be completed on the following 2 documents:

1. Extravasation Flow-Sheet - Initial Evaluation
2. Extravasation Flow-Sheet - Ongoing Evaluation

Additional documentation related to the extravasation can be captured via the Progress Notes and other nursing documentation tools.

Ongoing wound care related to the extravasated site should be documented on the respective wound care flow-sheets.

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Approved/Reviewed/Revised:

November 2012

Revised: September, November 2014

Revised: May 2018

Appendices:

Appendix A - Extravasation Flow-sheet Initial Evaluation

Appendix B - Extravasation Flow-sheet Ongoing Assessment

Appendix C - Patient & Family Extravasation Instructions (inpatient & outpatient)

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Appendix A Extravasation Flow Sheet – Initial Evaluation

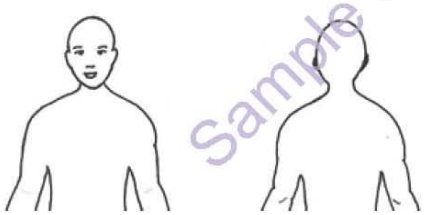
EXTRAVASATION FLOWSHEET
INITIAL EVALUATION

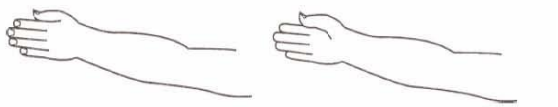
This form to be completed ***at the time of the extravasation event***. All subsequent assessments and interventions must be documented on the "Extravasation Flowsheet - Ongoing Assessment".

Extravasation Event		IV Access at Time of Extravasation Event	
Date of suspected extravasation		☐ Peripheral IV	☐ CVC
Time of suspected extravasation		Type and gauge of IV	
Extravasated drug		Location of IV	
Concentration of extravasated drug		Number of venipuncture attempts (for peripheral administration) :	
Estimated volume of extravasated drug		Vesicant administration technique	☐ Bolus ☐ Infusion
Symptoms reported by the patient:		Description and quality of blood return before and during administration:	
Description of site & extremity:			

On the diagrams below, please indicate the following:
○ = Insertion site
X = Insertion attempts

Area of swelling and redness
Outline the area of swelling and redness on the diagram below and include measurements of width x height in centimeters.





Initial Interventions	Additional Interventions
☐ Physician notified:	☐ Patient/family education:
☐ Antidote given:	
	☐ Wound Care consult
☐ Cold compresses:	☐ Plastics consult
☐ Warm compresses:	☐ Follow-up:
☐ Other:	

Date: _____ Time: _____

Signature: _____ Printed name: _____

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Appendix B Extravasation Flow Sheet – Ongoing Evaluation

EXTRAVASATION FLOWSHEET
ONGOING EVALUATION

Complete this flowsheet every other day for 1 week then weekly for 6 weeks.
For ongoing wound care, please initiate the Wound Assessment and Documentation Flowsheet PHC-NF099

Date					
Time					
Indicate call or visit					
Pain					
Edema					
Erythema					
Discoloration					
Induration					
Blistering					
Ulceration					
Necrosis					
Size (width x height x depth in cm)					
Fever					
Other (physician follow-up, patient education etc.)					
Initials					

If you initial this form, you must complete the Interdisciplinary Signature Sheet at the front of the Patient chart.

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Appendix C Patient Teaching Documents

Found on the Patient Health Education Materials web page (search Extravasation)

Extravasation - Patient Instructions: azacitidine, bendamustine, bortezomib, CISplatin, dacarbazine, doxorubicin liposomal, gemcitabine, ifosfamide, melphalan

Inpatient: FE.225.C18.PHC

Outpatient: FE.225.C18op.PHC

Extravasation - Patient Instructions: DAUNOrubicin, DOXOrubicin, mitomycin, mitoxantrone

Inpatient: FE.225.C182.PHC

Outpatient: FE.225.C182op.PHC

Extravasation – Patient Instructions: vinBLAStine, vinCRIStine, etoposide

Inpatient: FE.225.C183.PHC

Outpatient: FE225.C183op.PHC

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