

CONSIDERATIONS:

1. Infiltration is the inadvertent escape of a nonvesicant solution into surrounding tissue. Extravasation is the inadvertent escape of a vesicant solution into surrounding tissue.
2. A vesicant is a solution or medication that has the potential, even in small amounts, to cause cellular damage or tissue necrosis if leakage into the tissue occurs. The home care nurse should have knowledge of the characteristics of medications/solutions administered and their potential to cause tissue damage with infiltration or extravasation. The nurse should consult with the home care pharmacist and/or physician related to concerns about the ordered infusate.
3. Infiltration and extravasation are caused by mechanical (e.g. too large catheter, poor catheter stabilization, site in an area of flexion), pharmacological (e.g. pH, osmolarity, vasoconstrictive, cytotoxic), and physiologic factors (e.g. thrombus/fibrin sheath at catheter tip).
4. Infiltration/extravasation can happen with any venous access device. While most problems are commonly associated with short peripheral IV catheters, infiltration/extravasation can also occur with midline peripheral catheters, PICCs, tunneled or nontunneled central venous catheters, or implanted ports.
5. Prevention is the most important aspect to infiltration and extravasation management.
6. Vesicants should not be administered via a peripheral IV catheter in the home setting. Medications/solutions administered peripherally should generally have a pH between 5 and 9 and an osmolarity less than 600 mOsm/L to reduce risk to the endothelium of the peripheral vein.
7. Assessment of patency of the venous access device for patency is critical, including presence of a blood return upon aspiration, ability to easily flush the catheter, no evidence of swelling, and no reports of pain or burning. The infusion should not be administered if these characteristics are not present. The physician is notified and evaluation of catheter patency and function are required.
8. Infiltration/extravasation occurs during medication administration. With a peripheral IV catheter, signs and symptoms occur in the area of insertion site. With a central line, sign and symptom CVAD location is more variable. Immediate symptoms include pain and burning. Swelling is usually immediate and can be severe depending on the type, concentration, and volume of fluid leaked into the interstitial tissues.
9. The patient is instructed to immediately report any pain, burning, or stinging at the insertion site or along the entire venous pathway of administration including the catheter tip. The infusion should be stopped immediately with any such complaints.
10. Extravasation can cause severe local tissue damage and can erode deep tissues including muscles, tendons, nerves, and blood vessels. Irreversible neuromuscular and vascular damage may result. Infiltration of nonvesicants can cause tissue and nerve damage when a large volume of drug infiltrates and leakage happens in an area or tissue where circulation becomes severely compromised, as in compartment syndrome. Severe infiltration or extravasation can also initiate a chronic and exaggerated inflammatory process that can result in permanent altered sensation, pain, and loss of function.
11. Delayed symptoms may include, but are not limited to, blanching, bruising, redness, development of blisters, ulcers, sloughing, tissue necrosis, numbness, tingling, paresthesia, and impaired ability to move fingers, hand, or extremity.
12. The nurse should assess and document all signs and symptoms of infiltration/extravasation using a standardized scale (e.g. INS Infiltration Scale), interventions, and patient response.
13. Treatment of infiltration/extravasation is not well established in the literature. Nursing interventions for infiltration include thermal application and extremity elevation for 24 - 48 hours. With extravasation, physician and pharmacist advice as well as drug manufacturer's recommendations regarding use of antidotes should be obtained. Expediting treatment of a homecare patient with an extravasation may prevent more extensive tissue damage. The patient should be transported to a facility where the infiltration/extravasation is carefully evaluated and specialized, emergent care can be given.
14. Alarms from electronic infusion pumps should not be relied upon to signal infiltration or extravasation; infusion pumps do not detect infiltration/extravasation.

EQUIPMENT:

- Alcohol wipes
- Ice pack or warm pack, if appropriate
- Non-sterile gloves
- Chemo gloves, if appropriate
- Sharps container
- Commercially prepared biohazard/chemotherapy spill kit, if appropriate
- 2 x 2 gauze pad

PROCEDURE:

1. Adhere to Standard Precautions.
2. Stop the infusion of the infiltrated agent immediately.
3. Explain the procedure and purpose to the patient/caregiver.

4. Assemble the equipment on a clean surface close to the patient.
5. Place patient in comfortable position, making sure site is accessible.
6. Ensure adequate lighting.
7. Remove peripheral IV and apply gentle pressure to the site to prevent bleeding and facilitate hemostasis.
8. If the peripheral infiltration is significant (e.g. gross edema, skin blanched/translucent, presences of pain or numbness), or if it occurs with a central venous device, notify physician.
9. Mark the border of the affected area.
10. Initiate supportive measures which are appropriate such as elevation of the extremity and application of warmth or cold or follow specific physician orders.
11. Follow specific physician orders if a PICC or central line.
12. Ongoing monitoring and reassessment of the site should be arranged. Delayed clinically significant complications can result.

EXTRAVASATION

EQUIPMENT:

Non-sterile gloves
1 - 3 mL syringe
2 x 2 gauze pad
Warm or cold pack, if ordered
Extravasation antidote, if ordered

PROCEDURE:

1. Adhere to Standard Precautions.
2. Stop the infusion immediately.
3. Explain the procedure and purpose to the patient/caregiver.
4. Assemble the equipment on a clean surface close to the patient.
5. Place patient in comfortable position, making sure site is accessible.
6. Ensure adequate lighting.
7. Aspirate any residual drug/fluid from the catheter using a small syringe.
8. Notify physician and obtain specific orders for immediate treatment and arrange for transport to the emergency department/outpatient for evaluation and treatment. Treatment depends on the specific medication and the severity of the extravasation. Application of warmth or cold, antidotes injected subcutaneously, and surgical intervention may be indicated.
9. Ongoing monitoring and reassessment of the site should promptly be arranged. If delayed, permanent vascular/nerve damage can result.

AFTER CARE:

1. Instruct patient/caregiver regarding care of the affected area and responsibilities for follow-up observation.
2. Document in patient's record:
 - a. Time and date of extravasation
 - b. Interventions and treatment initiated
 - c. Medication administered method of administration, and estimated volume of fluid infiltrated/extravasated
 - d. Type and size of venous access device if removed, length of catheter and any irregularities in catheter integrity
 - e. Subjective symptoms reported by patient
 - f. Site appearance and location. Photograph infiltration/extravasation site if possible
 - g. Physician notification and communication
 - h. Intervention performed per doctor's orders
 - i. Patient/caregiver instruction and follow-up
3. Reassess vascular access needs.
4. Complete Incident or Unusual Occurrence Report per organizational policy.

REFERENCE:

- Doellman, D., Hadaway, L., Bowe-Geddes, LA et. al. (2009). Infiltration and Extravasation: Update on Prevention and Treatment. *Journal of Infusion Nursing* 32 (4), 203-211.
- Infusion Nurses Society (2011). Infusion Nursing Standards of Practice. *Journal of Infusion Nursing*. 34(1S), S1-S110.
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