Extravasation Management 1 (Vesicant and Contrast Agents)

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1Unintentional instillation, leakage, passage or escape of a vesicant out of a blood vessel into surrounding tissue. This may result in varying degrees of impairment including pain, necrosis, and tissue sloughing.
Extravasation Management (Vesicant and Contrast Agents)

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ADMINISTRATION OF VESICANT AGENT

Prior to starting infusion:
- CVAD required. If no CVAD, then nurse to contact ordering provider.
- Nurse to conduct pre-administration prevention strategies and line assessment (see Appendix B)
  - If any of the criteria are not met, do not start infusion and contact ordering provider and V&A&P Team

During infusion, monitor:
- Infusion flow rate
- Infusion site for signs and symptoms of extravasation after the first 15 minutes of infusion, then at least every 4 hours until completion
- Document as indicated

If infusion through PIV:
- Nurse to remain in room for entire infusion, monitor for signs and symptoms of extravasation
- Check for blood return and line patency:
  - IVBP every 5-10 minutes
  - IVP every 2-5 mLs
- Document as indicated

If infusion via CVAD preferred, see Box A above
- If only peripheral intravenous (PIV) access available, prior to starting PIV infusion:
  - Nurse to conduct pre-administration prevention strategies and line assessment (see Appendix B)
  - Avoid using established PIV access that is more than 24 hours old
  - Administer via new, non-traumatic adequately secured venipuncture site
  - If any of the criteria are not met, do not start infusion and contact ordering provider

After infusion:
- Document all assessment, interventions, evaluation, and patient education
- If patient experiences signs and symptoms of extravasation see Page 3 for management

CVAD = central venous access device
IVPB = intravenous piggyback
IVP = intravenous push
VA&P = Vascular Access and Procedures

1 Vesicant is any agent that has the potential to cause tissue destruction, blistering, severe tissue injury, or tissue necrosis when extravasated. Refer to current institutional list of vesicant agents.
2 See Appendix C for signs and symptoms of extravasation
3 This does not apply to patients who are going home with a CVAD other than an implanted venous port. Refer to Vascular Vesicant/Irritant Administration and Extravasation Policy (#CLN0986).
4 Refer to Medication Administration Record (MAR) Policy (#CLN0648)
5 If blood return and/or line patency cannot be established and there is no sign of infiltration, the infusion must be stopped and a PIV access must be restarted using a new site. Refer to Vascular Vesicant/Irritant Administration and Extravasation Policy (#CLN0986).
6 Refer to patient education Chemotherapy Vesicant Administration Special Instructions

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Extravasation Management (Vesicant and Contrast Agents)

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MANAGEMENT OF VESICANT EXTRAVASATION

Signs and symptoms of extravasation during infusion

Nursing interventions:
- Stop the infusion and assess the patient
- Notify provider STAT
- Grade affected area (see Appendix D)

Signs and symptoms of extravasation after infusion

Nursing interventions:
- Assess patient
- Notify provider STAT
- Grade affected area (see Appendix D)

Patient is on site (inpatient/ambulatory)

Patient is home

Is patient ready for discharge?

Yes

- Ensure patient has initial follow-up visit with provider within 24-48 hours from time of discharge
- Provider to determine subsequent visits needed (e.g., twice a week) after initial follow-up visit
- Photos to be taken at subsequent visits as clinically indicated

- Nursing interventions:
  - Review plan of care and provide patient and caregiver education
  - Document all assessment, interventions, evaluation, and patient education

No

- Refer patient to higher level of care
- Consider notifying Plastic Surgery if any concerns for:
  - Tissue compromise
  - Delayed skin healing
  - Skin infection

ACCC = Acute Cancer Care Center
1 Refer to Appendix C for signs and symptoms of extravasation
3 Nursing assessment to include checking capillary refill, motor function and sensation
4 For the main campus, the primary team/ordering provider is notified first. For after hours, holidays or weekends, contact the on-call advanced practice provider (APP), nocturnal team or the on-call provider for the ordering physician.
5 For Houston Area Locations (HALs), contact site-specific on-call provider or the primary team. For after hours and the weekend, contact the appropriate covering provider.
6 Subsequent photos to be obtained as clinically indicated. For medical photography, refer to Photographs – HIPAA Authorizations General Reference Tool (ATT1597)
7 Consider transfer of patient to ACCC based on clinical assessment and medical history. For patient at a HAL, consider calling 911 if appropriate.
8 Antidote to be ordered by provider after assessment and evaluation are completed
9 For additional documentation, see Appendix E
10 Refer to patient education Chemotherapy Vesicant Administration Special Instructions
11 Nurse to confirm patient is en route to ACCC or local Emergency Center. Recommend patient/caregiver to mark the boundary of the erythema with a pen and photograph the affected site, include time taken, and if photo taken using a mirror and upload by MyChart. Instruct patient to elevate affected extremity; do not apply any pressure on the affected area. If photo confirmed in MyChart, instruct patient to apply appropriate compress (see Appendix D).

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Department of Clinical Effectiveness V1
Patient to be administered intravenous (IV) contrast media in diagnostic imaging (DI)

DI technologist to administer contrast via power injector and follow DI Techniques for Administration of IV Contrast Agents (see Appendix G)
- If techniques for administration of IV contrast agents cannot be met, DI technologist/DI nurse to contact Radiologist
- Monitor for signs and symptoms of extravasation

DI technologist interventions:
- Stop infusion immediately
- Notify DI nurse

DI nurse interventions:
- Patient assessment, including neurovascular assessment of affected extremity/site
- Remove needle
- Mark and measure affected site
- Notify Radiologist

Radiologist interventions:
- Physical exam/assessment
- Determine any topical treatments, if indicated
- Contact ordering provider to discuss plan of care

Document all assessment, interventions, evaluation, and patient education

Patient to be discharged:
- If patient asymptomatic or has mild symptoms, follow plan of care as determined by Radiologist
- Document all assessment, interventions, evaluation, and patient education
- DI nurse will call patient 24-48 hours after imaging for follow-up

1 Refer to Administration of Contrast Media in Diagnostic Imaging Policy (#CLN1268)
2 Signs and symptoms of extravasation may include pain, tenderness, swelling, itching, skin tightness, redness
3 If after hours, contact DI on-call resident
4 Severe extravasation requires immediate surgical consult and includes one or more of the following signs or symptoms: progressive swelling or pain, altered tissue perfusion, change in sensation in the affected limb, worsening passive or active range of motion of the elbow, wrist, or fingers, and skin ulceration or blistering
5 Refer to Patient Education

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1 Extravasation Management (Vesicant and Contrast Agents)
   Department of Clinical Effectiveness
   Approved by the Executive Committee of the Medical Staff on 07/20/2021

DIAGNOSTIC IMAGING EXTRAVASATION MANAGEMENT
APPENDIX A: Extravasation Management of Vesicants

<table>
<thead>
<tr>
<th>VESICANT</th>
<th>IMMEDIATE TOPICAL THERAPY</th>
<th>ANTIDOTE1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthracyclines:</td>
<td>Apply COLD compress (remove at least 15 minutes prior to dexrazoxane administration)</td>
<td>Dexrazoxane</td>
</tr>
<tr>
<td>danorubicin, doxorubicin,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>epirubicin, idarubicin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alkylating agent:</td>
<td>Apply COLD compress for 6-12 hours after sodium thiosulfate injection</td>
<td>Sodium thiosulfate</td>
</tr>
<tr>
<td>mechlorethamine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinka alkaloids:</td>
<td>Apply WARM compress for 15-20 minutes four times daily for the first 24 hours.</td>
<td>Hyaluronidase2</td>
</tr>
<tr>
<td>vinblastine, vincristine,</td>
<td>Elevate extremity for peripheral extravasations.</td>
<td></td>
</tr>
<tr>
<td>vinorelbine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dactinomycin, mitomycin</td>
<td>Apply COLD compress for 15-20 minutes four times daily for the first 24 hours</td>
<td>No available antidote3</td>
</tr>
<tr>
<td>Vaspressors:</td>
<td>Apply WARM pack proximal to the cannulation site for 15-20 minutes four times daily</td>
<td>Phentolamine (preferred) or tertubaline if phentolamine not available</td>
</tr>
<tr>
<td>dobutamine, dopamine,</td>
<td>daily for the first 24 hours. Elevate extremity for peripheral extravasations.</td>
<td></td>
</tr>
<tr>
<td>epinephrine, norepinephrine,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>phenylephrine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Refer to Appendix F for Antidote Dosing and Administration
2 Hyaluronidase should be avoided with vasopressor and taxane related extravasations as it may worsen outcomes
3 For extravasated vesicants that do not have effective antidotes available, local non-pharmacologic measures and close monitoring are important.

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# Extravasation Management (Vesicant and Contrast Agents)

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## APPENDIX B: Pre-Administration Prevention Strategies

### Vesicant Administration Strategies

<table>
<thead>
<tr>
<th>CVAD Vesicant Administration:</th>
<th>Line Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All medications classified as vascular vesicants will be dispensed from pharmacy with an extravasation warning label</td>
<td>CVAD and PIV Line Assessment Include:</td>
</tr>
<tr>
<td>• Verify patient has received education materials¹ regarding specific drug being infused</td>
<td>A. Site assessment</td>
</tr>
<tr>
<td>• Recommended to be infused through a central vascular access device</td>
<td>B. Patency status (i.e., no resistance and presence of blood return during the flushing procedure)</td>
</tr>
<tr>
<td>• If infused over 60 minutes or greater, vesicant must be administered through a CVAD</td>
<td>C. Placement verification</td>
</tr>
<tr>
<td>• Avoid continuous infusions of vesicants through a femoral-placed implanted venous ports</td>
<td>D. Dressing status</td>
</tr>
<tr>
<td>• Continuous infusions of vascular vesicant through implanted venous ports are permitted only on inpatient units</td>
<td>E. Needleless connector status</td>
</tr>
<tr>
<td>• Short term infusions of vesicant agents through implanted venous ports may be administered in the Ambulatory Treatment Center (ATC), Clinical Translation Research Center (CTRC), or Houston Area Locations (HALs). Continuous infusion of vascular vesicant agents, e.g., home infusions, are prohibited for out-of-hospital/out-of-clinic treatment.</td>
<td>F. Line necessity</td>
</tr>
<tr>
<td>• If an infusion pump is required for administration of a vesicant drug, it must be administered through a CVAD</td>
<td>G. Any deviation in care</td>
</tr>
</tbody>
</table>

### Peripheral IV Vesicant Administration:

<table>
<thead>
<tr>
<th>Peripheral IV Vesicant Administration:</th>
<th>Needle Length Selection for Implanted Venous Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All medications classified as vascular vesicants will be dispensed from pharmacy with an extravasation warning label</td>
<td>• Needle length selection is dependent on nursing assessment of the depth of the reservoir (distance of the diaphragm from the skin)</td>
</tr>
<tr>
<td>• Verify patient has received education materials¹ regarding specific drug being infused</td>
<td>• The needle length selected should allow for the non-corning needle tip to come in contact with the base of the port reservoir and to rest as closely to the skin as possible</td>
</tr>
<tr>
<td>• Must be infused in less than 60 minutes</td>
<td></td>
</tr>
<tr>
<td>• Will be administered via new, non-traumatic (“clean stick”) adequately secured venipuncture site</td>
<td></td>
</tr>
<tr>
<td>• Avoid using an established PIV access that is more than 24 hours old</td>
<td></td>
</tr>
<tr>
<td>• Administration in the dorsum of the hand, any joint space or lower extremity require a physician order. Ensure adequate PIV securement and use joint stabilization device.</td>
<td></td>
</tr>
<tr>
<td>• Avoid using small, fragile veins, an extremity with previous multiple venipuncture sites, a vein below a recent (less than 24 hours) venipuncture site and/or venous access site</td>
<td></td>
</tr>
<tr>
<td>• Avoid using an extremity with altered sensation or recent/non-healed vesicant extravasation or infiltration site</td>
<td></td>
</tr>
<tr>
<td>• Administer with caution in patients with impaired cognition/mental status</td>
<td></td>
</tr>
<tr>
<td>• Must be administered via gravity drip or IV push (e.g., no pump administration). If the medication is administered via a pump, it must be infused through a CVAD. Vasopressors during an emergent situation will be an allowed exception and may be infused via a PIV through a pump, if deemed medically necessary.</td>
<td></td>
</tr>
</tbody>
</table>

¹ Refer to patient education Chemotherapy Vesicant Administration Special Instructions

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APPENDIX C: Signs and Symptoms of Vesicant Extravasation

Immediate extravasation: Refers to those reactions typically occurring during or shortly after vesicant administration
- Pain, redness, or swelling on or around the injection/infusion site
- Resistance when performing IVP
- No blood return
- Leakage of infusion around injection/infusion site
- Infusion flow that slows or stops

Delayed extravasation: Depending on the vesicant drug, reactions can occur up to 1-2 weeks after vesicant administration
- Persistent, worsening pain, redness on or around the injection/infusion site
- Blistering, sloughing off, ulceration

APPENDIX D: Grading of Infusion Site for Extravasation and Injection Site Reaction CTCAE v5

<table>
<thead>
<tr>
<th>Adverse Event</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infusion Site Extravasation</td>
<td>Painless edema</td>
<td>Erythema with associated symptoms (e.g., edema, pain, induration, phlebitis)</td>
<td>Ulceration or necrosis; severe tissue damage; operative intervention indicated</td>
<td>Life-threatening consequences; urgent intervention indicated</td>
<td>Death</td>
</tr>
</tbody>
</table>

APPENDIX E: Suspected Extravasation Documentation

- Date and time event occurred
- Estimated amount of vesicant infused
- Signs/Symptoms observed or reported by patient
- Site assessment (range of motion, if applicable), include images of affected site, if available. Every attempt to obtain photographs should be taken in order to better assess extent and progression of tissue damage in the area.
- Physician/designee notification
- Nursing interventions implemented
- Description and volume aspirated
- Antidote administration, if ordered
- Discharge instructions (include consults, follow-up care, and wound management, if applicable)
## APPENDIX F: Antidote Treatments

<table>
<thead>
<tr>
<th>Drug (antidote)</th>
<th>Use With</th>
<th>Dose</th>
<th>Administration</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Dexrazoxane     | Anthracyclines | Day 1: 1000 mg/m² (maximum dose 2000 mg)  
Day 2: 1000 mg/m² (maximum dose 2000 mg)  
Day 3: 500 mg/m² (maximum dose 1000 mg) | • Withhold cold pack 15 minutes prior to dexrazoxane infusion  
• Begin infusion as soon as possible and within 6 hours of anthracycline extravasation  
• Administer over 1 to 2 hours in a large vein in an area remote from the extravasation  
• Treatment on day 2 and 3 should start at the same hour (± 3 hours) as on day 1 | • Efficacy is optimal when administered within 6 hours of extravasation, although patients may still derive some benefit if received after this time  
• Avoid other topical antidotes (e.g., DMSO) as they may diminish dexrazoxane efficacy  
• Dexrazoxane may diminish antitumor response to anthracyclines. Clinical evaluation is required to fully assess the risk and determine whether re-dosing of the chemotherapy is warranted  
• Use with other chemotherapy agents is untested |
| Hyaluronidase   | Vinca alkaloids | 150 units-250 units | • Dosing based on the size of the affected area and can be repeated up to a total dose of 250 units  
• Inject the total dose subcutaneously (SQ) with a 25-gauge (G) needle using the pentagon approach  
  ○ Divide the total dose into 5 injections  
  ○ Administer across the affected area | Avoid use with taxanes and vasopressors due to potential for delayed healing |
| Phentolamine    | Vasopressors | 5-10 mg | • Administer as soon as possible and within 12 hours of vasopressor extravasion  
• Inject total dose SQ with a 25G needle using the pentagon approach  
  ○ Divide the total dose into 5 injections  
  ○ Administer across the affected area | • Efficacy is optimal when administered within 12 hours of extravasation, although patients may still derive some benefit if received after this time  
• FDA-approved with norepinephrine; off-label use with phenylephrine, dopamine, and epinephrine |

1 Providers should contact pharmacy to coordinate therapy  
2 If more than the recommended time has passed for when to give the antidote, it is still recommended that it be administered, although efficacy may be compromised  
3 Change needle with each injection

---

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<thead>
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<th>Use With</th>
<th>Dose</th>
<th>Administration</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Sodium thiosulfate    | Mechloretamine    | 4% solution (1/6 molar) solution  | • Order 2 mL of 4% solution for each 1 mg of drug  
• Inject the total dose SQ with a 25G needle using the pentagon approach  
  ○ Divide the total dose into 5 injections  
  ○ Administer across the affected area | Use with cisplatin and bendamustine are less substantiated |
| Terbutaline           | Vasopressors, if phentolamine is not readily available | 1 mg                              | • Volume administered will be 3-10 mL for large extravasations and 0.5-1 mL for small/distal extravasations  
• Inject the total dose SQ with a 25G needle or smaller using the pentagon approach  
  ○ Divide the total dose into 5 injections  
  ○ Administer across the affected area | Used off-label with sympathomimetic vasoconstrictors |

---

1 Providers should contact pharmacy to coordinate therapy
2 Change needle with each injection
# Extravasation Management ( Vesicant and Contrast Agents )

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## APPENDIX G: Techniques for Administration of IV Contrast Agents

### CT Procedures with Power Injected IV contrast:
- 18G needle is the preferred catheter to utilize for PIV and not the 20G needle
- 20G or 22G Diffusics™ may be used in routine protocols for difficult access patients
- If utilizing power port and/or Power PICC line, ensure it is accessed with 19G Power Needle

### MRI Procedures with Power Injected IV contrast:
- 20G is preferred catheter to utilize for PIV verses with power injection
- 22G Diffusics™ may be used with power injection for difficult access patients
- If utilizing power port and/or Power PICC line, ensure it is accessed with 19G Power Needle
- Hand access is allowed when hand injecting only and/or using a 22G

### Additional Instructions for Administering Contrast Agents
- Placement of IV catheters should be at least above patients’ wrist and if possible, utilize antecubital site when using power injection
- Avoid placing the IV on the hand with power injection
- If unable to get access in the arms and in need of a foot access, a Radiologist order is required and the rate should be 2 mL/sec or less to minimize risk of extravasation
- If patient’s primary cancer is breast cancer, utilize contra-lateral side of breast cancer
- IV contrast media should be administered by power injector through a flexible plastic cannula
  - Use of metal needles for power injection should be avoided whenever possible
- Flow rate should be appropriate for the gauge of the catheter used
  - Although 22G catheters may be able to tolerate flow rates up to 5 mL/sec, a 20G or larger catheter is preferable for flow rates of 3 mL/sec or greater
- An antecubital or large forearm vein is the preferred venous access site for power injection.
  - If a more peripheral (e.g., hand or wrist) venipuncture site must be used, flow rates should be reduced if feasible (e.g., 1-2 mL/sec)

---

<sup>1</sup> Pediatric access may require a smaller gauge, along with a lower rate depending on age and protocol
Extravasation Management (Vesicant and Contrast Agents)

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SUGGESTED READINGS


This practice consensus statement is based on majority opinion of the Vesicant Extravasation Management experts at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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Brett Carter, MD (Thoracic Imaging)
Heather Cienfuegos, BSN, RN (Nursing Informatics)
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^† Core Development Team Lead
^* Clinical Effectiveness Development Team

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