

Prevention and Management of Extravasation in Adults (non-cytotoxic) Clinical Guideline

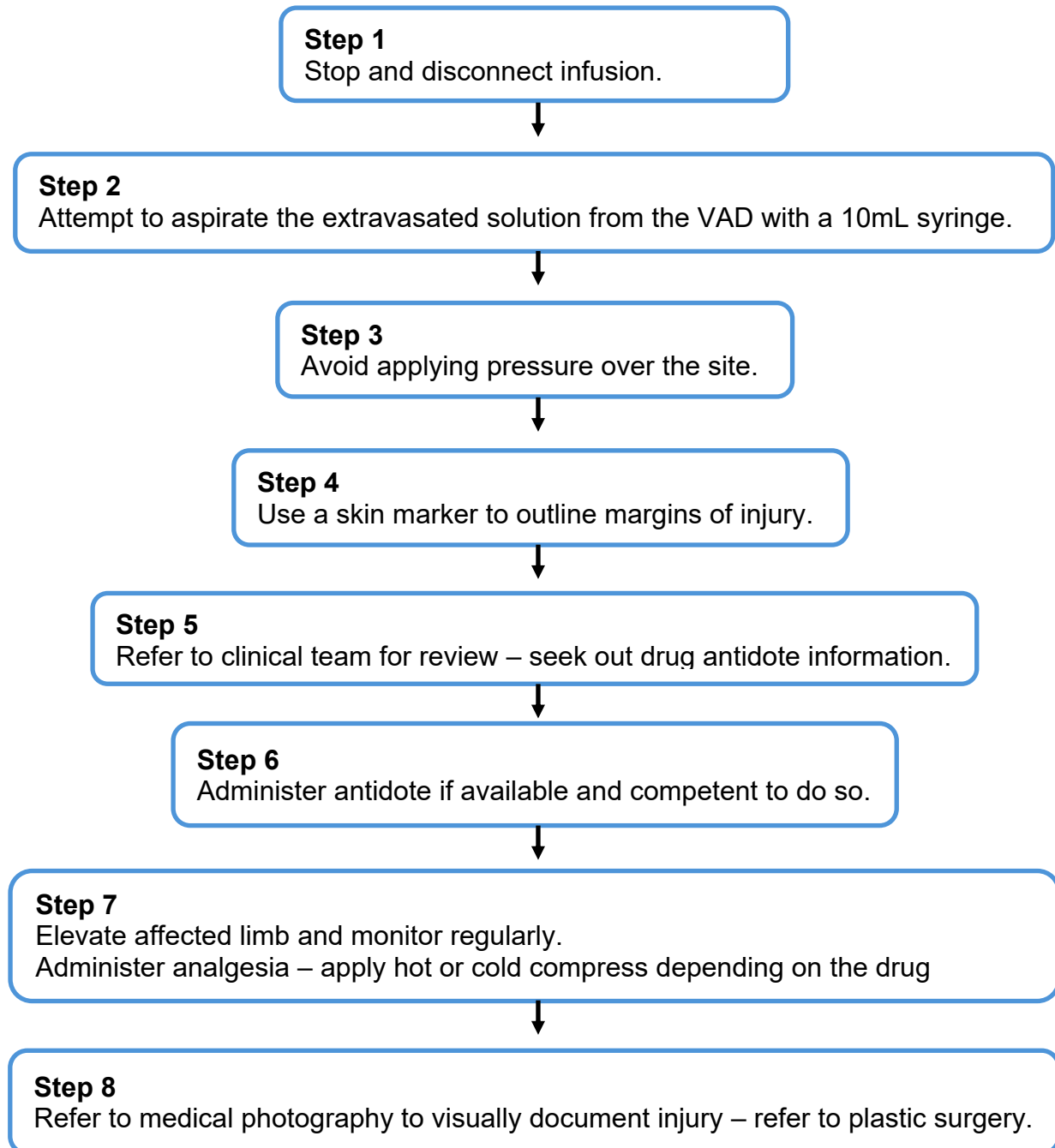
V1.0

September 2026

Summary: Treatment of Peripheral Line Extravasation

Extravasation should be suspected if one or more of the following symptoms have occurred:

- The patient complains of burning, stinging, pain or any discomfort at the injection site. This should be distinguished from a feeling of cold that may occur with some drugs.
- Observation of swelling, redness, mottling or blistering at the injection site. This should be distinguished from the 'nettle rash' or 'flare' effect seen with some drugs.



([NIVAS - Infiltration and Extravasation](#))

1. Aim/Purpose of this Guideline

- 1.1. This document outlines guidelines for the treatment of non-SACT / non-Cytotoxic extravasation injuries within Royal Cornwall Hospital Trust.

Note: Adult Systemic Anti-Cancer Therapy (SACT) Extravasation Prevention and Management must follow the separate RCHT clinical guideline:

> RCHT 'Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline'

- 1.2. This document provides a guideline to assist practitioners in the care of patients who may have experienced an extravasation injury.

The main content of this guidance follows the document produced by National Infusion and Vascular Access Society (NIVAS) > Infiltration and Extravasation – A Toolkit to Improve Practice (NIVAS V1 Feb 2024). Recognition must be given to NIVAS for kindly sharing their content.

Relevant content has also been taken from the well-established document RCHT 'Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline' with permission from the authors.

- 1.3. This document will provide a basis for all healthcare professionals to recognise ways in which to help prevent and manage extravasations and how to recognise when an extravasation has occurred.

- 1.4. This version supersedes any previous versions of this document.

Data Protection Act 2018 (UK General Data Protection Regulation – GDPR) Legislation.

The Trust has a duty under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 please see the Information Use Framework Policy or contact the Information Governance Team.

Royal Cornwall Hospital Trust rch-tr.infogov@nhs.net

2. The Guidance

2.1. Definition

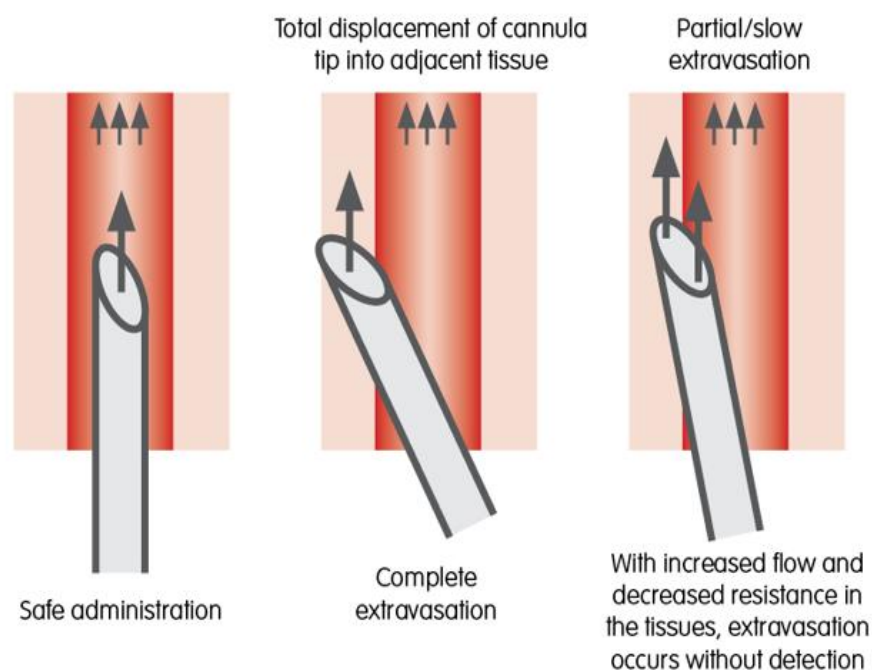
- 2.1.1. Extravasation is the accidental leakage or accidental infiltration of intravenous medications or fluids into the tissues surrounding the vein. This can cause serious harm to the patient and lead to an immediate inflammatory painful reaction. With some drugs this may result in local tissue destruction (necrosis) and other complications. Prompt management is required in the event of an extravasation (NHS Resolution, 2022).
- 2.1.2. The treatment required may depend on the volume of drug, the type of drug, the type of vascular access device (VAD) used, the location of the peripheral VAD (e.g., cannula) and other comorbidities. If a large volume of any classification of drug extravasates, it has the potential to cause complications and should be carefully managed.
- 2.1.3. See ([NIVAS - Infiltration and Extravasation](#)) for a list of common high-risk pH, high osmolarity, vasopressor and vesicant non-cytotoxic drugs.
- 2.1.4. Classification of Drugs:
 - Neutrals: do not cause ulceration, inflammation or damage and are unlikely to produce an acute reaction or progress to necrosis.
 - Inflammitants: capable of mild to moderate inflammation and irritation and flare in local tissues, in addition to painless erythema and elevation (Flare reaction) at the extravasation site.
 - Irritants: capable of causing inflammation, irritation and pain at site. They rarely proceed to the breakdown of tissues. They do have the potential to cause ulceration only if a large amount has extravasated into the surrounding tissue.
 - Exfoliants: capable of causing inflammation and shedding of the skin but are less likely to cause tissue death. They can cause pain and may have a low-level vesicant potential which can cause superficial tissue injury.
 - Vesicants: these drugs that can result in tissue necrosis and or the formation of blisters/ulceration when accidentally infused into the tissues surrounding the vein. If left untreated this may lead to tissue damage and necrosis and or the formation of blisters/ulceration.
- 2.1.5. Aiming to prevent and reduce the risk of extravasation is essential. Extravasation Injury claims to NHS Resolution from 1 April 2011 until 31 March 2021 have so far cost the NHS £15.6 million (2022 NHS Resolution).

<https://resolution.nhs.uk/wp-content/uploads/2023/05/Did-You-Know-Extravasation.pdf>

- 2.1.6. Contributing factors that can increase each individual patient's risk of extravasation are detailed in [Appendix 3](#).
- 2.1.7. In the event of a suspected extravasation, contact pharmacy or the on-call pharmacist for additional advice. Information can also be found on MEDUSA or the BNF.

2.2. Prevention

- 2.2.1. Choice of VAD: choosing the right VAD > for the right treatment > at the right time > all essential in the prevention of extravasations (NIVAS 2024).
- 2.2.2. Catheter to vessel occupancy: for peripheral vascular access with a cannula, a large vein sited away from joints or tendons should be selected - the smallest possible cannula in the biggest vein (see [NIVAS - Infiltration and Extravasation](#)).
- 2.2.3. Partial Displacement Syndrome: this can be prevented by ensuring that the cannula is placed safely and directly into the vein. If the cannula is sitting part in the vein and part in the surrounding tissue, this has the potential to cause increased flow rate with decreased resistance in the tissues, leading to a potential undetected extravasation (Roe, H 2016).



- 2.2.4. Assessment of risk factors relating to the suitability of the drug being administered > for example pH, Osmolarity, Viscosity, Volume of Dilution, Speed of Infusion, Size and Fragility of a peripheral vein (Hallam et al 2021).
- 2.2.5. Assessment of patient risk factors (see [Appendix 3](#)).
- 2.2.6. Healthcare Professional Education.
- 2.2.7. Patient Education and obtaining informed consent.

2.2.8. Following drug administration guidelines.

2.2.9. Early recognition of a suspected extravasation and prompt intervention.

2.3. Recognition

2.3.1. Extravasation Signs and Symptoms:

An **Extravasation** should be suspected if one or more of the following symptoms have occurred:

- The patient complains of burning, stinging, pain or any discomfort at the injection site. This should be distinguished from a feeling of cold that may occur with some drugs.
- Observation of swelling, redness, mottling or blistering at the injection site. This should be distinguished from the 'nettle rash' or 'flare' effect seen with some drugs.

Extreme caution should be taken when no blood return is obtained on aspiration. However, this may not be a sign of extravasation if found in isolation. Equally the presence of blood return does not exclude a possible extravasation. Follow the Management of Extravasation (non-cytotoxic) Flow Chart (See [Summary](#)).

Extreme caution should be observed if increased resistance is felt on the plunger of a syringe on a bolus drug administration. This should be followed by an immediate re-assessment of patency of access.

In the absence of free-flowing fluid or if the rate of flow is remarkably reduced or if the infusion pump is alarming because of increased pressure, this must be investigated immediately.

2.3.2. Chemical phlebitis:

Definition: Chemical phlebitis is caused by irritation from the drug or fluid being infused. Contributing factors include the level of osmolarity and pH of the drug or fluid.

Signs and symptoms: Pain, skin tightness or swelling, redness and potential for skin puckering of the skin caused by sclerosis of the veins. Phlebitis results from an inflammatory response and so symptoms can often present late.

Risk Reduction: Drug specific additional larger flushing volumes can help reduce risk or the use of free-flowing saline for drugs that require bolus administration.

Management guidance: Regarding peripheral venous access, if a new cannula is required to continue with intravenous drug administration, then alternating the site of the cannula from left to right arm is recommended to reduce the risk of chemical irritation to the veins and the potential for tissue damage and venous sclerosis.

It is also important to identify individual patient risk for developing these symptoms and advance plan for the placement of a central venous access device.

Extravasation injury should always be suspected until proven otherwise.

2.3.3. Flare Reaction Management:

It is possible for some non-vesicants and vesicants to cause a flare reaction. A flare reaction can be defined as a local allergic reaction without pain that is usually accompanied by red blotches along the vein. Symptoms of flare should subside within 30 minutes with or without treatment. If a flare reaction is suspected, then extravasation **MUST** first be excluded.

Extravasation injury should always be suspected until proven otherwise.

2.4. Treatment

2.4.1. Treatment of Peripheral Line Extravasation

2.4.1.1. Initial first aid treatment for all drugs:

- Stay calm; get help from a senior nurse.
- Explain to the patient what you suspect may have happened and the procedures for dealing with this so you can obtain their co-operation.
- Obtain an extravasation kit from Pharmacy.
- Immediately stop the injection/infusion leaving the cannula in place. If the medication is critical or time sensitive, the medical team must be informed immediately.
- Aspirate any residual drug and blood from the cannula using a 10ml luer-lock syringe. This will allow the direct removal of as much of the drug as possible at the site of the extravasation thereby minimising progressive local injury and reducing subsequent tissue damage.
- Mark any demarcated area with an indelible pen.
- Remove the cannula, unless directed otherwise by a medical professional.
- Determine whether the agent that has extravasated requires the application of a hot or cold compress and apply to the suspected extravasation site.
- Elevate the affected limb.
- Offer patient appropriate analgesia and reassurance.

- Obtain photographs of extravasated area using appropriate clinical photography.
- The details of the extravasation incident together with all the treatment administered must be documented in the patient's medical notes and incident report via Datix and a RCHT extravasation data collection form available in the extravasation kit.
- Confirm all the initial first aid procedures have been completed. Immediately contact senior doctor.
- The most important indicator of the severity of extravasation is pain.
- For small amounts of extravasated drug (suggested 3mls or less) apply a **hot** or **cold** compress as recommended. If the patient is systemically unwell, give an intravenous dose of 100mg Hydrocortisone via a newly inserted cannula and 4mg dose of oral chlorphenamine.
- Treat with appropriate antidote as advised by the Specialist Pharmacist.
- Extravasation injuries treated with specific antidotes should be reviewed 4 hourly over the first 12 hours for signs of deterioration, then after 24 hours, 72 hours and weekly until resolved (NIVAS 2024).
- If any deterioration is noted during this period, the on-call plastic surgeon will need to be contacted by the named patient consultant.
- **Do not cover with bandaging** - leave the site clear and continue to observe for 24 hours.
- If a larger volume (e.g., greater than 3mls) of a vesicant drug has extravasated refer to Plastic Surgery. There is no plastic surgery team in RCHT. The on-call medical team should therefore contact Derriford hospital for further escalation and referral.
- Referral within a few hours is essential if active treatment to remove extravasated substance is to be performed.
- If the skin viability is compromised, dressing advice can be obtained from the tissue viability team.

2.4.2. Exfoliants

- 2.4.2.1. Confirm all the initial first aid procedures have been completed.
- 2.4.2.2. For extensive extravasations of exfoliant drugs treat in the same way as a vesicant extravasation. The most important indicator of the severity of extravasation is pain.
- 2.4.2.3. For small amounts of extravasated drug causing only minor symptoms apply 1% hydrocortisone cream, apply **hot** or **cold compress** and consider giving an intravenous dose of 100mg Hydrocortisone and 4mg dose of oral chlorphenamine via a newly inserted cannula in the non-affected arm.
- 2.4.2.4. If more severe symptoms develop after this follow the vesicant treatment instructions.
- 2.4.2.5. Continued monitoring for several days may be recommended. Arrange follow up in the appropriate clinical area as indicated by the medical team ([NIVAS - Infiltration and Extravasation](#))
- 2.4.2.6. If the skin viability is compromised, dressing advice can be obtained from Tissue Viability.

2.4.3. Irritant / Inflammatory Agents

- 2.4.3.1. Confirm all the initial first aid procedures have been completed.
- 2.4.3.2. With irritant drugs there exists the possibility of some local inflammation and rarely necrosis, and/or some pain in sensitive individuals.
- 2.4.3.3. For small amounts of an extravasated drug causing only minor symptoms apply 1% hydrocortisone cream, apply **hot** or **cold** compress depending on the drug that has extravasated.
- 2.4.3.4. For a large volume extravasation consider the risk of a more significant reaction. Apply 1% hydrocortisone cream and if systemically unwell, consider giving an intravenous dose of 100mg Hydrocortisone and 4mg dose of oral chlorphenamine.
- 2.4.3.5. Inform the patient that if there appears to be any deterioration in the injury, they must contact the appropriate clinical area immediately and arrange for the injury to be reviewed the following day ([NIVAS - Infiltration and Extravasation](#))
- 2.4.3.6. If the skin viability is compromised, dressing advice can be obtained from Tissue Viability.

2.4.4. Neutral / non-vesicants

- 2.4.4.1. If an extravasation of a non-irritant occurs, aspirate as much fluid as possible then remove the cannula. No further treatment should be required. Manage the situation symptomatically.
- 2.4.4.2. For all extravasations, the details of the incident must be documented in the patient's medical notes together with the drug and volumes administered. Completion of the RCHT incident reporting form (Datix) and RCHT Extravasation data collection form is required (available in the Pre-Prepared Extravasation kit).
- 2.4.4.3. Provide the patient with verbal and written information relating to the extravasation incident.

2.4.5. Extravasation from Central Venous Access Devices: PICC's, Skin Tunnelled Catheters and Implanted Ports

- 2.4.5.1. Although less likely to occur an extravasation from an indwelling central line can be particularly problematic because of the depth of the line. Signs and symptoms may develop more slowly and not be as obvious.
- 2.4.5.2. Extravasation can occur in any part of the line.
- 2.4.5.3. Extravasation can occur due to fracture of the catheter possibly related to a blocked segment of line, perforation of the superior vena cava on insertion, formation of a fibrin sheath on the catheter are some of the potential reasons.
- 2.4.5.4. Patients should be educated of the possibility of this happening and that burning or pain on administration is not normal and should be reported immediately.
- 2.4.5.5. Regardless of drug classification, stop the administration leave the central line in place. Immediately refer to senior member of staff, registrar and/or patients' consultant. Seek advice from vascular access team during working hours.
- 2.4.5.6. Aspirate as much as the drug as possible.
- 2.4.5.7. Mark area with pen and take digital pictures of area.
- 2.4.5.8. Apply **hot** or **cold** compress depending on the drug that has extravasated. Consider (depending on classification of drug) administering an intravenous dose of 100mg Hydrocortisone and 4mg dose of oral chlorphenamine, via a new peripheral cannula if systemically unwell. **Do not use the line if catheter fracture is suspected.**
- 2.4.5.9. Referral to a plastic surgeon should be made in most cases depending on the classification of the drug and in discussion with the patients' consultant (or consultant on call).

- 2.4.5.10. The line should be x-rayed and removed as soon as clinically appropriate if fractured.
- 2.4.5.11. The details of the extravasation incident together with the drugs and volumes administered must be documented in the patient's medical notes, the RCHT incident reporting system (Datix) and RCHT Extravasation data collection form, available in the extravasation kit.

2.4.6. Mixed Extravasations

- 2.4.6.1. In the event of an extravasation where different agents may have been given the following applies:
- 2.4.6.2. The order of priority is vesicant, exfoliants, irritant.
- 2.4.6.3. For drugs of different classifications apply the temperature compress of the drug that takes priority
- 2.4.6.4. For drugs of the same classification a cold compress takes priority over a hot compress.

3. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	Intravascular device care plans.
Lead	Deputy of Infection Prevention and Control and Heads of Nursing.
Tool	Device specific intravascular care plans. Audit tools on the Trusts electronic audit system. IPAC moderated audits to be collected on Excel spreadsheet.
Frequency	Electronic auditing of intravascular devices is completed monthly by clinical areas. Results are reported monthly at IPAC steering group. IPAC complete an annual intravascular device audit. Reported once per year at IPAC steering group and IPAC committee.
Reporting arrangements	Vascular Access Working Group. RCHT Infection Prevention and Control Committee.
Acting on recommendations and Lead(s)	As above.
Change in practice and lessons to be shared	Required changes to practice will be identified and actioned within an agreed timeframe that is specific to the complexity of the change. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders via embedded learning channels.

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the [Equality Diversity And Inclusion Policy](#) or the [Equality and Diversity website](#).

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Information Category	Detailed Information
Document Title:	Prevention and Management of Extravasation in Adults (non-cytotoxic) Clinical Guideline V1.0
This document replaces (exact title of previous version):	New Document
Date Issued/Approved:	August 2026
Date Valid From:	September 2026
Date Valid To:	September 2029
Directorate/Department responsible (author/owner):	Claire Tapping, Systemic Anti-Cancer Therapy (SACT) CNS
Contact details:	01872 258095
Brief summary of contents:	The purpose of this document is to provide health care professionals with the knowledge and tools to aid the prevention, recognition and management of extravasation and infiltration of intravenous medications and intravenous fluids.
Suggested Keywords:	Extravasation, Infiltration, non-cytotoxic, intravenous medication management, intravenous fluid management.
Target Audience:	RCHT: Yes CFT: No CIOB ICB: No
Executive Director responsible for Policy:	Chief Nursing Officer
Approval route for consultation and ratification:	Vascular Access Working Group. RCHT Infection Prevention and Control Committee.
Manager confirming approval processes:	Joanne Taylor
Name of Governance Lead confirming consultation and ratification:	Joanne Taylor
Links to key external standards:	None required
Related Documents:	RCHT 'Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy

Information Category	Detailed Information
	in Adults Clinical Guideline' version 6.0, 2022. Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline David et al (2020) 'Extravasation of Noncytotoxic Drugs', Annals of Pharmacotherapy. Vol 54 (8) 804 – 814. NIVAS (2024) 'Infiltration and Extravasation: A toolkit to improve practice', National Infusion and Vascular Access Society (NIVAS) in association with Patient Safety Learning /The Hub. Version 1 Feb 2024. Infiltration and Extravasation A practical Guide [accessed online: 24.10.2024] NHS Resolutions (2022) 'Did you Know? Extravasation', NHS Resolutions. https://resolution.nhs.uk/wp-content/uploads/2023/05/Did-You-Know-Extravasation.pdf Hallam et al (2021) 'UK Vessel Health and Preservation (VHP) Framework: a commentary on the updated VHP 2020' https://journals.sagepub.com/doi/pdf/10.1177/1757177420976806 UK Vessel Health and Preservation (2020) [accessed online: 24.10.2024] Roe, H (2016) 'Managing chemotherapy extravasations in practice', Hospital Pharmacy Europe. https://hospitalpharmacyeurope.com/news/editors-pick/managing-chemotherapy-extravasations-in-practice/ [accessed online: 29.11.2024]
Training Need Identified?	No.
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet
Document Library Folder/Sub Folder:	Clinical/Infection Prevention and Control.

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
August 2026	V1.0	Initial issue.	Vascular Access Working Group. Claire Tapping, SACT CNS, Cancer Services.

All or part of this document can be released under the Freedom of Information Act 2000.

All Policies, Strategies and Operating Procedures, including Business Plans, are to be kept for the lifetime of the organisation plus six years.

This document is only valid on the day of printing.

Controlled Document.

This document has been created following the Royal Cornwall Hospitals NHS Trust [The Policy on Policies \(Development and Management of Knowledge Procedural and Web Documents Policy\)](#). It should not be altered in any way without the express permission of the author or their Line Manager.

Appendix 2. Quality and Equality Impact Assessment (QEIA) Form

The QEIA process allows RCHT to monitor the impact of changes to its policies and services, ensuring that nobody is unduly disadvantaged.

Please ensure you have completed a Quality and Equality Impact Assessment (QEIA) using this link to complete the form:

[E11 QEIA Policy](#).

For guidance, please see the [QEIA Essentials – Quick Reference Guide](#) or contact as required below:

Equality, Diversity and Inclusion guidance, please contact: rcht.inclusion@nhs.net.

Quality Governance guidance, please contact Jillian Tozer: jillian.tozer3@nhs.net

Appendix 3. Contributing factors that increase the risk of extravasation

- Risk assessment of veins should be carried out by an experienced practitioner.
- For peripheral vascular access with a cannula, a large vein sited away from joints or tendons should be selected - the smallest possible cannula in the biggest vein (see [Appendix 4](#)).
- Care of all vascular access devices should follow associated trust guidelines and include documented twice daily VIP assessments and twice daily flushes.
- Insertion of cannulas over joints and bony prominences should be avoided as displacement of the cannula is more likely and tissue damage in this area may have serious consequences.
- It is recommended that the antecubital fossa or hand should only be used as a last resort and in extreme circumstances where a central line cannot be placed. This is only after discussion and agreement with an experienced healthcare professional.
- Rotation of cannulation sites on each treatment may help to minimise vein trauma. Some patient groups are at increased risk of extravasation. These include the elderly, paediatric patients, patients on anticoagulants, thrombocytopenic patients, unconscious or sedated patients, patients with lymphedema, patients with peripheral neuropathy or peripheral circulatory diseases and obese patients. Extra care should be taken with these patient groups, and they should be escalated for central venous access at the earliest opportunity if access is becoming problematic.
- Elderly patients can be more at risk of extravasation as they may have more fragile skin and veins. They can also be confused or agitated, pull at and dislodge cannulas.
- Patients with communication difficulties, such as those with learning difficulties or those unable to speak English, may potentially be at more risk of extravasation injuries going unnoticed.
- Careful consideration should be given to those patients who have recently had venepuncture or previous cannulation attempts, and the location of these must be investigated.
- Patients with underlying medical conditions, such as diabetes, peripheral circulatory diseases, lymphedema, and previous breast surgery may have more associated risk factors and limited choice for the practitioner regarding venous access.
- Patients receiving anticoagulants may be more predisposed to bleeding this may potentially increase the risk of extravasation by increasing local bleeding.
- Patency of the vascular access device should be established prior to and during the administration of vesicants, using flash back observation of blood.
- The infusion site should always be visible during drug administration.

Note: This is not an exhaustive list.

Appendix 4. Follow up documentation chart for an Extravasation

Hyperlink available below to directly access this form from the RCHT Forms-To-Print webpage.

[CHA4576: Documentation for Suspected Extravasation of vesicant / exfoliant drug \(cornwall.nhs.uk\)](https://www.cornwall.nhs.uk/Forms-To-Print/CHA4576-Documents-for-Suspected-Extravasation-of-vesicant-exfoliant-drug)

Appendix 5. Extravasation patient information leaflet

Hyperlink available below to directly access this leaflet from the RCHT Patient Information webpage:

[Extravasation \(cornwall.nhs.uk\)](https://www.cornwall.nhs.uk/patient-information/Extravasation)