Policy Document

Reference: C39

University Hospitals of North Midlands NHS Trust

Accidental Infiltration or Extravasation of Prescribed Intravenous Drugs: Prevention, Recognition and Effective Management

Version:	**4.1**
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Policy Author:	**Lead Nurse Policy & Professional Guidance**
Executive Lead:	**Chief Nurse / Chief Medical Officer**

Version Control Schedule

Version	Issue Date	Comments
1	December 2011	Policy developed
2	August 2015	Policy reviewed
3	January 2019	Policy reviewed
4	March 2022	Policy reviewed
4.1	June 2024	Addition of reporting of extravasation via Yellow card Scheme

Statement on Trust Policies

The latest version of 'Statement on Trust Policies' applies to this policy and can be accessed here

University Hospitals of North Midlands NHS Trust

Equality Impact Assessment (EIA)

The Trust aims to design and implement services, policies and measures that meet the diverse needs of our service, population and workforce, ensuring that none are placed at a disadvantage over others. The Equality Impact Analysis Form is designed to help consider the needs and assess the impact of each policy. To this end, EIAs will be undertaken for all policies.

Does this policy have the potential to affect any of the groups listed below differently - please complete the below. Prompts for consideration are provided, but are not an exhaustive list

Group	Is there a potential to impact on the group? (Yes/No/Unsure)	Please explain and give examples	Actions taken to mitigate negative impact
Age (e.g. are specific age groups excluded? Would the same process affect age groups in different ways?)	No		
Gender (e.g. is gender neutral language used in the way the policy or information leaflet is written?)	No		
Race (e.g. any specific needs identified for certain groups such as dress, diet, individual care needs? Are interpretation and translation services required and do staff know how to book these?)	No		
Religion & Belief (e.g. Jehovah Witness stance on blood transfusions; dietary needs that may conflict with medication offered)	No		
Sexual orientation (e.g. is inclusive language used? Are there different access/prevalence rates?)	No		
Pregnancy & Maternity (e.g. are procedures suitable for pregnant and/or breastfeeding women?)	Yes	Pregnant staff do not administer cytotoxic drugs	Closed system now in use on unit.
Marital status/civil partnership (e.g. would there be any difference because the individual is/is not married/in a civil partnership?)	No		
Gender Reassignment (e.g. are there particular tests related to gender? Is confidentiality of the patient or staff member maintained?)	No		
Human Rights (e.g. Does it uphold the principles of Fairness, Respect, Equality, Dignity and Autonomy?)	No		

Group	Is there a potential to impact on the group? (Yes/No/Unsure)	Please explain and give examples	Actions taken to mitigate negative impact
Carers (e.g. is sufficient notice built in so can take time off work to attend appointment?)	No		
Socio/economic (e.g. would there be any requirement or expectation that may not be able to be met by those on low or limited income, such as costs incurred?)	No		
Disability (e.g. are information/questionnaires/consent forms available in different formats upon request? Are waiting areas suitable?) Includes hearing and/or visual impairments, physical disability, neurodevelopmental impairments e.g. autism, mental health conditions, and long term conditions e.g. cancer.	No		
Are there any adjustments that need to be made to ensure that people with disabilities have the same access to and outcomes from the service or employment activities as those without disabilities?			**Yes/No**
			No
Will this policy require a full impact assessment and action plan?			**Yes/No**
			No

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1. INTRODUCTION

1.1 Extravasation of prescribed vesicant intravenous drugs

The University Hospitals of North Midlands NHS Trust NHS Trust (UHNM) is committed to ensure the safety and comfort of patients receiving prescribed drugs via the intravenous route of administration.

Extravasation should be minimised by following guidance on administration of intravenous medication on the MEDUSA web site: (login required)

http://medusa.wales.nhs.uk?ID=01ade7a21c9069316027b87fb92ec461007

There is a risk of infiltration or extravasation when **any** prescribed drugs are administered by the intravenous route. An infiltrated or extravasated drug has the potential to cause varying degrees of damage which can be dependent on the vesicant nature of the prescribed drug, the timely recognition that an extravasation has occurred, and the effective management of any such event. It is well known that some prescribed intravenous cytotoxic drugs are vesicant, and if they extravasate they can cause serious tissue damage/necrosis which can lead to loss of function or even loss of limb (EONS, 2009). It is also important to note that **many prescribed non-cytotoxic drugs also have vesicant properties** (Appendix 1).

Extravasation is a complex subject where there is limited evidence due to lack of research and a low incidence of reporting. (West Midlands EAG for SACT 2017, Hadaway, 2007; Doellman et al, 2009), however guidelines into the prevention, recognition and management of extravasation of prescribed vesicant drugs have been produced.

When administering Systemic Anti-Cancer Therapy (SACT), this policy is to be used in conjunction with the Guidelines for the Management of Extravasation of a Systemic Anti-Cancer Therapy including cytotoxic agents developed by the West Midlands Expert Advisory Group for Systemic Anti-Cancer Therapy (SACT) 2017.

https://wmcanceralliance.nhs.uk/clinical-leadership/expert-advisory-groups-m-z/systemic-anti-cancer-therapy-sact

The key points which must be recognised in order to ensure the safety and comfort of patients receiving prescribed drugs via the intravenous route of administration are:-

- A skilled and knowledgeable practitioner is the key to **preventing** infiltration and extravasation and to ensure the safe care of the patient. No one is permitted to administer intravenous therapy unless appropriately trained, and follows all relevant guidelines, routes of administration and is aware of any known side effects

- It is important that the practitioner can **recognise** the early signs and symptoms of an infiltration or extravasation.

- Management of an infiltration or extravasation requires **prompt and appropriate action** (Appendix 3)**.**

- Practitioners should be guided by an up-to-date, evidence based policy.

- The risks of infiltration and extravasation should never be overlooked during intravenous drug administration.(Dougherty, 2008)

1.2 Extravasation of prescribed non-vesicant intravenous drugs

This policy has been written to ensure that the extravasation of a prescribed vesicant intravenous drug is managed in a safe and effective manner. However, it must be noted that in certain circumstances, especially in the paediatric or frail adult patient, an extravasation of a prescribed irritant intravenous drug can also cause severe distress and a degree of short term tissue damage requiring some form of treatment in order to repair the damage caused. Therefore the principles contained in this policy can also be applied to these circumstances.

1.3 This policy should be read in conjunction with the following Trust Policies:

- MM02 – Safe Handling, Use and Administration of cytotoxic Agents and drugs Affecting Immune Response – specifically Appendix L
- MM03 – Storage, Prescription, Supply and Administration of medicines and within this policy as an appendix is MM09 with regards to intravenous Potassium

2. POLICY STATEMENT

ALL clinical staff involved with the intravenous delivery of prescribed drugs will:-

- Be trained and their competency checked prior to administering intravenous therapy
- **Provide** appropriate **monitoring** and **care** for intravenous cannulae.
- **Effectively manage** complications of any extravasation of prescribed vesicant intravenous drugs if they occur.
- **Inform** the Consultant/Registrar responsible for the patient.
- **Instigate appropriate and timely referral** to relevant clinicians for further management whenever necessary.
- **Inform** the patient of the situation and give timely and appropriate verbal and written advice (Appendix 6)
- **Inform** the patient's GP of the extravasation using the GP/Primary Care Information Sheet and e-discharge letter (Appendix 5).
- **Report** any extravasation using the DATIX system of Adverse Incident Reporting.

All reported incidents of extravasation will be considered at the Tissue Viability Steering Group, the Sister/Charge Nurse to attend the meeting.

3. SCOPE

This policy applies:-

- To all clinical staff who are directly involved in the administration of prescribed intravenous drugs.
- To all clinical staff providing care for patients receiving prescribed intravenous drugs.
- Whenever a patient is receiving prescribed drugs via the intravenous route.

4. DEFINITIONS

Word	Definition
Extravasation	The inadvertent leakage of a prescribed vesicant intravenous drug from its intended vascular pathway into the surrounding tissue
Infiltration	A leakage of a prescribed non-vesicant intravenous drug into the surrounding tissues
Vesicant	Capable of causing blisters, severe tissue injury or necrosis
Irritant	Drugs that are capable of causing inflammation and irritation, however if these drugs extravasate, they rarely cause tissue necrosis
Cytotoxic	Toxic to cells; causes cell death
Clinical expert	A practitioner who has the knowledge and skill to act as a role model and a source of advice in the prevention, recognition, and management of an extravasation of prescribed vesicant intravenous drugs

5. ROLES AND RESPONSIBILITIES

This policy describes the scope of clinical practice and supporting documentation required to ensure the safe management of extravasation injuries. Any practitioner administering intravenous drugs must follow the guidelines.

5.1 Medical Staff/Advanced Nurse Practitioners (ANP)/Medical Nurse Practitioners (MNNP)/Surgical Nurse Practitioners (SNNP), Specialist Radiographers will:

- Review any incidence of extravasation immediately and ensure that any treatment is specific to the extravasated drug.

- Refer any unresolved extravasation [appendix 7] to the relevant clinician (e.g. plastic surgeon) for further advice/management.

5.2 Associate Chief Nurses/Professional Head of Imaging will:

- Ensure an appropriate investigation is carried out and a Datix is completed on any incidence of extravasation, identify any trends and support the Matrons and Ward Sisters/Charge Nurses to ensure that evidence based practice is embedded into clinical practice.

5.3 Matrons will:

- Ensure that a list (Appendix 9) of commonly prescribed VESICANT drugs given intravenously within their area of responsibility is identified and clearly displayed. Identify from this list medicines appropriate for own clinical area.

- Ensure that procedures for the management of a vesicant extravasation are available, and pertinent, for each clinical area where the prescribed vesicant intravenous drugs are administered.

- Ensure that all the line managers of clinical staff in their area of responsibility are aware of this policy and that they achieve their responsibilities as identified below.

- Investigate any DATIX involving an extravasation.

- Organise internal audit of vesicants and clarify who is responsible

- Grade the DATIX using the Adverse Incident grading system in the Trust Policy RM07, and instigate any investigation/Root Cause Analysis (RCA) as indicated.

- Send a DATIX report of any Extravasation Incident to the Tissue Viability Specialist Nurse to be discussed at the next available Tissue Viability Steering Group.

5.4 Sisters / Charge Nurses will:-

- **Liaise with their ward pharmacist to :-**

  - have an agreed list of potential Vesicants (Appendix 9) for own clinical area and their approved antidote/action where appropriate, available in the clinical area

  - Ensure that antidotes are included in the ward stock list, and available for use.

  - Ensure that **instructions for the use** of identified antidotes/treatments are included in the extravasation kit (Appendix 2). The kit will be stored in an appropriate box clearly labelled with the label in Appendix 2.

  - Check weekly the extravasation kit for completeness and expiry dates

- Ensure that the procedure for managing an extravasation is followed (Appendix 3) and Royal Marsden (2015) and accurately documented (Appendix 4) and the incident is reported to medical staff.

- Ensure that the staff member involved completes a DATIX before the end of the shift, in the event of an extravasation or a near miss.

- Complete any investigation required in response to the DATIX of any extravasation within the time frame specified by the Adverse Incident grading system in the Trust Policy RM07 (UHNM, 2016).

- Include feedback from the DATIX and any resulting actions to all staff via ward meetings/minutes.

- Attend the Tissue Viability Steering group meeting to present/discuss the DATIX report of any extravasation incident as required.

- **Ensure that all clinical staff are aware of this policy and their responsibilities in the prevention, recognition, effective management and appropriate referral of any extravasation event:-**

  - Include in Ward/Departmental meetings.

  - Provide Minutes of the meetings for staff members unable to attend

  - Provide Teaching sessions

  - Keep a signed attendance list for all teaching sessions

  - Ask staff to read the Policy and provide a Self-Declaration list for staff to complete when they have read the Policy

  - Consider undertaking reflection sessions following any incidents to assist learning from mistakes

- Maintain and hold an accurate record of all clinical staff, who are directly involved in the administration of prescribed intravenous drugs using the e-rostering system.

- Identify any clinical staff who do not currently administer prescribed intravenous drugs, and if they need to develop this skill as part of their role, enable and ensure that these members of staff complete the UHNM Peripheral Venous Cannulation Competency Workbook (UHNM, 2016) before they can practice without supervision.

- Identify a member of the clinical team to act as a clinical expert in the prevention, recognition, effective management and appropriate referral of an extravasation. Record this using the e-rostering system.

- Ensure that an Extravasation kit is assembled and maintained and kept safely in the ward/department.

5.5 All clinical experts will:-

- Using a Trust recognised competency assessment tool be assessed as competent to administer prescribed intravenous drugs, with a self-declaration of competency via their appraisals.

- Have the knowledge to act as a source of advice on the prevention, recognition and treatment of extravasation of prescribed vesicant intravenous drugs.

- Assemble an extravasation kit to be kept in the ward/clinical area.

- Promote safe administration of prescribed vesicant intravenous drugs.

- Ensure that practice is up-to-date and that any changes in practice are disseminated to the clinical team in a timely manner.

- Be recorded as a clinical expert on the e-rostering system.

5.6 All clinical staff:-

Any registered Health Care Practitioner who is trained in cannulation, in preparation for the administration of vesicant agents should complete the UHNM Peripheral Venous Cannulation Competency Workbook.

Venepuncture and Cannulation Teaching Package

Forward the sign off sheet to Matrons and to their personal file.

- Monitor for extravasation whilst administering a vesicant agent being aware of their responsibilities in the prevention; of any extravasation event.

- Will be aware of the extravasation kit. Ensure extravasation kit is complete, all items are in date, and that this is confirmed with a daily signature Appendix 2

- Will use the Visual Infusion Phlebitis (VIP) score and documentation to assess, monitor and record the condition of any intravenous cannula sited in a patient in their care.

- Will complete a DATIX before the end of the shift in which an extravasation or near miss occurs.

- Will inform the Ward sister/charge nurse immediately in the event of an extravasation or near miss.

- Will ensure that any extravasation is reviewed by a Doctor/Advanced Nurse Practitioner (ANP)/Medical or Surgical Night Nurse Practitioner (M/SNNP) and referred for appropriate expert medical opinion/management if required.

- Will document any extravasation and actions taken in the patient's records (Appendix IV).

- Will inform the patient involved and their General Practitioner/Primary Care Nurse of the extravasation incident and give them written information of what treatment has been given and any further management that may be required (Appendix V and Appendix VI).

- Will inform the Consultant/Medical Team responsible for the care of the patient in the event of any extravasation.

- All medication extravasation incidents need to be reported via the Medicines and Healthcare Products Regulatory Agency (MHRA) Yellow Card Scheme.

  Yellow Card | Making medicines and medical devices safer (mhra.gov.uk)

6. EDUCATION/TRAINING AND PLAN OF IMPLEMENTATION

6.1 Policy

This policy will be published on the policies section of the UHNM Intranet.

6.2 Education and Training

It is the responsibility of the **Associate Chief Nurses, Specialist Radiographers**, **Sisters; Charge Nurses** to ensure a nominated member of staff from each clinical area will have responsibility to update the staff on this Policy

- An overview of the policy

- Prevention, Recognition, Management of Extravasation

- Their responsibility for Equipping area/ Cascading training to the clinical team/ Monitoring Adverse events / Audit

- A record of attendance at these sessions should be added to their MAPS Healthroster competency record.

7. MONITORING AND REVIEW ARRANGEMENTS

7.1 Monitoring Arrangements

Compliance with this policy where incidents of extravasation have occurred should be monitored by an audit conducted in the clinical area.

7.1.1 The Matron will

- Monitor the results of any audit

- Monitor any actions required to ensure compliance

- Submit a report on the results of any audit to the Directorate and Divisional Clinical Governance group.

7.1.2 The Ward Sister/Charge Nurse/Line Manager will

- Use the e-rostering system to record staff competencies
- Use the e-rostering system to identify the clinical expert
- Ensure that any audits are performed
- Write an action plan to ensure compliance is attained
- Report the results of the audit and the action plan to the Matrons

7.1.3 The Clinical Expert will

- Perform an audit – as required
- Report the results of the audit to the Ward Sister/Charge Nurse/Line Manager

7.2 Review

The evidence supporting the treatment of vesicant extravasation is sparse, therefore in order to ensure that practice remains as up to date as possible and that novel developments are integrated into current practice this policy will be reviewed every three years by the Policy Lead.

Any major changes in practice will be communicated to staff via updates sent to the Matrons.

8. REFERENCES

Doellman, D. Hadaway, L. Bowe-Geddes, L.A. Franklin, M. LeDonne, J. Papke-O'Donnell, L. Pettit, J. Schulmeister, L. Stranz, M. (2009). *Infiltration and extravasation: update on prevention and management*. Journal of Infusion Nursing. 32 (4). pp. 203-11.

Dougherty, L. (2008). *IV therapy: Recognising the Differences between Infiltration and Extravasation.* British Journal of Nursing, Vol.17, No 14, pp. 896-901.

Hadaway, L. (2007). *Infiltration and Extravasation.* American Journal of Nursing. 107. (8). pp. 64-72.

Perez Fidalgo, J.A. etal (2012) Management of chemotherapy extravasation: ESMO-EONS clinical Practice Guidelines. Annals of Oncology 23 (supplement 7)
The Royal Marsden Hospital: Manual of Clinical Nursing Procedures. (2015). (9th Edition). Available: UHNM Intranet – Clinical Section – Nursing & Midwifery - Procedures – The Marsden Manual – Chapter 15 & Chapter 16.

University Hospitals of North Midlands NHS Trust (NHS) Trust (UHNM). (2016).Peripheral Venous cannulation competency workbook . UHNM.

University Hospitals of North Midlands NHS Trust (NHS) Trust (UHNM). (2016). Trust Policy RM07: An Organisation-Wide Policy for the Management of Untoward Incidents (Including Serious Untoward Incidents. UHNM.

Appendix 1: How to monitor veins for signs of extravasation

	Signs & Symptoms	Action
Patient	Pain; Swelling; Redness; Discomfort; Burning; Stinging; other acute changes at site of extravasation	Treat with concern Check patency by looking for blood return Consider other possible diagnoses (see chart below) Record VIP score Record when cannula sited
Visual assessment	Early signs: Swelling/Oedema/Redness/Erythema; Late signs: Inflammation/ Induration/ Blistering	Monitor during and for some time following infusion/injection
Checking infusion	Increased resistance during administration Slow or sluggish infusion or change in infusion flow Lack or loss of blood return from cannula	Stop injection/infusion

- If extravasation suspected follow Procedure for Managing an Extravasation Flow Chart (Appendix 3)
- Record and monitor (Appendix 4)
- Inform Patient's GP/Primary Care Nurse (Appendix 5)
- Give patient a Patient Information Leaflet (Appendix 6)

How to distinguish extravasation from other conditions				
Characteristic	**Flare Reaction**	**Venous Irritation**	**Venous Shock**	**Extravasation**
Presenting Symptoms	Itchy blotches or hives; pain & burning uncommon	Aching & tightness	Muscular wall of the blood vessel in spasm	Pain & burning are common at the injection site; Stinging may occur during infusion
Colouration	Raised red streak, blotches or 'hive-like' erythema along the vessel; diffuse or irregular pattern	Erythema or dark discolouration along vessel		Erythema around area of needle or around the cannulation site
Timing	Usually appears suddenly and dissipates within 30-90 minutes	Usually appears within minutes after injection. Colouration may only appear later in the process	Usually appears right after injection	Symptoms start to appear right after injection, symptoms endure
Swelling	Unlikely	Unlikely		Occurs often; does not dissipate for several days
Blood Return	Usually, but not always intact	Usually, but not always intact	Often absent	Usually absent or sluggish

(EONS, 2007 - European Oncology Nursing Society)

Appendix 2: Management of Extravasation

The management of an extravasation is dependent upon a number of contributing factors:-

- The drug involved – i.e. whether it is DNA-binding or Non-DNA binding
- The volume extravasated
- The site of the extravasation

The early initiation of treatment reduces the potential for tissue damage and necrosis and therefore is a critical part in the management of extravasation. However in some cases an extravasation injury may not become apparent until a number of days or weeks later.

Extravasation is an oncology emergency and treatment should be initiated as soon as extravasation is suspected.

Appendix 3: Examples of prescribed intravenous drugs which can cause Vesicant Injury if Extravasated

([Dougherty, 2008b; EONS, 2007; National Extravasation Information Service, 2007](#)).

PRESCRIBED NON CYTOTOXIC VESICANT INTRAVENOUS DRUGS		
Hyperosmolar	**Acid & Alkaline Agents**	**Vascular Regulators**
• Antibiotics • Calcium Chloride • * Hypertonic Glucose (10% or greater) • Hypertonic Saline • Parenteral Nutrition • * Potassium Chloride (greater than 40mmols/l) • Sodium Bicarbonate • Radiologic Contrast Media	• Amphotericin • Etomidate • Methohexitone • Methylene Blue • Phenytoin, pH 12 • Thiophentone, pH10.5 • Aminophylline • Amiodorone • Cefotaxime • Cotrimoxazole • Erythromycin • Foscornet Sodium • GTN Infusion • Vancomycin	• Adrenaline • Dobutamine • Dopamine • Epoprostenol • Metaraminol • Noradrenaline • Prostoglandins • Vasopressin
OTHER PRESCRIBED NON-CYTOTOXIC VESICANT INTRAVENOUS DRUGS		
• Acyclovir • Calcium Gluconate	• Diazepam • Digoxin	• Gancyclovir • Mannitol 10% & 20%

PRESCRIBED CYTOTOXIC- DNA-BINDING VESICANT INTRAVENOUS DRUGS	PRESCRIBED CYTOTOXIC NON-DNA-BINDING VESICANT INTRAVENOUS DRUGS
Alkylating agents	**Vinca alkaloids**
• Dacarbazine • Mechlorethamine (Nitrogen Mustard)	• Vinblastine • Vincristine • Vindesine • Vinorelbine
Anthracyclines	
• Daunorubicin • Doxorubicin • Epirubicin • Idarubicin	
Others	
• Dactinomycin • Mitomycin C • Paclitaxel	

Those indicated in * **MUST NEVER** be given peripherally except in emergency/life threatening situations where benefits to the patients outweigh the risks of extravasation. The justification for using the peripheral route must be discussed and documented in the patient's medical records

THIS LIST IS NOT EXHAUSTIVE - For further information/advice contact Pharmacy Medicines Information Enquiries

Appendix 4 – Extravasation Kit (this is the responsibility of each clinical area to collect and provide), keep in locked drugs cupboard in clinical room and check contents daily

Essential Equipment **Date**	**Date Column and Confirm that item is 'In pack' and 'In Date' with an Initial and Time against each item**						
Gel Pack X 2 1for Heating; 1for Cooling (available within chemotherapy unit)							
10 mL syringe X 2							
Green needles & Orange needles							
Water for injection							
Skin cleansing swabs 2% Chlorhexidine; 70% Alcohol							
Sterile gauze and cotton wool							
Non-occlusive dressing							
Copy of extravasation management procedure (also available on the intranet)							
Patient Information Leaflet							
GP/Primary Care Information Leaflet							
Indelible Pen							
Medicinal Products							
Hyaluronidase 1500 IU / 2mL x2 (administration instructions appendix 9.4 III in C39)							
Hydrocortisone cream 1% 15g tube X 1(labelled with instructions for use to reduce local trauma and irritation)							
Savene Kit availiable in aseptic suite (administration instructions appendix 9.4 I in C39)							

PLEASE PRINT OFF AND USE ON YOUR OWN KIT

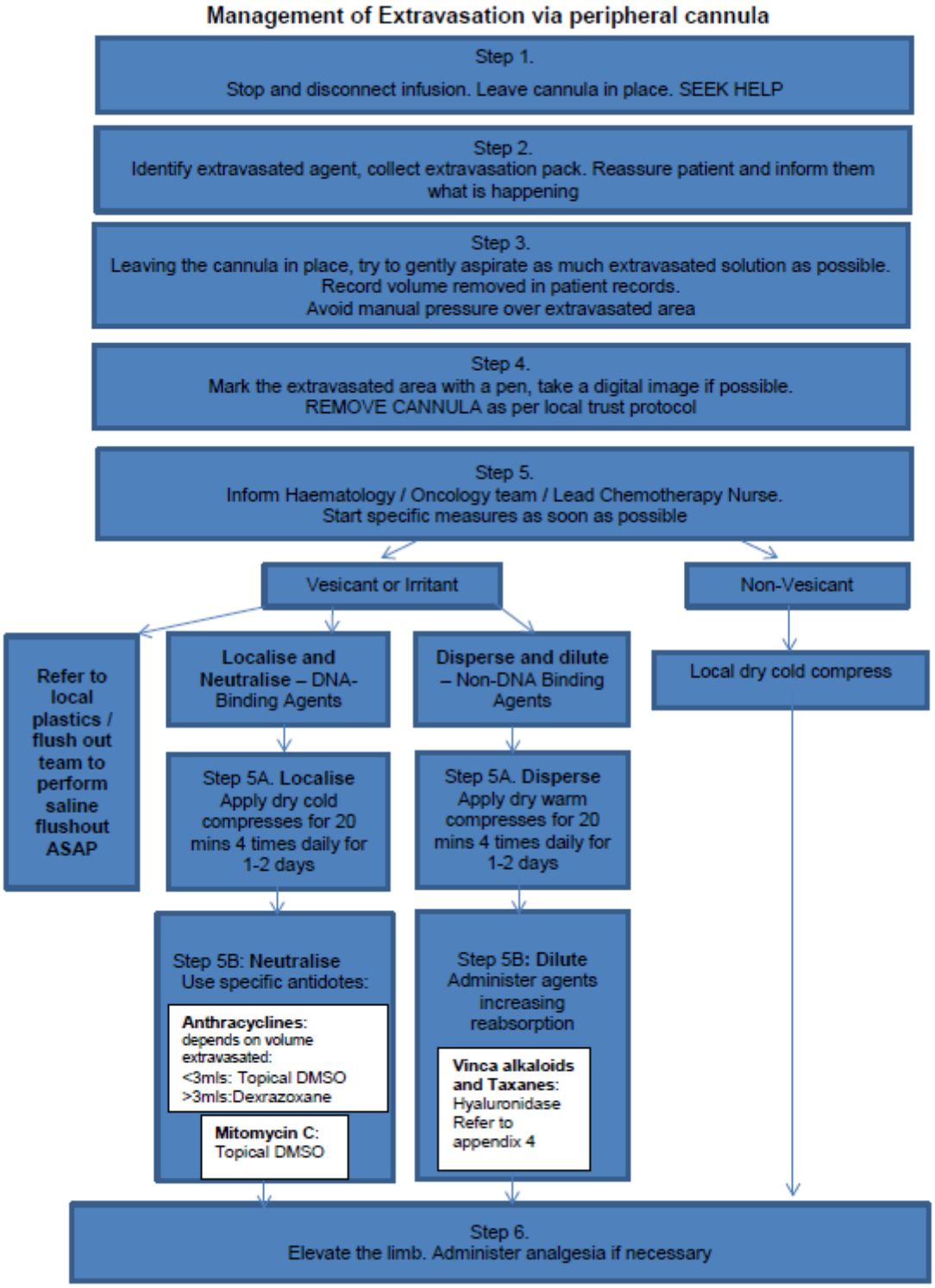
EXTRAVASATION KIT

THIS IS THE RESPONSIBILITY OF EACH CLINICAL AREA TO ASSEMBLE AND PROVIDE. KEEP IN LOCKED DRUGS CUPBOARD IN CLINICAL ROOM

CHECK CONTENTS DAILY

DATE ASSEMBLED:

Appendix 5: Management of Extravasation via peripheral cannula



Rationale

The 'Disperse and dilute' pathway utilises warm compresses to promote vasodilation and encourage blood flow in the tissues therefore spreading the extravasated agent.

Hyaluronidase may be utilised with the aim of promoting drug diffusion and enhancing drug absorption.

The 'localise and neutralise' pathway utilises cold compresses to limit the spread of the extravasated agent. It is proposed that the cellular uptake of the agent into the tissues is reduced when cold compresses are utilised. The cold compresses also may reduce local discomfort.
There are a number of antidotes available for certain cytotoxic agents and these are drug/group specific, these should be considered to reduce the potential for severe tissue damage or injury.

Specific Measures (antidotes)

Clinicians should consider the utilisation of antidotes where available. These antidotes when utilised appropriately may help to prevent progression to ulceration and severe tissue damage. This decision will be based on a holistic assessment of the individual patient, their treatment protocol, the suspected extravasated drug, their co-morbidities and concurrent medications. The evidence to support the utilisation of antidotes is often inconclusive and any decision to utilise these antidotes should be carefully considered.

Various suggestions of specific antidotes have been published with possible topical or injected pharmacologic methods for some vesicant drugs, however many of these are considered ineffective or may further damage the extravasated area (Perez-Fidalgo et al , 2012).

The table below summarises some of the drugs most frequently used with their suggested specific antidotes:

Extravasated Drug	Suggested antidote	Level of evidence	Advice
Anthracyclines	Savene (Dexrazoxane) The only licensed antidote. Savene neutralises anthracyclines	Efficacy in biopsy confirmed anthracycline extravasation has been confirmed in clinical trials	3 day course of treatment Day 1 (within 6 hours of extravasation) 1000mg/m^2. Day 2 1000mg/m^2. Day 3 500mg/m^2.
Anthracyclines	Topical DMSO (99%) It is proposed this prevents ulceration by its property of scavenging free radicals.	Suggested as a possible antidote in many literature sources.	Apply locally as soon as possible. Repeat every 6 hours for 7 days stop if blistering occurs
Mitomycin C	Topical DMSO (99%) It is proposed this prevents ulceration by its property of scavenging free radicals	Suggested as a possible antidote in many literature sources.	Apply locally as soon as possible. Repeat every 6 hours for 7 days stop if blistering occurs

Vinca alkaloids	Hyaluronidase Breaks down hyaluronic acid ("cement") in connective/soft tissue, allowing for dispersion of the extravasated drug, thereby reducing the local concentration of the damaging agent and increasing its rate of absorption	Suggested as a possible antidote in many literature sources	150–1500 IU subcutaneously around the area of extravasation
Taxanes	Hyaluronidase Breaks down hyaluronic acid ("cement") in connective/soft tissue, allowing for dispersion of the extravasated drug, thereby reducing the local concentration of the damaging agent and increasing its rate of absorption	Suggested as a possible antidote in many literature sources.	150–1500 IU subcutaneously around the area of extravasation

Specific advice for Carboplatin, Cisplatin and Oxaliplatin:
If treatment is administered within 24 hours then a warm pack and Hyaluronidase would be the treatment of choice, however for cisplatin and carboplatin, if the injury is not treated within 24 hours a cold pack and hydrocortisone cream would then be the appropriate management (not in the case of Oxaliplatin where the cold may risk development of other symptoms)

If DMSO 99% is not available, the 50% solution can be used as an alternative

Appendix 9.4 I, II, III detail the specific individual drug management instructions for Savene, DMSO and Hyaluronidase.

Follow Up

- All patients must have a review of their extravasation injury within 1 week, this appointment must be arranged prior to the patient leaving clinic
- Advise the patient of the importance of contacting the 24 hour helpline if there is any deterioration in the affected limb

Surgical management

- Treatment of unresolved tissue necrosis or pain lasting more than 10 days is surgical debridement; this is generally for those patients who have suffered a severe extravasation in whom conservative therapy has not been appropriately initiated. Once this has been performed, skin grafting is usually applied.

Documentation

- Ensure all extravasations are reported in the local incident reporting system (Datix) to enable monitoring and review of incidents.
- Ensure that the extravasation injury is recorded in line with the NMC standards for record keeping, using Aria MedOncology.

Administering Savene (Dexrazoxane)

THE DECISION TO UTILISE EITHER SAVENE OR DMSO FOR AN ANTHRACYCLINE EXTRAVASATION MUST BE UNDERTAKEN BY A MEDIC BASED ON AN ASSESSMENT OF THE INDIVIDUAL'S COMORBIDITIES AND CONCURRENT MEDICATIONS

INDICATION
Savene is indicated for the treatment of extravasation by one of the following anthracycline agents: Doxorubicin, Epirubicin, Idarubicin and Daunorubicin.

DMSO must not be used concurrently
Steps for administration.

1. Follow localise and neutralise pathway for extravasation (pg 17)
2. The indicated dose should be administered as an intravenous infusion over 1-2 hours into a large vein in an extremity / area other than the one affected by the extravasation. The first infusion should be initiated as soon as possible and within the first six hours after the incident.
3. Cooling procedures such as ice packs should have been removed from the area at least 15 minutes prior to Savene administration in order to allow sufficient blood flow. DMSO should not be used concurrently.
4. Savene will be reconstituted during normal working hours within the aseptic suite (where the Savene kit will be stored) or by nurses where applicable according to local trust policies.
5. Savene should be given once daily for three consecutive days. The patient will need to be recannulated for each infusion as Savene is classified as a cytotoxic agent
6. The recommended dose according is:
   a) Day 1: 1000mg/m2
   b) Day 2: 1000mg/m2
   c) Day 3: 500mg/m2
7. For patients with a body surface area of more than 2 m2 the single dose should not exceed 2000 mg
8. Treatment on Day 2 and Day 3 should start at the same hour (+/- 3 hours) as on the first day.
9. The Savene kit contains 10 vials of Savene powder each containing 500mg Dexrazoxane and 3 bags of Savene diluent.
10. The kit must be stored at less than 25^0C
11. After reconstitution Savene should be stored for no longer than 4 hours at $2\text{-}8^0$C

Administering Dimethylsulfoxide (DMSO)

THE DECISION TO UTILISE EITHER SAVENE OR DMSO FOR AN ANTHRACYCLINE EXTRAVASATION MUST BE UNDERTAKEN BY A MEDIC BASED ON AN ASSESSMENT OF THE INDIVIDUAL'S CO-MORBIDITIES AND CONCURRENT MEDICATIONS.

Dimethylsulfoxide (DMSO 50%) is an unlicensed option for the treatment of extravasation with anthracyclines including Doxorubicin, Idarubicin, Epirubicin, Daunorubicin; it can also be used to treat extravasation with Mitomycin C, Mitoxantrone, Dactinomycin, Liposomal Daunorubicin and Liposomal Doxorubicin.

As this is an unlicensed indication patient details must be recorded when DMSO is utilised

Steps for administration:

1. Follow steps for localisation and neutralisation of extravasation (page 17)
2. Draw around the area with indelible pen.
3. Put gloves on
4. Carefully apply a thin layer of DMSO topically to the marked area avoiding contact with unaffected areas
5. Allow it to dry,
6. This should be applied ideally within 10 – 25 minutes,
7. Check for erythema caused by DMSO.
8. Repeat administration of DMSO every 6 hours for 7 days
9. Advise patient to stop using DMSO and contact chemotherapy unit if blistering occurs

Note:
Please refer to DMSO prescribing information for a full list of contraindications, precautions and warnings.

(EONS 2007)

Administering Hyaluronidase

Hyaluronidase has been suggested as a possible antidote for some extravasations in many literature sources. It works by breaking down hyaluronic acid (“cement”) in connective/soft tissue, allowing for dispersion of the extravasated drug, thereby reducing the local concentration of the damaging agent and increasing its rate of absorption. (Schrijvers 2003)

Steps for administration:

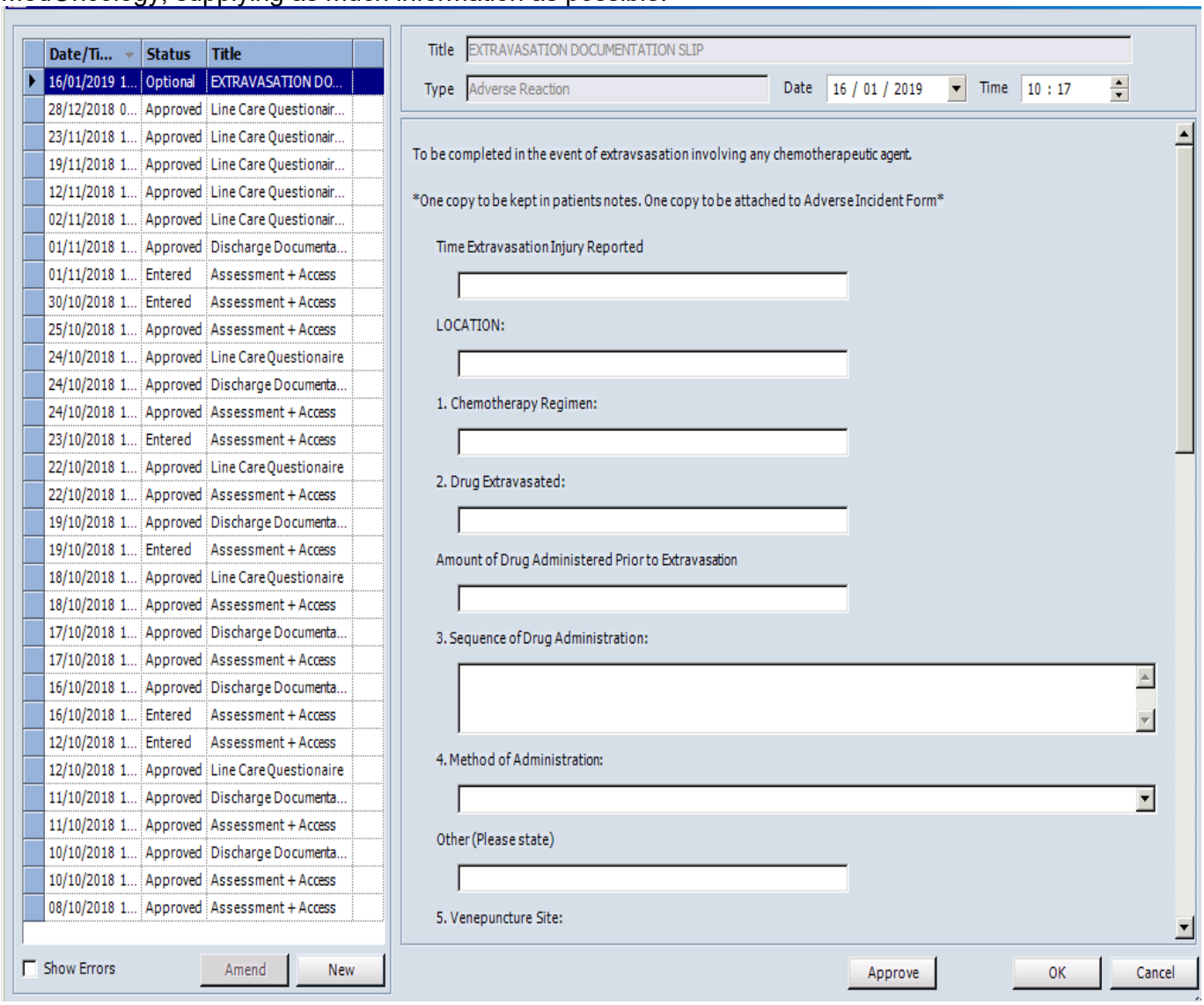
1. Follow steps for dispersion and dilution of extravasation (page 17)
2. Administration of hyaluronidase should begin within 1 hour of extravasation for best results.
3. Dilute 150 – 1500 IU of hyaluronidase in 1 ml of sterile water,
4. Subcutaneously (or intradermally) inject 1 ml (150 IU) of hyaluronidase as 5 separate 0.2 ml injections around the periphery of extravasation site.
5. To ensure adequate coverage, the 4 compass points can be utilised first, followed by a further injection into the middle of the site

Note:
Please refer to hyaluronidase prescribing information for a full list of contraindications, precautions and warnings.

(EONS 2007)

Appendix 6: Record and Monitoring of an Extravasation

Document all extravasation injuries onto the Extravasation Documentation Slip under questionnaires on MedOncology, supplying as much information as possible.



Always complete a Datix on the UHNM Trust's electronic incident reporting system Datix.

Patients are to be asked to return 24 hours post the initial injury. The below documentation (Extravasation Follow Up) on MedOncology needs to be completed, supplying as much information as possible.

Appendix 7: GP/Primary Care Letter

EXTRAVASATION
GENERAL PRACTITIONER/PRIMARY CARE

Name		Address
Date of Birth		
NHS Number		

An extravasation occurred on the above named patient whilst receiving an intravenous injection of:-

Name of vesicant drug

The following treatment and advice was given:-

If the patient should attend your clinic within 24 - 48 hours of this occurrence with increased discomfort, peeling or blistering of the skin please contact the department for advice on the following telephone numbers:

Please contact

Ward / Clinic Name	
Telephone Number	
Contact name	

It is important that appropriate advice is sought as mismanagement of extravasation can lead to tissue necrosis and functional loss of tissue and limb involved.

Appendix 8: Patient Information Leaflet

PATIENT INFORMATION LEAFLET - EXTRAVASATION

Name		Address
Date of Birth		
NHS Number		

Whilst having an injection of a vesicant drug today an **extravasation** occurred. This happens when the vesicant drug that is given into your vein leaks into the tissue around the site. This can cause pain, inflammation, erythema (redness of the skin) and discomfort.

You have been given the treatment described below to reduce the reaction of the vesicant drug.

Describe immediate treatment given:

The site that is affected by the extravasation may remain sore for several days afterwards therefore please follow the advice stated below including directions of how to take any medication prescribed:-

Tick all that apply

Cold compress to be applied for 24 hours as tolerated	□	Hot compress to be applied for 24 hours as tolerated	□	Topical Cream to be applied as directed	□
Analgesia to be taken as directed	□	Elevate the limb involved	□		

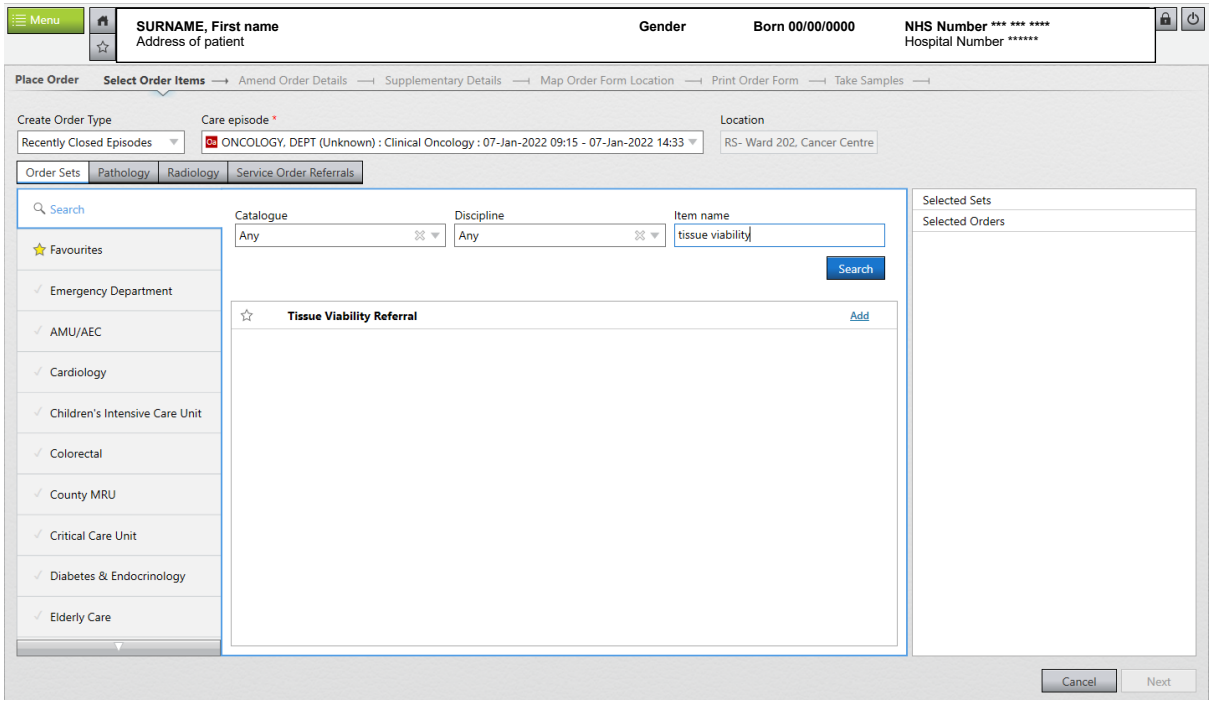
Additional comments:

It is possible that in extreme circumstances the extravasation of a vesicant drug can lead to severe tissue damage and functional loss of tissue and limb involved.
Therefore if you detect increased discomfort, peeling or blistering of the skin within 24 hours of an extravasation happening you should immediately contact:

Ward / Clinic Name	
Telephone Number	
Contact name	

Appendix 9: Referral to Tissue Viability for review of extravasation injury is completed online via Order Comms

Access Order Comms via CareFlow with your Trust login. Once you have searched for the patient, select Place Order, type in tissue viability in the search box, click on Add and complete the referral form. (See below)



Appendix 10: Referral to Plastic Surgeon for review of extravasation injury

An urgent referral to the plastic team is done via paging the Duty Consultant Plastic Surgeon On Call on No. 15097.

This referral must always be followed up by a referring letter.