ASWCS Policy for the Treatment of Extravasation Injury

Extravasation of Cytotoxic Drugs

Introduction

1. The purpose of this policy is to inform practitioners of their responsibilities in relation to preventing and minimising the risk of Cytotoxic Chemotherapy extravasation as well as the actions that must be taken to minimise tissue damage should it occur.

2. This policy must be read in conjunction with the relevant Trust’s policy for safe prescribing, handling and administration of cytotoxic drugs.

3. There is no national standard on treatment of cytotoxic chemotherapy extravasation (Allwood et al, 1997). Due to the difficulties of researching this aspect of care this policy is based on individuals’ review of the evidence and expert opinions.

4. Treatment of extravasation as outlined within this document must be initiated as soon as possible (preferably within 10 minutes to 1 hour of injury occurring) in order to achieve a favourable outcome.

5. Should an extravasation go unnoticed and not treated within 24 hours of its occurrence, treatment can only provide damage limitation (Allwood et al, 1997) and advice must be sought from a senior chemotherapy nurse or the Chemotherapy Team regarding its management.

Accountable practitioner

The term ‘accountable practitioner’ includes Registered Nurses and Medical staff

Education and Training

All practitioners who administer intravenous cytotoxic chemotherapy must first receive education and training in the prevention and treatment of extravasation as part of their training programme before they can be assessed and be deemed competent.

Reporting of extravasation injuries

Document all details of the extravasation injury in the patient’s nursing and medical notes and complete an incident form.

Always refer the patient to a doctor for further medical examination. Occasionally some drugs continue to cause damage after the initial injury and thus referral is vital so as to avoid further damage.

All extravasation injuries should also be reported to the Extravasation Report coordinator, using a Green Extravasation Reporting Card and posted to St Chad’s Unit, City Hospital, Dudley Road, Birmingham. Additional Green Cards for reporting can be obtained directly via the website at www.extravasation.org.uk

Extravasation Kits

An extravasation kit (appendix 3) must be available within all areas where vesicant cytotoxic chemotherapy drugs are administered routinely. It is also recommended that an extravasation kit should be kept in other areas where non-vesicant chemotherapy may be administered.

Staff working in each area must know where the kit can be located.
The used extravasation kit **must be** replaced at the earliest possible opportunity.

**Definition**

Extravasation is defined as the leakage of a drug or fluid from a vein into the surrounding tissue during intravenous administration. The drug or fluid may cause damage to the surrounding tissue, nerves, tendons or joints. Some drugs (vesicants) can cause extensive necrosis and the damage can continue for several weeks or months after the incident. The extent of trauma may result in surgical excision of the affected area, skin grafting and functional loss. Cytotoxic drugs are classified according to their potential for causing damage:

<table>
<thead>
<tr>
<th>Neutrals: Group 1</th>
<th>Inflammants: Group 2</th>
<th>Irritants: Group 3</th>
<th>Exfoliants: Group 4</th>
<th>Vesicants: Group 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aldersleukin (IL-2)</td>
<td>Etoposide</td>
<td>Carboplatin</td>
<td>Aclarubicin</td>
<td>Amsacrine</td>
</tr>
<tr>
<td>Alemtuzumab (MabCampath®)</td>
<td>Phosphate</td>
<td>Bortezomib (Velcade®)</td>
<td>Cisplatin</td>
<td>Carmustine</td>
</tr>
<tr>
<td>Asparaginase</td>
<td>Fluorouracil (5-FU)</td>
<td>Etoposide</td>
<td>Liposomal</td>
<td>Daunorubicin</td>
</tr>
<tr>
<td>ß-Interferon</td>
<td>Pemetrexed</td>
<td>Irinotecan</td>
<td>Liposomal</td>
<td>Daunorubicin</td>
</tr>
<tr>
<td>Bevacizumab (Avastin®)</td>
<td>Raltitrexed</td>
<td>Mesna (Undiluted)</td>
<td>Doxorubicin</td>
<td>Doxorubicin</td>
</tr>
<tr>
<td>Bleomycin</td>
<td></td>
<td></td>
<td>Liposomal</td>
<td>Epirubicin</td>
</tr>
<tr>
<td>Cetuximab (Erbitux®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisplatin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cladribine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cytarabine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dexrazoxane</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edroclomab</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fludarabine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gemcitabine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gemtuzumab (Mylotarg®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melphalan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ifosfamide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesna (Diluted)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pentostatin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rituximab</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiopeta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trastuzumab (Herceptin®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note that the groupings were modified in October 2005 to facilitate the formulation of a grading system for extravasation risk - the higher the grouping, the higher the risk of causing severe and serious tissue damage.

**Recognition of Extravasation**

The Registered nurse / doctor must be able to distinguish between the normal sensations which may be experienced during cytotoxic chemotherapy administration as some drugs produce:

- A ‘feeling of cold’ at the injection site
- Redness ‘nettle rash’ effect

Extravasation will present with one or more of the following:

- The patient experiences a burning, stinging sensation at the cannula site or along the pathway of central venous catheter.
• Swelling, leaking or induration is visible from the cannula site or along the pathway of the central venous catheter.
• No blood return via cannula / central venous catheter
• Resistance is felt on the plunger of the syringe when drugs are given as a bolus and / or reduction or absence of flow rate during an infusion

Should there be any doubt as to whether an extravasation has occurred chemotherapy administration must be stopped immediately and a second opinion urgently sought from another registered nurse / doctor who has undergone training in cytotoxic chemotherapy and is aware of the signs and symptoms of extravasation.

Differential Diagnosis

If there is aching or red streaking along the vein or resistance is felt on the plunger of the syringe, inflammation and spasm of the vein may have occurred. The injection should be discontinued and a saline infusion allowed to flush the vein until the pain, redness or spasm has subsided.

Doxorubicin and Epirubicin are particularly likely to cause a local wheal or red streaking (a histamine release phenomenon) which will subside but may take thirty minutes or more after the injection is stopped. Hydrocortisone may help to resolve the reaction after which time the injection may be cautiously resumed.

Thrombosis or sclerosis of veins may occur due to the local effect of chemotherapeutic agents on the endothelium. These can be managed conservatively with warm or cold compresses to the area plus an analgesic for pain, if required.

If doubt still exists one must assume extravasation has occurred and follow the appropriate flow diagram.

Phlebitis or flare reactions are often mistaken for extravasation injuries. The table below lists the major differences so as to help identify the likely cause.

<table>
<thead>
<tr>
<th>Assessment Parameter</th>
<th>Immediate Manifestations of Extravasation</th>
<th>Delayed Manifestations of Extravasation</th>
<th>Spasm/Irritation of the Vein</th>
<th>Flare Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Severe pain or burning that lasts minutes or hours eventually subsides; usually occurs while the drug is being given around the needle site</td>
<td>Hours - 48</td>
<td>Aching and tightness along the vein</td>
<td>No pain</td>
</tr>
<tr>
<td>Redness</td>
<td>Blotchy redness around the needle site; it is not always present at the time of extravasation</td>
<td>Later occurrence</td>
<td>The full length of the vein may be reddened or darkened</td>
<td>Immediate blotches or streaks along the vein, which usually subside within 30 minutes with or without treatment</td>
</tr>
<tr>
<td>Ulceration</td>
<td>Develops insidiously; usually occurs 48-96 hours later</td>
<td>Late occurrence</td>
<td>Not usually</td>
<td>Not usually</td>
</tr>
<tr>
<td>Swelling</td>
<td>Severe swelling; usually occurs immediately</td>
<td>Hours - 48</td>
<td>Not likely</td>
<td>Not likely; wheals may appear along the vein line</td>
</tr>
<tr>
<td>Blood return</td>
<td>Inability to obtain blood return</td>
<td>Good blood return during drug administration</td>
<td>Usually</td>
<td>Usually</td>
</tr>
<tr>
<td>Other</td>
<td>Change in the quality of infusion</td>
<td>Local tingling and sensory deficits</td>
<td>Possibility resistance felt in injection</td>
<td>Urticaria</td>
</tr>
</tbody>
</table>
Prescription for medicines used in the Management of Extravasation

All medicines advised for use in the immediate treatment of cytotoxic chemotherapy extravasation must be prescribed unless an individual has received training and has been deemed competent to administer the appropriate agent(s) within a specific Patient Group Direction (PGD).

Where a trust has a generic Extravasation Form, this should be signed before any agent is administered if practitioners have not received PGD training. This should also be used if drugs that are not covered within a PGD need to be given (i.e. unlicensed agents such as DMSO).

Procedure for treatment of Extravasation

Treat extravasation injury as outlined on the flow chart

All syringes, needles and other clinical waste must be disposed of in accordance with the relevant Trust policy.

The used extravasation kit must be replaced at the earliest possible opportunity.

Aftercare

- Complete specific Patient Information Leaflet according to which Flow Chart treatment followed and explain the treatment plan to patient.
- Seek patient written consent to have a photograph taken of the extravasated site. This must be requested at least every week or whenever any change is noted in the extravasation site.
- Prescribe analgesia (if appropriate)
- Ensure all subsequent treatment applications for extravasation injuries are prescribed as appropriate.
- If blistering or tissue breakdown occurs, commence sterile dressing techniques to prevent superimposed infection. Inform Chemotherapy Team.
- If blistering / tissue breakdown occurs, patient must be referred to a plastic surgeon.

References


Appendix 1: Glossary of Terms

- **Extravasation**: refers to the inadvertent administration of an intravenous fluid or medication into the tissues surrounding a vein. (Weinstein, 1997; Allwood et al, 1997).

- **Vesicant**: refers to a cytotoxic chemotherapy drug capable of causing blistering and/or severe tissue damage and necrosis if extravasated. (Allwood et al, 1997; How and Brown, 1998)

- **Exfoliant**: refers to a cytotoxic chemotherapy drug capable of causing inflammation and shedding of skin but less likely to cause tissue death (Allwood et al 1997).

Appendix 2: Guidance on Preventing or Minimising the Risk of Extravasation

When administering intravenous cytotoxic chemotherapy the aims are:

1. To minimise the risks of extravasation occurring
2. Early recognition and prompt management of extravasation

These are achieved by:

- The position, size and age of the venepuncture site are the factors which have greatest bearing on the likelihood of problems occurring. However, the likelihood of extravasation can be significantly reduced if the following principles are observed:
  - Administer cytotoxic chemotherapy in a well lit area, preferably in daylight hours.
  - For slow infusion of high-risk drugs, a central line or PICC line should be used.
  - Consider the use of a suitable central venous line in patients with poor vascular access or those having repeated vesicant drugs in order to minimise the risk of repeated venepuncture and extravasation trauma.
  - To ensure patency of a peripheral IV site, it is best to administer cytotoxics through a recently sited cannula. Site the cannula so it cannot become dislodged; ideally use the dorsum of the hand and if cannulation fails then use the forearm.
  - Never give chemotherapy in the inner wrist (where there is little tissue covering the underlying structures) or the antecubital fossa (where the veins are larger and deeper and may delay the onset of pain and burning sensations).
  - Avoid sites over joints and where there are vascular problems with impaired circulation or decreased venous flow, such as lymphoedema, or patients with peripheral circulatory disease.
  - Avoid sites of previous radiation or surgery due to an increased risk of tissue damage or fibrosis. This is particularly relevant with anthracyclines and Paclitaxel.
  - Local warming (for example, with a heat pad) may help to dilate the vein. If the vein diameter is of concern or if venous collapse has occurred previously and continues to be a problem, then the use of glyceryl trinitrate patches (5mg) placed distal to the cannula the evening before (or at least ½ hour prior to cannulation) may be helpful.
  - Try to alternate sites of cannulation to allow the vein time to recover.
  - Allow drugs which are usually stored in a refrigerator to reach ambient room temperature prior to administration (allow at least 30 minutes prior to administration for boluses or 60 minutes for infusion bags).
  - Administer vesicants by slow IV push into the side-arm port of a fast-running IV infusion of compatible solution. This prevents any undue pressure being exerted which could potentially result in physical damage to the vein.
  - Administer the most vesicant drug with the smallest volume first.
• Caution must be used when giving vesicant drugs to patients who are confused or unconscious or those who have difficulty communicating.

• The smallest gauge of cannula appropriate for the type and length of therapy should be chosen to ensure good blood flow around the cannula site. However, very fine cannulae may result in increased pressure at the tip which could in itself left to venous trauma.

• Regularly assess a peripheral site continually for signs of redness, swelling or leakage.

• Verify patency of the IV site prior to vesicant infusion by injecting 5 - 10 ml (cannula) or 20 ml (CVC) of sodium chloride 0.9% and visualising a good blood return either into the syringe or down the infusion line. Regularly verify that the line/cannula is still sited correctly throughout the infusion/injection; if there are any doubts, stop and investigate. Re-site the cannula proximally if the patency of the cannulation is still not entirely satisfactory.

• In the case of a CVC, an injection of contrast under x-ray control must be used to check the patency and integrity of the catheter.

• Ask the patient to report any sensations of burning or pain at the infusion site. Some investigators suggest delaying the administration of antiemetics until after vesicant administration as it has been suggested that the sedative and anti-inflammatory effects of antiemetics may mask the early warning signs of extravasation and may therefore impede the patient’s ability to report any sensation at the infusion site. However, in practice, the risks are minimal and psychologically patients would prefer to receive antiemetic cover prior to chemotherapy. As a result, such agents are routinely given prior to chemotherapy and therefore either pre or post cover can be recommended. This choice should be left to individual clinicians and/or Trusts.

• Carefully document the rate of administration, location and condition of site, verification of patency, and patient’s responses, on giving any potentially extravasable drugs.

• Cannulation must be performed by a registered nurse / doctor who has received supervised training and been deemed competent.

**Appendix 3: Contents of Extravasation Kit**

Contents of Extravasation Kit

- Dexamethasone Injection 8mg in 2 ml x 1
- Hyaluronidase Injection 1500 units x 1
- Hydrocortisone Cream 1% 15 g x 2
- Hydrocortisone Injection 100mgs x 2
- Dimethylsulphoxide (DMSO) 50%/50mls
- 10 ml syringe x 1
- 2 ml syringes x 2
- 21 g needle x 2 (for drawing up drug)
- 25 g needle x 2 (for administering drug)
- Cotton buds x 2
- Gauze swabs x 1 packet
- Permanent marker
- Extravasation evaluation forms
- Copy of Extravasation Procedure
Cold packs must be kept in an appropriately located freezer specifically for extravasation injuries and must not be used for any other purpose. An electric ‘Heat pad’ must be kept in an appropriate location and be available for extravasation injuries. Alternatively, ‘Instant Heat’ & ‘Instant Cold’ flexible packs can also be kept in the extravasation kits.

Appendix 4: Use of Dexrazoxane (SAVENE®) for anthracycline extravasation.

ASWCS recommends SAVENE® for the treatment of anthracycline extravasation. However, in view of the high cost of this drug, its availability is subject to local funding approval.

Currently, within ASWCS, SAVENE® is only used in BHOC and the BHOC SOP (below) for the use of Dexrazoxane(Savene®) in the treatment of anthracycline (Daunorubicin, Doxorubicin, Epirubicin, Idarubicin) extravasation has been incorporated into the ASWCS extravasation policy. This will be reviewed if, and when, other trusts in the network approve the use of SAVENE® at their sites.

<table>
<thead>
<tr>
<th>SETTING</th>
<th>Bristol Haematology and Oncology Centre (BHOC), Division of Specialised Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR STAFF</td>
<td>Chemotherapy competent Registered General Nurses working in the BHOC. Medical staff authorised to prescribe chemotherapy at BHOC.</td>
</tr>
<tr>
<td>PATIENTS</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**GUIDANCE**

Dexrazoxane (Savene®) is a DNA topoisomerase II inhibitor that protects against tissue damage by one of the following anthracycline agents: Daunorubicin, Doxorubicin, Epirubicin, Idarubicin.

It **MUST ONLY** be prescribed in the following circumstances:

- If there is a suspected peripheral extravasation of 3mls or more of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin.

**OR**

- There is an extravasation of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, via the central venous route.

**Procedure**

- In the event of a suspected peripheral extravasation of 3mls or more of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin OR there is an extravasation of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, via the central venous route.

**Process**

- The nurse will follow the extravasation flow diagram 1a up to step 7 (see appendix 1)
- The nurse will alert Consultant / Senior registrar of suspected anthracycline extravasation
- The Consultant / Senior registrar will assess the patient taking into account hepatic function, renal function and concomitant medication, and make a decision as to whether treatment is warranted. **IF NOT FOR DEXRAZOXANE (SAVENE®) THERAPY -FLOW DIAGRAM 1 WILL BE FOLLOWED AS PER ASWCS EXTRAVASATION POLICY .**
- The Consultant / Senior registrar will prescribe dexrazoxane( Savene®) therapy using the preprinted prescription chart located in the extravasation kit, ensuring that administration can commence within 6 hours of the extravasation.
- A designated nurse or ward clerk will take the prescription to an oncology/haematology specialist pharmacist at BHOC for a clinical check. If extravasation occurs outside of normal working hours they will contact the on- call pharmacist via switch board.
- During normal working hours the BHOC specialist pharmacists will return the clinically checked
prescription to the clinical area. Outside of normal working hours the on-call pharmacist will verbally confirm that the dose of dexrazoxane (Savene®) is appropriate.

- The nurse will calculate the patient’s body surface area, calculate the dose of dexrazoxane required and cross check with the prescription, following the checking procedure as per medicines management policy.
- The nurse will ensure that any cooling procedures e.g. ice packs are removed from the area at least 15mins before administration of dexrazoxane (Savene®).
- The nurse will collect dexrazoxane (Savene®) from the treatment room on ward 61 and reconstitute as per manufacturers guidelines using the Phaseal device (see appendix 2).
- The nurse will administer dexrazoxane (Savene®) as an infusion over 1-2 hours into a large vein in an extremity / area other than the one affected by the extravasation. The nurse will observe the infusion & infusion site.
- The nurse will report the extravasation using the green card system or on line at www.extravasation.org.
- The nurse will complete the online UHBristol incident form and BHOC extravasation documentation and ensure a copy is sent to the Lead Chemotherapy Nurse, LG1, BHOC.
- The nurse will make appointments for the patient for day 2 & day 3 dexrazoxane (Savene®) therapy ensuring that the times are no earlier or later than 3hours before or after the start time on day 1.
- Photographs of the extravasation site should be taken on days 1, 2 & 3.
- The nurse will arrange follow up post day 3 as per ASWCS extravasation policy.
- The prescriber will ensure that the patient’s Consultant is notified of the treatment due to its cytotoxic potential and organise a follow up appointment, noting that the NADIR for dexrazoxane is 11-12 days. The patients consultant will assess whether the cycle of chemotherapy that was extravasated needs to be re-prescribed.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY</td>
<td>All SOPs must be checked and authorised by the relevant group at BHOC.</td>
</tr>
<tr>
<td>QUERIES</td>
<td>Nathalie Delaney, x 23391, bleep 6043</td>
</tr>
</tbody>
</table>
# BRISTOL HAEMATOLOGY AND ONCOLOGY CENTRE
## STANDARD OPERATING PROCEDURE

**TITLE:** The use of Dexrazoxane(Savene®) in the treatment of anthracycline (Daunorubicin, Doxorubicin, Epirubicin, Idarubicin) extravasation  
21/02/2011

### 1.1.1 Document details

<table>
<thead>
<tr>
<th>Code</th>
<th>BHOC</th>
</tr>
</thead>
</table>
| Name and job title of author | Rachael Herrington  
Chemotherapy Lead Nurse, Bristol Haematology and Oncology Centre |
| Date       | 21/02/2011 |
| Version    | Draft v 0.3 |
| Replaces   | New SOP |
| Next review date | February 2013 |
| Contributors | Andrea Dahlgren, Lead Pharmacist |
| Approved by | |
| Date approved | |
| Equality impact assessment complete and date | Yes |
| Target audience | All BHOC nursing, medical and pharmacy staff |
| Name of Trust member responsible for implementation | Rachael Herrington |
| Consultation. | This document was reviewed with the following individuals and groups  
BHOC Chemotherapy Group, BHOC consultants, BHOC Clinical Governance |

### 1.1.2 Document history

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Who</th>
<th>Description of change</th>
<th>Date approved</th>
<th>Next review date</th>
</tr>
</thead>
<tbody>
<tr>
<td>22/2/2011</td>
<td>0.1</td>
<td>RJH</td>
<td>First draft</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>5/5/2011</td>
<td>0.2</td>
<td>RJH</td>
<td>Comments from Pharmacy Team</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>9/9/11</td>
<td>0.3</td>
<td>RJH</td>
<td>Comments from BHOC Chemotherapy Group, Clinical Governance &amp; Consultants</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
2 Introduction

Extravasation refers to the process by which one substance (e.g. fluid, drug) leaks into the surrounding tissue\(^1\). In terms of cancer therapy, extravasation is defined as the accidental leakage from its intended compartment (e.g. a vein) into surrounding tissues\(^2\). The degree of injury can range from a very mild skin reaction to severe necrosis\(^3\).

Prevalence: although extravasation is not as rare as some people may think, cancer therapy experts estimate that it accounts for 0.5% to 6.0% of all adverse events associated with treatment\(^3\). The prevalence of anthracycline extravasation is 0.1% to 1%.

3 Purpose and scope

Dexrazoxane (Savene\(^\circledR\)) is a DNA topoisomerase II inhibitor that protects against tissue damage by one of the following anthracycline agents: Daunorubicin, Doxorubicin, Epirubicin, Idarubicin. Side effects include nausea (very common), neutropenia and thrombocytopenia (common), (Jackson 2007; Schulmeister 2007)

It MUST ONLY be prescribed in the following circumstances:

- If there is a suspected peripheral extravasation of 3mls or more of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin.
- There is an extravasation of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, via the central venous route.

Dosage

Dexrazoxane (Savene\(^\circledR\)) should be given once daily for 3 consecutive days. The recommended dose is:

- Day 1: 1,000 mg/m\(^2\) as soon as possible and not later than 6 hours after extravasation
- Day 2: 1,000 mg/m\(^2\) at the same hour (±3 hours) as on the first day
- Day 3: 500 mg/m\(^2\) at the same hour (±3 hours) as on the first day (Maximum single daily dose 2,000 mg i.e. cap at 2m\(^2\)).

The required dose may be calculated using the table below:

<table>
<thead>
<tr>
<th>BSA (m(^2))</th>
<th>Day 1&amp;2 Dose</th>
<th>Volume of reconstituted drug</th>
<th>Day 3 Dose</th>
<th>Volume of reconstituted drug</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.40</td>
<td>1400 mg</td>
<td>70.00 mls</td>
<td>700 mg</td>
<td>35.00 mls</td>
</tr>
<tr>
<td>1.45</td>
<td>1450 mg</td>
<td>72.50 mls</td>
<td>725 mg</td>
<td>36.25 mls</td>
</tr>
<tr>
<td>1.50</td>
<td>1500 mg</td>
<td>75.00 mls</td>
<td>750 mg</td>
<td>37.50 mls</td>
</tr>
<tr>
<td>1.55</td>
<td>1550 mg</td>
<td>77.50 mls</td>
<td>775 mg</td>
<td>38.75 mls</td>
</tr>
<tr>
<td>1.60</td>
<td>1600 mg</td>
<td>80.00 mls</td>
<td>800 mg</td>
<td>40.00 mls</td>
</tr>
<tr>
<td>1.65</td>
<td>1650 mg</td>
<td>82.50 mls</td>
<td>825 mg</td>
<td>41.25 mls</td>
</tr>
<tr>
<td>1.70</td>
<td>1700 mg</td>
<td>85.00 mls</td>
<td>850 mg</td>
<td>42.50 mls</td>
</tr>
<tr>
<td>1.75</td>
<td>1750 mg</td>
<td>87.50 mls</td>
<td>875 mg</td>
<td>43.75 mls</td>
</tr>
<tr>
<td>1.80</td>
<td>1800 mg</td>
<td>90.00 mls</td>
<td>900 mg</td>
<td>45.00 mls</td>
</tr>
<tr>
<td>1.85</td>
<td>1850 mg</td>
<td>92.50 mls</td>
<td>925 mg</td>
<td>46.25 mls</td>
</tr>
<tr>
<td>1.90</td>
<td>1900 mg</td>
<td>95.00 mls</td>
<td>950 mg</td>
<td>47.50 mls</td>
</tr>
<tr>
<td>1.95</td>
<td>1950 mg</td>
<td>97.50 mls</td>
<td>975 mg</td>
<td>48.75 mls</td>
</tr>
<tr>
<td>2.00</td>
<td>2000 mg</td>
<td>100.00 mls</td>
<td>1000 mg</td>
<td>50.00 mls</td>
</tr>
</tbody>
</table>

Concomitant medication

- Patients on anti-coagulants should be monitored more frequently i.e. daily whilst receiving dexrazoxane.
• Phenytoin absorption may be reduced leading to an exacerbation of convulsions.
• Dexrazoxane is not recommended in combination with live attenuated vaccines due to risk of systemic, possibly fatal disease. Use an inactivated vaccine wherever possible.
• Yellow fever vaccine is contraindicated.

**Renal & Hepatic impairment:**

**Renal impairment:**
Dexrazoxane (Savene®) has not been studied in patients with impaired renal function and its use in such patients is not recommended by the manufacturers. Decreased renal function may lead to decreased rate of elimination and prolonged systemic exposure. Patients with impaired renal function should therefore be monitored closely for signs of haematological toxicity.

**Hepatic impairment:**
Dexrazoxane (Savene®) has not been studied in patients with impaired hepatic function and its use in such patients is not recommended. Liver dysfunction (increases in transaminases and bilirubin) may occur with dexrazoxane (Savene®) treatment. The prescribing Consultant / Senior Registrar will make a clinical judgement on the use of Dexrazoxane (Savene®) in patients with renal or hepatic impairment where the potential benefit may outweigh the risk.

4 **Definitions**

BHOC Bristol Haematology and Oncology Centre
DNA Deoxyribonucleic acid
SOP Standard Operating Procedure
PSU Parenteral Services Unit
ASWCS Avon Somerset & Wiltshire Cancer Services

5 **Roles and responsibilities**

- Medical Staff
- Pharmacy Staff
- Nursing Staff

**Medical Staff** – Only consultants and senior registrars who are authorised to prescribe chemotherapy at BHOC may prescribe dexrazoxane (Savene®) in the event of an extravasation involving Daunorubicin, Doxorubicin, Epirubicin, Idarubicin.

**Pharmacy Staff** - During normal working hours all prescriptions for dexrazoxane (Savene®) will be clinically checked by a specialist pharmacist. Outside of normal working hours the dose will be verbally confirmed by the on-call pharmacist. The pharmacist involved will notify a Senior Pharmacist at BHOC, who will organise replacement stock with Pharmacy Purchasing Staff.

**Nursing Staff** – Only chemotherapy competent nurses who have undergone specific training in the reconstitution and administration of dexrazoxane(Savene®) may use the drugs in the event of an extravasation. The nurse using dexrazoxane (Savene®) will be responsible for informing a Senior Pharmacist at BHOC so stock can be re-ordered.
6 Procedure

- In the event of a suspected peripheral extravasation of 3mls or more of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin OR there is an extravasation of Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, via the central venous route.

Process

- The nurse will follow the extravasation flow diagram 1a up to step 6 (see appendix 6)
- The nurse will alert consultant/senior registrar of suspected anthracycline extravasation
- The consultant / Senior registrar will assess the patient taking into account hepatic and renal function and make a decision as to whether dexrazoxane (Savene®) is warranted. IF NOT FOR DEXRAZOXANE (SAVENE®) THERAPY -FLOW DIAGRAM 1 WILL BE FOLLOWED AS PER ASWCS EXTRAVASATION POLICY
- The Consultant / Senior registrar will prescribe the dexrazoxane (Savene®) therapy using the preprinted prescription chart located in the extravasation kit, ensuring that administration can commence within 6 hours of the extravasation.
- A designated nurse or ward clerk will take the prescription to an oncology / haematology specialist pharmacist at BHOC for a clinical check. If extravasation occurs outside of normal working hours they will contact the on-call pharmacist via switch board.
- During normal working hours the specialist pharmacist will return the clinically checked prescription to the clinical area. Outside of the normal working hours the on-call pharmacist will verbally confirm that the dose of dexrazoxane is appropriate
- The nurse will calculate the patient’s body surface area, calculate the dose of dexrazoxane required and cross check with the prescription, and the follow checking procedure as per medicines management policy.
- The nurse will ensure that any cooling procedures e.g ice packs, scalp cooling systems are removed from the area at least 15 minutes before administration of dexrazoxane(Savene®).
- The nurse will collect dexrazoxane(Savene®) from the treatment room on ward 61 and reconstitute as per manufacturers guidelines using the Phaseal device(see appendix 2).
- The nurse will administer dexrazoxane(Savene®) as an infusion over 1-2 hours into a large vein in an extremity/area other than the one affected by the extravasation. The nurse will observe the infusion & infusion site.
- The nurse will report the extravasation using the green card system or on line at www.extravasation.org.
- The nurse will complete the online UHBrstol incident form and BHOC extravasation documentation and ensure a copy is sent to the Lead Chemotherapy Nurse, LG1, BHOC.
- The nurse will make appointments for the patient for day 2 & day 3 Savene® therapy ensuring that the times are no earlier or later than 3hours before or after the start time on day 1.
- Photographs of the extravasation site should be taken on days 1, 2 & 3
- The nurse will arrange follow up post day 3 as per extravasation policy.
- The prescriber will ensure that the patient’s Consultant is notified of the treatment due to its cytotoxic potential and organise a follow up appointment, noting that the NADIR for dexrazoxane is 11-12 days. The patient’s consultant will assess whether the cycle of chemotherapy that was extravasated needs to be prescribed.
7 Training

Use of Dexrazoxane (Savene ®) Therapy – all staff that will reconstitute and administer Dexrazoxane (Savene ®) therapy will be trained and assessed as competent, this training will be arranged and supervised by Chemotherapy Sister for Training and Development, Chemotherapy Lead Nurse.

A record of training and competency and annual update will be held by the Chemotherapy Sister for training & Development and the individual member of staff. On –call pharmacists will be trained and assessed as competent to verify the dose of dexrazoxane (Savene®) by the Divisional Pharmacist Oncology/Haematology, BHOC or Lead Pharmacist, CDU, BHOC.

8 Monitoring

- Monitoring - Updating and assessment of staff undertaking the procedure. Audit of appropriate use of Savene®.
- Responsibilities for monitoring – Chemotherapy Sister for Training & Development, Chemotherapy Lead Nurse
- Methodology – Yearly update & assessment of staff using Savene®
- Frequency – rolling basis
- Process for reviewing results & improving performance – BHOC chemotherapy Group

9 References

Preparing Savene using Phaseal

Equipment Required:
Phaseal:
P50 protector (1 per vial)
N35 injector (1 per vial)
C100 infusion adaptor (1 per bag)

Other:
Syringe (1 per vial)
Water (25ml per vial)

Procedure Guidelines:
1) Placing the vial on a steady surface, attach the protector to each vial (number required for one patient dose) using a downward force.

2) Draw up 25ml of sterile water into each syringe (using regular needle).

3) Remove needle and attach injector to the end of each syringe.
   NB. Once injector is attached to syringe **DO NOT REMOVE**.

4) Using Push-Turn-Push technique (handling the white part of the injector only), connect the injector (with syringe attached) to the protector on the vial.

5) Keeping the vial and syringe upright, push the water into the vial. The expansion chamber will inflate.

6) Once the Savene is fully reconstituted, draw back the required amount from the vial.

7) Using Pull-Turn-Pull technique, remove the injector from the protector.

8) Spike the provided diluent bag with the Phaseal infusion adaptor.

9) Using Push-Turn-Push technique, connect the injector (with syringe attached) to the infusion adaptor and push the Savene into the bag.

10) Using Pull-Turn-Pull technique, remove the injector from the infusion adaptor. Do not detach injector from syringe.

11) Dispose of syringe (with injector attached) and vial (with protector attached) according to facility protocol.

12) To administer Savene, attach administration set through bottom of infusion adaptor.
<table>
<thead>
<tr>
<th><strong>Title of document:</strong></th>
<th>The use of Dexrazoxane (Savene®) in the treatment of anthracycline (Daunorubicin, Doxorubicin, Epirubicin, Idarubicin) extravasation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date finalised:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Dissemination lead:</strong></td>
<td>Rachael Herrington</td>
</tr>
<tr>
<td><strong>Previous document already being used?</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>If yes, in what format and where?</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Proposed action to retrieve out-of-date copies of the document:</strong></td>
<td>Circulate new version as pdf link to all members of BHOC chemo group and clinical governance group for reference and ask to destroy any copies of draft document</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>To be disseminated to</strong></th>
<th><strong>How will it be disseminated?</strong></th>
<th><strong>Paper/ electronic</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>BHOC clinical governance group</td>
<td>Email by Rachael Herrington</td>
<td>Electronic</td>
<td></td>
</tr>
<tr>
<td>BHOC chemo group</td>
<td>Email by Rachael Herrington</td>
<td>Electronic</td>
<td></td>
</tr>
<tr>
<td>BHOC staff</td>
<td>Training sessions</td>
<td>Paper</td>
<td>Hard copies given at training sessions</td>
</tr>
</tbody>
</table>

Is a training programme required? Yes, Training programme to be arranged for staff of BHOC

Who is responsible for the training programme? Rachael Herrington & Clare Greatorex
Appendix 5: Guidance & advice when using common extravasation antidotes/treatment

1. **Hyaluronidase**: Dilute 1500 units of hyaluronidase in 2 ml of water for injection or 0.9% sodium chloride. Gently massage the area to facilitate dispersal.

2. **Sodium Thiosulphate**: Infiltrate 1-3 ml of 3% isotonic sodium thiosulfate into the affected area using multiple 'pin cushion' injections. To prepare 3% sodium thiosulfate from the 50% vial in the extravasation kit, dilute 1.2ml of 50% to 20ml with water for injection.

3. **Dimethyl Sulphoxide (DMSO)**: is normally applied topically, by painting on with a 'cotton bud' to the affected area four times a day for 5-7 days. Do not use an occlusive cover. If one is required, cover once the area is dry. Its application should be alternated with topical Hydrocortisone. Avoid contact with good skin. If blistering occurs, stop the DMSO and seek further advice.

4. **Dexrazoxane (SAVENE®)**: see Appendix 4

5. **Sodium Bicarbonate**: Infiltrate with 1-3 ml of 2.1% sodium bicarbonate. To prepare 2.1% sodium bicarbonate from the 8.4% vial in the extravasation kit, take 2.5ml of 8.4% sodium bicarbonate and add a 7.5ml of water for injection. **Caution and expert advice should be exercised, before using this antidote in view of the high risk of causing an alkali burn and possible necrosis (see acidic extravasation below)**

6. **Chlorphenamine/Hydrocortisone Mixture**: Infiltrate the area with 1-3ml of a 100mg Hydrocortisone and 10mg chlorphenamine mixture diluted up to 10ml with water for injection. Depending upon the size of injury, it may not be necessary to use the whole 3mls. Large-volume extravasation may need as much as 10mls.

7. **Surgical excision**: Moderate to severe pain persisting for 1-2 weeks after extravasation may require surgical intervention. Wide excision with use of grafts may be indicated. Inadequate excision is associated with continuing necrosis at the margins, poor granulation and failure of engraftment.

8. **Warm Continuous Compression (WCC)**: This involves applying firmly but without undue pressure a heat source (hot water bottle or small electrically heated blanket) to the area continuously for 24 hours. The heat source should not be in direct contact with the skin and a piece of dry gauze should be laid in between. This assists the natural dispersal of the drug.

9. **Pulsed Cold Compress (PCC)**: This involves applying, firmly but without pressure a cold source (crushed ice, flexible cold pack or cold bandage) intermittently (for 30 minutes in every 2 hours) over the area for the first 24 hours, unless advised otherwise. The cold source should however not be placed directly on the skin and a piece of dry gauze should be laid in direct contact.

10. **Acidic Extravasations**: If the extravasation has been misdiagnosed or the volume extravasated wrongly assessed, the treatment could lead to an alkali extravasation. If this secondary extravasation occurs, it is far more serious and the consequence far more devastating than those associated with venous extravasation. Caution and expert advice should therefore be exercised before proceeding with this specific management.
### Appendix 6: Treatment flow diagrams and flow diagram index

<table>
<thead>
<tr>
<th>Chemotherapy agent</th>
<th>Broad category</th>
<th>Flow diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aldesleukin (IL-2)</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Alemtuzumab (MabCampath®)</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Asparaginase</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Amsacrine</td>
<td>Vesciant</td>
<td>1</td>
</tr>
<tr>
<td>ß-Interferon</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Bevacizumab (Avastin®)</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Bleomycin</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Bortezomib (Velcade®)</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Carboplatin</td>
<td>Exfoliants/irritants/inflammants</td>
<td>5</td>
</tr>
<tr>
<td>Carmustine</td>
<td>Miscellaneous vesicants</td>
<td>2</td>
</tr>
<tr>
<td>Cetuximab (Erbitux®)</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Cisplatin</td>
<td>Exfoliants/irritants/inflammants</td>
<td>6</td>
</tr>
<tr>
<td>Cladribine</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Cytarabine</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Dacarbazine</td>
<td>Miscellaneous vesicants</td>
<td>1</td>
</tr>
<tr>
<td>Daclanomycin</td>
<td>Vesciant</td>
<td>1</td>
</tr>
<tr>
<td>Daunorubicin</td>
<td>Vesciant</td>
<td>1A</td>
</tr>
<tr>
<td>Docetaxel</td>
<td>Vinca alkaloids /Taxanes</td>
<td>4</td>
</tr>
<tr>
<td>Doxorubicin</td>
<td>Vesciant</td>
<td>1A</td>
</tr>
<tr>
<td>Doxorubicin &amp; Vincristine (VAD)</td>
<td>Vesciant</td>
<td>1</td>
</tr>
<tr>
<td>Epirubicin</td>
<td>Vesciant</td>
<td>1A</td>
</tr>
<tr>
<td>Etoposide</td>
<td>Exfoliants/irritants/inflammants</td>
<td>2</td>
</tr>
<tr>
<td>Etoposide phosphate (Etopophos®)</td>
<td>Exfoliants/irritants/inflammants</td>
<td>2</td>
</tr>
<tr>
<td>Fludarabine</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>5-Fluourouracil (5-FU)</td>
<td>Exfoliants/irritants/inflammants</td>
<td>2</td>
</tr>
<tr>
<td>Gemcitabine</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Gemtuzumab (Mylotarg®)</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Idarubicin</td>
<td>Vesciant</td>
<td>1A</td>
</tr>
<tr>
<td>Ifosfamide</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Irinotecan</td>
<td>Exfoliants/irritants/inflammants</td>
<td>6</td>
</tr>
<tr>
<td>Liposomal Daunorubicin</td>
<td>Cytotoxic antibiotics</td>
<td>1</td>
</tr>
<tr>
<td>Liposomal Doxorubicin</td>
<td>Cytotoxic antibiotics</td>
<td>1</td>
</tr>
<tr>
<td>Melphalan</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Methotrexate</td>
<td>Exfoliants/irritants/inflammants</td>
<td>2</td>
</tr>
<tr>
<td>Mitomycin-C</td>
<td>Vesciant</td>
<td>1</td>
</tr>
<tr>
<td>Mitozantrone</td>
<td>Exfoliants/irritants/inflammants</td>
<td>1</td>
</tr>
<tr>
<td>Oxaliplatin</td>
<td>Exfoliants/irritants/inflammants</td>
<td>5</td>
</tr>
<tr>
<td>Paclitaxel</td>
<td>Vinca alkaloids / taxanes</td>
<td>4</td>
</tr>
<tr>
<td>Pemetrexed (Alimta®)</td>
<td>Exfoliants/irritants/inflammants</td>
<td>2</td>
</tr>
<tr>
<td>Pentostatin</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Raltitrexed</td>
<td>Exfoliants/irritants/inflammants</td>
<td>2</td>
</tr>
<tr>
<td>Rituximab</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Chemotherapy agent</td>
<td>Broad category</td>
<td>Flow diagram</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Streptozocin</td>
<td>Miscellaneous vesicants</td>
<td>1</td>
</tr>
<tr>
<td>Thiotepa</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Topotecan</td>
<td>Exfoliants/irritants/inflammants</td>
<td>6</td>
</tr>
<tr>
<td>Trastuzumab</td>
<td>Non-vesicant/neutral</td>
<td>5</td>
</tr>
<tr>
<td>Treosulfan</td>
<td>Vesicant</td>
<td>6</td>
</tr>
<tr>
<td>Vinblastine</td>
<td>Vinca-alkaloids</td>
<td>3</td>
</tr>
<tr>
<td>Vincristine</td>
<td>Vinca-alkaloids</td>
<td>3</td>
</tr>
<tr>
<td>Vincristine + Doxorubicin (VAD)</td>
<td>Vesicant</td>
<td>1</td>
</tr>
<tr>
<td>Vindesine</td>
<td>Vinca-alkaloids</td>
<td>3</td>
</tr>
<tr>
<td>Vinorelbine</td>
<td>Vinca-alkaloids</td>
<td>3</td>
</tr>
</tbody>
</table>

Flow diagram 1: Vesicants  
Flow diagram 2: Miscellaneous agents I  
Flow diagram 3: Vinca alkaloids  
Flow diagram 4: Taxanes  
Flow diagram 5: Non-vesicant/neutral agents  
Flow diagram 6: Miscellaneous agents II
Suspected or Actual Extravasation

Stop infusion/injection and explain what has happened to the patient

Collect extravasation kit and where possible assistance from another trained nurse

Using a 10ml syringe aspirate as much extravasated drug out of the cannula / central venous catheter

Mark circumference of extravasated site with marker pen

Give Hydrocortisone 100mgs via cannula

Remove cannula
If extravasation is via central venous device treat extravasation and then discuss removal of device with registrar / consultant

Apply Ice Pack. Draw up 4mg (1ml) of Dexamethasone injection and administer in clockwise direction 0.1-0.2mls subcutaneously around the circumference of the extravasated site

Applying cotton bud paint Dimethylsulphoxide (DMSO) onto the affected area and allow to dry.
DO NOT APPLY TO HEALTHY SKIN & DO NOT COVER UNTIL DRY
Alternate every 3 hours with topical hydrocortisone cream.

Liposomal Daunorubicin
Liposomal Doxorubicin

Suspected or Actual Extravasation

* With Liposomal Daunorubicin & Liposomal Doxorubicin delay application of DMSO for 8 to 12 hours.

Inform Consultant/Registrar responsible for Patient

Complete Adverse Incident Form and National Extravasation reporting card

Educate patient on aftercare as per Information sheet

Make Appt for patient to see Chemotherapy Nurse/Doctor the next day

FLOW DIAGRAM 1
VESICANTS
Amsacrine
Dacarbazine
Dactinomycin
Liposomal Daunorubicin (see note*)
Liposomal Doxorubicin (see note*)
Mitomycin C
Steptozocin
VAD Infusor (Vincristine & Doxorubicin Mix)
Aim: Localise and Neutralise

Apply ice pack for 30 mins - 4 hours. Bandage into position

If still blistering stop DMSO and contact St Chads Birmingham for advice
Tel: 0121 5543801

* With Liposomal Daunorubicin & Liposomal Doxorubicin delay application of DMSO for 8 to 12 hours.
FLOW DIAGRAM 1A  
- VESICANT
Anthracycline only
Daunorubicin
Doxorubicin
Epirubicin
Idarubicin

If Savene® is NOT warranted follow Flow diagram 1 - Vesicants, as per ASWCS extravasation policy.

Suspected or Actual Extravasation

1. Stop infusion and explain what has happened to the patient

2. Collect extravasation kit and where possible assistance from another trained nurse

3. Using a 10ml syringe aspirate as much extravasated drug out of the cannula / central venous catheter

4. Mark circumference of extravasated site with marker pen

5. Remove cannula. If extravasation is via a central venous device treat extravasation and then discuss removal of device with consultant / senior registrar

6. Apply Ice pack and elevate limb.

Alert consultant / senior registrar of suspected anthracycline extravasation and if dexrazoxane( Savene®) therapy is warranted ensure it is prescribed on pre-printed prescription chart from extravasation kit.

Calculate patients’ body surface area, and calculate the dexrazoxane (Savene®) dose required. Confirm dose with prescription and obtain dexrazoxane from treatment room on Wd61. If possible take a clinical photo for medical records

Remove ALL cooling (including scalp cooling) at least 15 minutes prior to dexrazoxane (Savene®) infusion. Administration of dexrazoxane (Savene®) should begin as soon as possible and within 6hrs of extravasation

Administer dexrazoxane (Savene®) over 1-2 hrs in a cannula away from or above the injury site at a dose of:-
1000mg/m² on Days 1&2 and 500mg/m² on Day 3. (Maximum single daily dose 2,000 mg i.e. cap at 2m²)

Note: - first dose must be given within 6hours of extravasation. Subsequent doses must be given 24 ± 3 hours

Complete Adverse Incident Form and National Extravasation reporting card (green card) or online via www.extravasation.org

Educate patient on aftercare as per information sheet

Make appointment for Savene infusion days 2&3
FLOWSHET 2
Miscellaneous Agents I

Carmustine
Etoposide
Etoposide Phosphate (Etopophos®)
5-Fluorouracil (5-FU)
Methotrexate
Raltitrexed

**Aim: Localise and Neutralise**

**CARMUSTINE**
Infiltrate the site with 2.1% Sodium Bicarbonate, leave for 2 minutes and then aspirate off again.
To prepare 2.1% Sodium Bicarbonate, take 2.5ml of the 8.4% Sodium Bicarbonate and add a 7.5ml of water for injection.

*Note: Caution and expert advice should be exercised before using this antidote*

*Note: Sodium Bicarbonate 8.4% may NOT be kept in some kits – when required, use ward/clinic stock or if still unavailable, continue treatment algorithm*

**ETOPOSIDE PHOSPHATE**
5-FLUOROURACIL (5-FU)
METHOTREXATE
RALTITREXED

After 4 Hours, if the local reaction has settled, apply a heat pad for a further 24 to 48hrs.

If still blistering then contact St Chads, Birmingham for advice.
Tel: 0121 5543801

**Suspected or Actual Extravasation**
Stop infusion/injection and explain what has happened to the patient

Collect extravasation kit and where possible assistance from another trained nurse

Using a 10ml syringe aspirate as much extravasated drug out of the cannula/central venous catheter

Mark circumference of extravasated site with marker pen

Give Hydrocortisone 100mgs via cannula

Remove Cannula
If extravasation via central venous device treat extravasation and then discuss removal of device with Consultant / Registrar

Apply a thin layer of Hydrocortisone 1% cream and cover with 2 squares of gauze

Inform Consultant/Registrar responsible for Patient

Complete Adverse Incident Form and National Extravasation reporting card

Educate patient on aftercare as per Information sheet

Make Appt for patient to see Chemotherapy Nurse/Doctor the next day

If still blistering then contact St Chads, Birmingham for advice.
Tel: 0121 5543801
Suspected or Actual Extravasation

Stop infusion/injection and explain what has happened to the patient

Collect extravasation kit and where possible assistance from another trained nurse

Using a 10ml syringe aspirate as much extravasated drug out of the cannula/central venous catheter

Mark circumference of extravasated site with marker pen

Give Hydrocortisone 100mgs via cannula

Remove Cannula
If extravasation via central venous device treat extravasation and then discuss removal of device with Consultant / Registrar

Inform Consultant/Registrar responsible for Patient

Complete Adverse Incident Form and National Extravasation Reporting card

Educate patient on aftercare as per Information sheet

Make Appt for patient to see Chemotherapy Nurse/Doctor the next day

FLOW DIAGRAM 3
Vinca Alkaloids
Vinblastine
Vincristine
Vindesine
Vinorelbine

Aim: Spread and dilute

Dissolve Hyaluronidase 1500iu in 1ml water for injection. Administer Hyaluronidase 0.1-0.2ml subcutaneously in a clockwise direction around the circumference of the extravasation site. Gently massage area to facilitate dispersal of drug.

Apply heat pad for 30 - 60 minutes

Apply a thin layer of Hydrocortisone 1% cream, cover with 2 squares of gauze and bandage into position

If still blistering then contact St Chads, Birmingham for advice. Tel: 0121 5543801
Mix together a solution containing 100mg Hydrocortisone + 10mgs Chlorphenamine injection and then administer in a clockwise direction 0.1 - 0.2 mls subcutaneously around the circumference of the extravasation site.

Stop infusion/injection and explain what has happened to the patient

Collect extravasation kit and where possible assistance from other trained nurse

Using a 10ml syringe aspirate as much extravasated drug out of the cannula/central venous catheter

Mark circumference of extravasated site with marker pen

Give Hydrocortisone 100mgs via cannula

Remove Cannula
If extravasation via central venous device treat extravasation and then discuss removal of device with Consultant / Registrar

Mix together a solution containing 100mg Hydrocortisone + 10 mgs Chlorphenamine injection and then administer in a clockwise direction 0.1 - 0.2 mls subcutaneously around the circumference of the extravasation site.

Inform Consultant/Registrar responsible for Patient

Complete Adverse Incident Form and National Extravasation Reporting card

Educate patient on aftercare as per Information sheet

Make Appt for patient to see Chemotherapy Nurse/Doctor the next day
FLOW DIAGRAM 5
Non-Vesicant/Neutral Agents

Aldesleukin (IL-2)
Alemtuzumab (MabCampath®)
Asparaginase
β-Interferon
Bevacizumab (Avastin®)
Bleomycin
Bortezomib (Velcade®)
Carboplatin
Cetuximab (Erbitux®)
Cisplatin
Cyclophosphamide
Cytarabine
Doxorubicin
Gemcitabine
Gemcitabine
Gemtuzumab (Mylotarg®)
Ifosfamide
Melphalan
Oxaliplatin
Pentostatin
Rituximab
Thiotepa
Trastuzumab (Herceptin®)

Aim: Spread and dilute

Suspected or Actual Extravasation

Stop infusion/injection and explain what has happened to the patient

Collect extravasation kit and
Where possible seek assistance from another trained nurse

Using a 10ml syringe aspirate as much extravasated
drug out of the cannula/central venous catheter

Mark circumference of extravasated site with marker pen

Give Hydrocortisone 100mgs via cannula

Remove cannula. If extravasation via central venous
device treat extravasation and then discuss removal of
device with Consultant / Registrar

Oxaliplatin Extravasation: Put up a 500ml bag of Glucose
5% in the centre of the extravasation area in a
‘hypodermoclysis’ fashion. Leave in situ for up to 8 Hours

Recannulate patient in opposite arm or distal to the
extravasation site and recommence chemotherapy

Inform Consultant/Registrar responsible for Patient

Complete Adverse Incident Form and National
Extravasation Reporting card

Educate patient on aftercare as per Information sheet

Make Appt for patient to see Chemotherapy Nurse/Doctor the next day

Oxaliplatin Only

Draw up 100 mgs Hydrocortisone injection and
administer in a clockwise direction 0.1 – 0.2 mls
subcutaneously around the circumference of the
extravasated site

Dissolve Hyaluronidase 1500iu in 1ml water for injection.
Infiltrate the affected area subcutaneously with this.
Gently massage area to facilitate dispersal of drug

Apply a thin layer of Hydrocortisone 1% cream and
cover with 2 squares of gauze

Apply heat pad for 30 - 60 minutes

If blistering occurs contact St
Chads, Birmingham for advice.
Tel: 0121 5543801.
FLOW DIAGRAM 6
Miscellaneous Agents II
Cisplatin
Irinotecan
Topotecan
Treosulfan

Suspected or Actual Extravasation
Stop infusion/injection and explain what has happened to the patient

Collect extravasation kit and where possible seek assistance from another trained nurse.

Using a 10ml syringe aspirate as much extravasated drug out of the cannula/central venous catheter

Mark circumference of extravasated site with marker pen

Give Hydrocortisone 100mgs via cannula

Remove cannula. If extravasation via central venous device treat extravasation and then discuss removal of device with Consultant / Registrar

Infiltrate the site with 2.1% Sodium Bicarbonate, leave for 2 minutes and then aspirate off again.

To prepare 2.1% Sodium Bicarbonate, take 2.5ml of the 8.4% Sodium Bicarbonate and add a 7.5ml of water for injection.

Note: Caution and expert advice should be exercised before using this antidote
Note: Sodium Bicarbonate 8.4% may NOT be kept in some kits – when required, use ward/clinic stock or obtain from the pharmacy department: if still unavailable, continue treatment algorithm

Infiltrate the site with 3% Sodium Thiosulphate and aspirate back
Note: Sodium Thiosulfate 3% may NOT be kept in some kits – when required, use ward/clinic stock or obtain from the pharmacy department: if still unavailable, continue treatment algorithm

Dissolve Hyaluronidase 1,500iu in 1ml water for injection. Infiltrate the affected area subcutaneously with this. Gently massage area to facilitate dispersal of drug

Apply a thin layer of Hydrocortisone 1% cream and cover with 2 squares of gauze

If a large volume the seek advice from St Chads Birmingham, tel: 0121 5543801

Make Appt for patient to see Chemotherapy Nurse/Doctor the next day

Educate patient on aftercare as per Information sheet

Complete Adverse Incident Form And National Extravasation reporting card

IRINOTECAN – TOPOTECAN – TREOSULFAN
Infiltrate the site with 2.1% Sodium Bicarbonate, leave for 2 minutes and then aspirate off again.

To prepare 2.1% Sodium Bicarbonate, take 2.5ml of the 8.4% Sodium Bicarbonate and add a 7.5ml of water for injection.

Note: Caution and expert advice should be exercised before using this antidote
Note: Sodium Bicarbonate 8.4% may NOT be kept in some kits – when required, use ward/clinic stock or obtain from the pharmacy department: if still unavailable, continue treatment algorithm

Apply heat pad for 30 - 60 minutes

Recannulate patient in opposite arm or distal to extravasation site and recommence chemotherapy

Inform Consultant/Registrar responsible for Patient.
PATIENT INFORMATION LEAFLET

This leaflet has been written to provide information about what extravasation is, what problems it may cause and how it should be treated.

What is extravasation?

Extravasation is when chemotherapy leaks from the vein into the surrounding tissue. This may cause pain, swelling and redness at the area.

Why did this Happen?

Extravasation is rare but known complication of treatment. Despite nurses carrying out all possible precautions it may still occur.
The drug which has extravasated is called _________________________________

What problems may it cause?

Most patients experience few problems following extravasation. However, occasionally it may cause skin blisters and ulceration and if left untreated serious damage to the tissues.

How should it be treated in hospital?

The treatment given will depend on which drug has extravasated. Whilst in hospital your chemotherapy nurse will have already carried out any necessary treatment to try and minimise any skin damage. This may have included the use of heat or ice to the affected area, and/or an injection of drugs or application of cream to the area. The nurse may have taken a photograph of the site of injury. This is purely for your confidential medical records in order for the nursing team to accurately assess your response to treatment.
What should I do when I get home?

Your Nurse will tick which of the following instructions need to be carried out.

<table>
<thead>
<tr>
<th>Tick if applicable</th>
<th>Instructions</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elevate arm as much as possible for the first 24 hours</td>
<td>Helps to reduce the swelling.</td>
</tr>
<tr>
<td></td>
<td>Apply a hot water bottle/heat pad for as much time as practically possible</td>
<td>This may help to reduce any swelling and tissue irritation.</td>
</tr>
<tr>
<td></td>
<td>for the first 24 hours. Wrap in clean cloth to prevent direct contact. Use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with caution to prevent burns/scalds.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply ice pack, firmly but without pressure for 15-30 mins, every 4-6 hours</td>
<td>This may help to reduce any swelling and tissue irritation.</td>
</tr>
<tr>
<td></td>
<td>Wrap in clean cloth to prevent direct skin contact. Use carefully to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>prevent cold burns.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Every 3 hours you must apply either hydrocortisone cream or DMSO cream.</td>
<td>Helps remove the drug that has leaked from the tissue.</td>
</tr>
<tr>
<td></td>
<td>Apply only a thin layer and take care to avoid unaffected skin. Allow cream to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dry before covering. Continue to apply alternate creams every 3 hours for 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Your nurse will give you an appointment to attend for an infusion of Savene</td>
<td>Savene is effective in minimising or reducing any tissue damage that may</td>
</tr>
<tr>
<td></td>
<td>for the next two days. It should be roughly the same time each day. You</td>
<td>occur</td>
</tr>
<tr>
<td></td>
<td>need to have an infusion of Savene for 2 more days.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply a thin layer of hydrocortisone cream to affected area four times a day.</td>
<td></td>
</tr>
</tbody>
</table>

What else should I do?

Gently exercise the affected arm/hand
Take mild pain killers if required
Only apply lotions/creams to area which have been recommended by the chemotherapy nurse. In the bath/shower do not use soap on affected area, and dry gently with a clean towel.
Avoid tight clothing around and sunlight exposure to the affected area
If you have any concerns re changes in injury or questions please ring your chemotherapy unit without delay.

What happens next?

Before you are discharged you will either be given an appointment to attend the hospital for review or a nurse will contact you the following day by phone to see how the injury site is feeling and looking. This will depend on the severity of the injury and the drug involved. You will be informed of any changes to treatment or further care required.