

# Standard Operating Procedures for the Management of Phlebitis, Infiltration, Air Embolism, Speedshock and Extravasation

Date	Version
December 2012	1

## Purpose

To instruct staff on how to correctly identify and manage complications arising from intravenous administration of drugs and fluids.

## Scope this document?

Applies to all staff who administer intravenous medications and fluids.

## Key Message

Staff working for or on behalf of Plymouth Hospitals NHS Trust who are involved in treating phlebitis, infiltration, air embolism, speedshock and extravasation as a result of drugs and/or fluids administered intravenously must do so in accordance with these SOPs.

## Accountabilities

<b>Production</b>	Peter Gray, Pharmacist and Henrietta Fergusson, Placement & Mentorship Lead
<b>Review and approval</b>	Medicines Governance Committee
<b>Ratification</b>	Medicines Governance Committee
<b>Dissemination</b>	Peter Gray, Pharmacist

## Links to other policies and procedures

### PHNT Chemotherapy Operations Group

- Oncology and Blood Services Clinical Chemotherapy Service Operations Policy

### Pharmacy Documents:

- PHNT Medicines Management Policy

### PHNT Infection Control Documents:

- Guidelines for the Management of Peripheral Intravenous Devices
- Guidelines for the Management of Central Intravenous Catheters
- Hand Hygiene Guidelines
- Guidelines for Aseptic Technique
- Safe Disposal of Sharps Policy

### Other Documents:

- Royal College Nursing Standards for Infusion Therapy, 2010
- [The Health and Social Care Act 2008: Code of Practice on the prevention and control of infections and related guidance](#) (published 14 Dec 2010)
- Please also refer to the Pan-Birmingham NHS Cancer Network Guidelines 2011: [http://www.birminghamcancer.nhs.uk/uploads/document\\_file/document/4e1bf958358e982bc500080f/management\\_of\\_extravasation\\_version\\_2.0.pdf](http://www.birminghamcancer.nhs.uk/uploads/document_file/document/4e1bf958358e982bc500080f/management_of_extravasation_version_2.0.pdf)
- Royal Marsden Hospital Manual of Clinical Nursing Procedures 2008

## Version History

Version 1	December 2012
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## Last Approval

December 2012

## Due for Review

December 2015

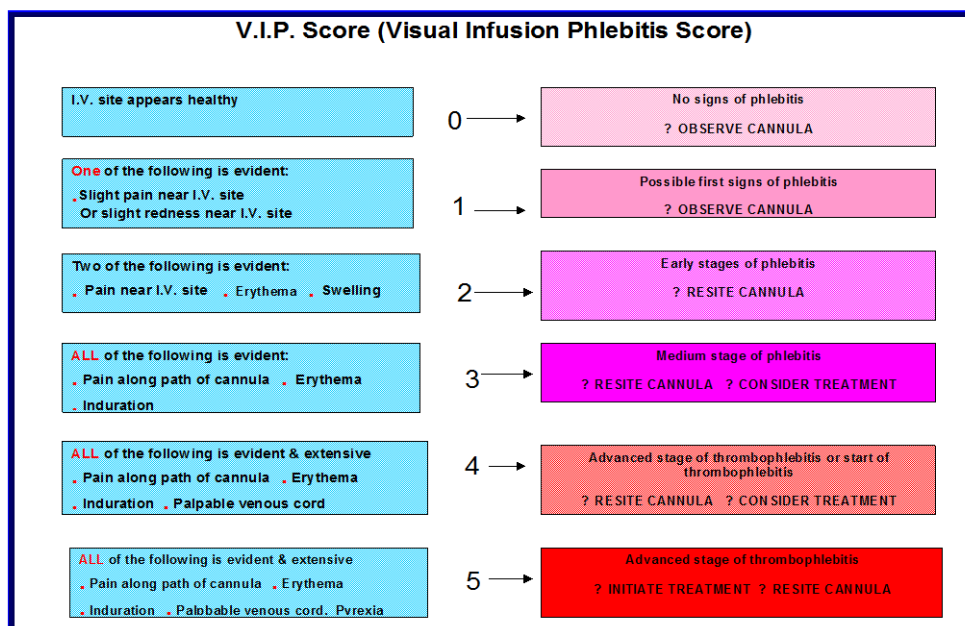
## 1 Phlebitis: Identification and procedure for treatment

### Definition:

Phlebitis is the inflammation of the intima of the vein (Perdue 2001). There are 3 main types of phlebitis, mechanical, chemical and infective.

### Signs and Symptoms include:

- Redness, pain, swelling at insertion site
- Erythema
- Palpable venous cord
- Pyrexia
- Assess the site using the VIP score:



### Treatment:

- Remove cannula and resite if required. Send the cannula tip to microbiology if signs of infection are present, along with wound swab of the affected site if applicable
- Heat/Ice pack can be placed over affected area if required
- If pyrexia or phlebitis is severe contact medical team
- Document in patients notes and complete clinical incident form

## 2 Air Embolism: Identification and procedure for treatment

**Definition:** Bubbles of air become trapped in the circulating blood

### Signs and Symptoms include:

shortness of breath, altered consciousness, visual disturbance, hemiparesis, chest pain and a low cardiac output state

**Treatment:** Assess Airway, Breathing and Circulation. Start resuscitation if necessary and call for urgent medical assistance. If patient is conscious, lay patient in Trendelenburg position,

administer 100% oxygen and document actions (Wittenberg 2006). Complete clinical incident form.

### 3 Infiltration: Identification and procedure for treatment

**Definition:** *Infiltration of a non-vesicant solution into tissues, which may lead to swelling and discomfort for the patient.*

**Signs and Symptoms include:**

- No flashback of blood possible from the device.
- Localised swelling at insertion site which may lead to swelling of the limb.
- Oozing from the insertion site .
- Blanching and coolness of skin around insertion site.
- Patient may also complain of pain but not always.

**Treatment:**

- Discontinue infusion immediately.
- Peripheral cannula should be removed and resited elsewhere if necessary .
- Elevation of affected limb.
- Treatment will depend on the severity of the infiltration so medical assistance should be sought if necessary.
- Document in patients notes.
- Ongoing assessment and observation of patient should be performed
- Clinical incident form to be completed

### 4 Speed Shock: Identification and procedure for treatment

**Definition:** *A sudden adverse physiologic reaction to IV medications or drugs that are administered too quickly. Mosby's Medical Dictionary 2009.*

**Signs and Symptoms:** Flushed face, headache, a tight feeling in the chest, irregular pulse, loss of consciousness, and cardiac arrest.

**Treatment:**

- Stop administration
- Call for immediate medical assistance
- Treat symptoms
- Administer oxygen
- Document in patients notes and clinical incident form

### 5 Extravasation: Identification and procedure for treatment

**For the management of extravasation of the vesicant chemotherapy agents listed below, refer to the PHNT Oncology and Blood Services Clinical Chemotherapy Service Operations Policy**

<b>Group A</b>	<b><u>Group B</u></b>	
Docetaxel	Amsacrine	<b><i>Anthracyclines:</i></b>
Paclitaxel	Carmustine	Epirubicin
Vinblastine	Dacarbazine	Idarubicin
Vincristine	Dactinomycin	Daunorubicin
Vindesine	Mitomycin C	Doxorubicin

Vinorelbine

Mitoxantrone

Mustine

Streptozocin

**Otherwise follow the instructions on the next page.**

**Definition:**

*Inadvertent infiltration of a vesicant solution or medication into surrounding tissues instead of into the intended vascular pathway (Dougherty et al 2010, Perdue 2001, Stanley 2003). A vesicant is any solution or medication that causes the formation of blisters with subsequent sloughing of tissues resulting from tissue necrosis (Goodman 2000, Perdue 2001)*

**Signs and Symptoms include:**

- No flashback of blood is possible from the device
- Resistance may be felt on the plunger of the syringe if bolus administration is performed
- There is absence of free flow if infusion is in progress
- Erythema and inflammation at insertion site
- Patient complains of burning, stinging or discomfort at the insertion site
- Swelling or leakage is observed at insertion site

**Prevention:**

- Do not use cannula if signs of phlebitis are present
- Flush cannula with Normal Saline to check patency before administering any medication
- Vesicants should always be administered first in a sequence of drugs because vascular integrity decreases over time. (Hyde and Dougherty 2008)
- Observe area around cannula site before and during administration of medication

**Treatment:**

If Extravasation is observed, the following procedure should be followed:

1. The infusion should be disconnected immediately.
2. DO NOT REMOVE CANNULA.
3. Inform medical staff immediately, giving details of drug involved.
4. Inform patient of what has occurred and the course of action to be followed.
5. Put on personal protective equipment as required.
6. Aspirate the drug which has been infused by trying to draw back some of the blood from the cannula/central line.
7. Cleanse the area with 0.9% Sodium Chloride.
8. MARK (outline) the extravasated area with a permanent marker pen.
9. Await further instructions from medical staff then remove cannula as per medical instruction.
10. Collect Extravasation pack if available.
11. Elevate the limb and encourage movement.
12. Assess patient's pain and consider analgesia.
13. If extravasation is confirmed a referral to plastic surgery should be made within 24 hours.
14. Consider referral to Tissue Viability team to discuss wound management.
15. Document in patient's notes and complete Trust incident form.

The following is a list of vesicant non-cytotoxic drugs in common use:

**Group B**

**Group A**

Calcium Chloride

Aciclovir

Calcium Gluconate

Amphotericin

Phenytoin

Cefotaxime

Hypertonic solution of Sodium Bicarbonate (greater than 5%)

Diazepam

Glucose 50%  
Therapeutic radiopharmaceuticals  
e.g. MIBG

Ganciclovir  
Potassium Chloride (>40 mmols/l)  
Mannitol

### Group A Drugs

Ideally within an hour of extravasation, infiltrate 1500 iu Hyaluronidase subcutaneously around the site. Inject volumes of 0.1-0.2ml subcutaneously at points of the compass around the area of extravasation. Hyaluronidase should be reconstituted with 1ml of sodium chloride 0.9% or water For Injection. Apply a warm pack and leave in situ for 2 to 4 hours. Check warm packs on a regular basis and replace when necessary. NB. Hyaluronidase and warm packs increases the absorption of local anaesthetic and other drugs. Therefore if local anaesthetic has been applied to the area, e.g. Ametop gel prior to cannulation, within 6 hours of extravasation, then the patient should be monitored for signs and symptoms of systemic anaesthesia such as increased pulse rate and decreased respirations and the doctor informed immediately

### Group B Drugs

Immediately apply cold packs (Articare Re-usable Cold Pack code 47424 available through Plymouth NHS supplies system Oracle) for 15 to 20 minutes, 3 or 4 times a day for up to 3 days. Replace cold packs regularly for 24 hours. Cold packs aid in localizing the area of extravasation, slowing cell metabolism and decreasing the area of tissue damage.

## Extravasation of Contrast Medium

### a. Objective

When contrast medium has been inadvertently injected into subcutaneous tissue, due to poor venous integrity or poor positioning of an intravenous cannula. It is necessary to treat extravasation **IMMEDIATELY** to minimise pain and discomfort, reduce the risk of inflammation, infection and necrosis occurring, the following guidance should be adhered to.

### b. Responsibilities

It is the responsibility of the practitioner injecting the contrast medium to be aware of the signs, symptoms, treatment of extravasation and the complications that can arise from it if left untreated.

Extravasation should be suspected if the patient complains of burning or stinging pain in the injection site, swelling is apparent, there is no blood return on withdrawal of the syringe plunger and there is resistance on depression of the syringe plunger.

- i) Stop the injection **immediately or as soon as you can**. Leave the cannula in situ to allow aspiration of any residual contrast medium. This will minimise local injury.
- ii) Remove the cannula and cover the puncture site with a sterile dressing.
- iii) **For Group A drugs**, Ideally within an hour of extravasation, infiltrate 1500 iu Hyaluronidase subcutaneously around the site. Inject volumes of 0.1-0.2ml subcutaneously at points of the compass around the area of extravasation. Hyaluronidase should be reconstituted with 1ml of sodium chloride 0.9% or water For Injection. Apply a warm pack and leave in situ for 2 to 4 hours. Check warm packs on a regular basis and replace when necessary. NB. Hyaluronidase and warm packs increases the absorption of local anaesthetic and other drugs. Therefore if local anaesthetic has been applied to the area, e.g. Ametop gel prior to cannulation, within 6 hours of extravasation, then the patient should be monitored for signs and symptoms of systemic anaesthesia such as increased pulse rate and decreased respirations and the doctor informed immediately.
- iv) **For Group B drugs, immediately** apply a cold pack (Articare Re-usable Cold Pack code 47424 available through Plymouth NHS supplies system, Oracle). Apply for 15 to 20 minutes, 3 or 4 times a day for up to 3 days. **Do not use ice** as it may give rise to cold burns (Ansell et al 1996).

- v) Elevate the affected limb, above the level of the heart, and observe closely. This action will decrease hydrostatic pressures in the capillaries, which makes it easier for extravasated fluid to be reabsorbed into these vessels and thereby removed (Cohan et al 1996).
- vi) Hydrocortisone 1% cream can be applied twice daily to the affected area to treat erythema.
- vii) Inform a radiologist if radiographer performing injection, the radiologist who may wish to prescribe topical corticosteroids.
- viii) Bandage or tubigrip the limb to protect it. Encourage the patient to keep the limb elevated as much as possible for several days and to apply cold packs as required. Analgesia such as paracetamol can be recommended.
- ix) Explain to the patient that their limb will feel sore for several days – to alleviate their anxiety.
- x) Document the incident in the patient's medical notes or / and report, and complete an incident form.
- xi) Report the incident to the ward sister if an in-patient. If the patient is an outpatient telephone their GP giving details of the incident. Give the patient the telephone number of the *Radiology nurses* should a follow-up appointment be necessary (if symptoms do not subside).

## 6 References

1. Goolsby TV, and Lombardo FA, (2006) Extravasation of Chemotherapeutic agents: prevention and treatment. *Semin Oncol* 33(1):139-43
2. Perdue MB (2001) Intravenous Complications. *Infusion therapy in clinical practice*. 2<sup>nd</sup> Ed. Pennsylvania: WB Saunders.
3. Wittenberg AG, Richard AJ, Conrad SA. (2006) Venous Air Embolism. *EMedicine* May 2, 2006 cited; Available from: <http://www.emedicine.com/EMERG/topic787.htm>
4. [http://www.birminghamcancer.nhs.uk/uploads/document\\_file/document/4e1bf958358e982bc500080f/management\\_of\\_extravasation\\_version\\_2.0.pdf](http://www.birminghamcancer.nhs.uk/uploads/document_file/document/4e1bf958358e982bc500080f/management_of_extravasation_version_2.0.pdf)

## 11 Document Accountability

<b>Production</b>	Peter Gray, Pharmacist
<b>Review and approval</b>	Medicines Governance Committee
<b>Dissemination</b>	Peter Gray, Pharmacist

## 12 Overall responsibility for this document

The Director of Pharmacy has overall responsibility for the safe preparation and administration of medicines in this Trust, and therefore has overall responsibility for this document.

## 13 Dissemination and Implementation of this document

- This SOP will be publicised in Vital signs and in the weekly staff news brief. The SOP will be held in the Pharmacy Dept. Section of Plymouth Healthnet and will be accessible using the link:  
<http://nww.picts.nhs.uk/PHNetLive/DesktopDefault.aspx?tabid=1715>