# Complications of Peripheral Intravenous Therapy

## Contents

## Purpose

To ensure:

- Timely identification of complications.
- Actions are implemented to avoid complications.
- Best practice interventions to manage complications of IV therapy are upheld.

## Scope

All staff and approved persons involved in Intravenous therapy management.

## Associated documents

- IV Cannulation package via Clinical Skills Unit website
- IV Certification package
- Incident Report Form (ref. 1077)

## Responsibilities

The RN/Midwife/EN responsible for managing or monitoring the patient and/or administering the IV therapy must be aware of the signs and symptoms of:

- Allergic reaction / Anaphylaxis
- Phlebitis (Place in link from IV section here)
- Hypervolemia
- Extravasation
- Flare Reactions
- Air Embolism
- Infection / Sepsis
- Cellulitis

### Documentation

Any of the above must be documented in the clinical notes.

This documentation must include:

- Date and time of problem
- What the problem is
- Action taken
- What medical staff have been notified and when.
- If appropriate/indicated, an Incident form must be completed

## Common Complications

## Phlebitis

An inflammation of one or more layers of the vein.

| **Mechanical Phlebitis (irritation by catheter)** | |
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| **Possible Causes** | **Management** |
| • Cannula too large for vein<br>• Cannula inserted near a joint, creating piston motion against vein wall when patient moves<br>• Inadequate dressing and securement | • Remove IV cannula and reinsert appropriate vascular access device in new location.<br>• Apply warm moist compress (ie. body temperature) to site for 20 mins, 6 hourly for 24 hours (non cytotoxic drugs only)<br>• Use smallest gauge cannula in largest vein possible (refer to IV cannulation package)<br>• Discuss with doctor or IV Certificated nurse /midwife, IV Link Staff nurse cannulator or senior nursing staff member<br>• Re secure or redress as required<br>• Document the above actions and assessments |
| **Chemical Phlebitis (irritation by IV medications or fluids)** | |
| **Possible Causes** | **Management** |
| • Infusion Alkaline solutions: - e.g. acyclovir, azathioprine, ganciclovir, phenytoin or Acid solutions - vancomycin, thiamine, glucagon, cyclizine, haloperidol | • Remove IV cannula and reinsert appropriate vascular access device in new location.<br>• Apply warm moist compress (i.e. body temperature) to site for 20 mins, 6 hourly for 24 hours for non cytotoxic drugs only<br>• Use smallest gauge, cannula in largest vein possible (refer to IV package) |

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| • Infusion of hyper/hypotonic solutions (link to IV certification package)<br>• Speed and method of infusion delivery | • Dilute irritating solutions to acceptable dilutions in consultation with pharmacy<br>• Decrease infusion rate<br>• Discuss with doctor or IV Certificated nurse /midwife, IV Link Staff nurse cannulator or senior nursing staff member<br>• Document the above actions and assessments |
| **Bacterial Phlebitis (irritation by bacteria or bacterial toxins)** | |
| **Possible Causes** | **Management** |
| • Break in aseptic technique during insertion or routine care.<br>• Inadequate skin preparation and/or hand hygiene<br>• Use of contaminated/expired IV solution or medication.<br>• Cannula remaining in situ past date of expiry (refer to IV cannulation package) | • Remove IV cannula and reinsert appropriate vascular access device in new location.<br>• Send IV cannula to Canterbury Health Laboratory for culture, if inflammation or sepsis is suspected.(refer to IV cannulation package for identification of bacterial infection)<br>• Obtain swab for culture if there is ooze from the site.<br>• Apply warm moist compress (ie. body temperature) to site for 20 mins, 6 hourly for 24 hours (non cytotoxic drugs only)<br>• Discuss with doctor for ongoing management<br>• Document the above actions and assessments |

## Hypervolaemia

Those particularly at risk are:

- The elderly
- Children and infants
- Patients with cardiac or pulmonary disease
- Patients with significant cerebral or renal disease/injury
- Pregnant women

### Clinical signs and symptoms

- Deteriorating respiratory status – tachypnoea, dyspnoea, decreased oxygen saturations
- Tachycardia.
- Hypertension.

- Raised CVP measurement and distended neck veins.
- Pulmonary oedema may also occur, leading to dyspnoea and cyanosis
- Weight increase >2kg over 24 to 48hrs

**Management**

- Stop the infusion.
- Notify Medical staff
- Administer treatment as ordered
- Document the above actions and assessments

## Extravasation

Extravasation of vesicant drugs / fluids into the tissues is a complication that can occur due to:

- Vein injury during cannula insertion
- Too large a cannula for the vein
- Cannula dislodgement during infusion
- Inadequate securement of the cannula
- Constriction of the vein above infusion site. e.g. clothing, patient ID bracelet

**Note**: For Cytotoxic extravasation refer to the Cytotoxic Therapy Section *(place link here)*

**Signs and symptoms**

- Swelling
- Burning and or pain at the insertion site. Pain may be severe if the IV solution is hypertonic (e.g. solutions greater than 5% Dextrose), acid or alkaline
- Slowing of the infusion rate
- Lack of blood return from cannula

**Management** (refer IV cannulation package/Cytotoxic Website for the Extravasation Management Flowchart)

- Do not flush the line
- Attempt to aspirate drug from the cannula
- Remove the cannula once aspiration is complete
- Notify medical staff

- Contact pharmacy regarding the ongoing management of the site in relation to the particular drug extravasation
- Re cannulate away from the affected area
- Document the above actions and assessments
- Ensure there is adequate follow up assessment of the site

### Prevention

- Ensure the cannula is the appropriate size and well secured
- Blood return on aspiration is observed before flushing cannula
- The insertion site must be visible at all times during administration
- Check cannula site at least hourly or more often if there is any concern during an infusion

**Note:** the insertion site should never be over an area of flexion. Splints are never to be used

## Flare reactions (transient chemical phlebitis)

Flare reactions can occur during administration of a drug.

### Signs and Symptoms

Transient venous irritation is marked by:

- local urticaria
- stinging
- oedema
- inflammation along the track of the vein
- blood return remains present
- no slowing of the infusion rate

### Management

- Discontinue administration of fluids
- Flush the line with 0.9% Sodium Chloride
- Rest the vein for at least 30 mins
- Use the phlebitis score to assess the site
- When appropriate use a 0.9% Sodium Chloride infusion to check patency of the line and check blood return
- Recommence the medication administration if patent
- Document the above actions and assessments

# Air Embolism

### Clinical signs and symptoms

- Characterised by abrupt onset of signs and symptoms.
- Loss of consciousness
- Focal seizures
- Complete collapse
- Loud murmur over heart on auscultation
- Death

### Management

If there is evidence that considerable air has entered the vascular compartment:

- Stop the infusion by clamping the line
- Place patient in left trendelenburg position (head down on left side by tipping the bed )
- Theoretically this action keeps the air in the pulmonary out flow tract to a minimum. Traps air in the right chamber of heart and great veins proximal to the pulmonic valve and may be withdrawn via a central catheter inserted into the ventricle. Notify medical staff immediately.
- Administer oxygen
- Hyperbaric treatment may be considered
- Document the above actions and assessments

### Prevention

- Ensure air is removed from administration set and the set is primed with the infusion fluid before commencing infusion
- Never leave the rate control fully open unless the fluids are continuously visually monitored, eg. Resus situation
- Observe the fluid level in the bag frequently and prepare the next prescribed bag when the level is low
- Ensure all connections are tight (Should they be loose, fluid usually leaks out rather than air entering the system)
- Remove air from the side arm reservoir before injection of intravenous drugs.
- Use of a buretrol/pump, if appropriate.
- Ensure lines are clamped during luer plug changes

# Allergic Reaction / Anaphylaxis

### Clinical Signs and symptoms

Systems that may be involved include:

- Skin producing urticaria
- Respiratory producing bronchospasm
- Oedema
- Cardiovascular producing signs of shock. i.e. Low BP, tachycardia.
- Gastrointestinal producing cramps and diarrhoea

### Management

- Cease treatment.
- Implement resuscitation procedures depending on severity
- Notify doctor immediately

Refer to the Adverse Reactions Policy Vol 12 regarding alerts and documentation

### Prevention

- It is the responsibility of all staff, ie. both the person prescribing and the person administering to be aware of previous reactions and possible medication interactions.

# Cellulitis

Cellulitis is an inflammation of the tissue whereas phlebitis is an inflammation of the vein

### Clinical signs and symptoms

- Erythema
- Pain
- Tenderness
- Swelling

### Management

- The cannula does not necessary require removal

- Antibiotic treatment as ordered by medical team
- Mark the site and monitor any deterioration/improvement of site 8 hrly
- Document the above actions and assessments

## Infection

Infection can be the result of cannula insertion or during management and care of a cannula when aspetic non touch technique is not ahered to. It is usually a local infection at the catheter-skin entry point.Infection can also be the result of unresolver phlebitis.

**Clinical signs and symptoms**

- Rednes
- Swelling
- Skin discolouration
- Purulent discharge
- Pain

**Management**

- Take swab from insertion site for culture
- Clean insertion site with antimicrobial wipe before removing cannula
- Remove cannula and culture
- Place sterile dressing over site
- Notify medical staff
- Systemic antibiotics may be necessary
- Monitor site 8 hourly
- Document the above actions and assessments

## Measurement/Evaluation

Canterbury and West Coast IV Clinical Practice Observation Audits – Peripheral IV audit

Incident Management System

## References

- INS Standards of Infusion Practice 2011

- CDC Guidelines for the Prevention of Intravascular catheter-related infections 2011

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| **Procedure Owner** | Professional Developmental IV Nurse Educator |
| **Procedure Authoriser** | Chief Medical Officer & Executive Director of Nursing |
| **Date of Authorisation** | 15 December 2015 |