The latest version of this document is available on the CDHB intranet/website only.
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1.2.8 Sepsis (Septicaemia / Bacteraemia /Fungaemia/ Bloodstream infection .............8

References.........................................................................................................................................................9

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)

1.1 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
- Sepsis
- Cellulitis

Documentation

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

This documentation must include:

- Date and time of problem

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1.2 Common Complications

1.2.1 Phlebitis

An inflammation of one or more layers of the vein.

<table>
<thead>
<tr>
<th>Mechanical Phlebitis (irritation by catheter)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Possible Causes</strong></td>
</tr>
<tr>
<td>• Cannula too large for vein</td>
</tr>
<tr>
<td>• Cannula inserted near a joint, creating piston motion against vein wall when patient moves</td>
</tr>
<tr>
<td>• Inadequate dressing and securement</td>
</tr>
<tr>
<td><strong>Management</strong></td>
</tr>
<tr>
<td>• Remove IV cannula and reinsert appropriate vascular access device in new location.</td>
</tr>
<tr>
<td>• Apply warm moist compress (i.e. body temperature) to site for 20 mins, 6 hourly for 24 hours (non cytotoxic drugs only)</td>
</tr>
<tr>
<td>• Use smallest gauge cannula in largest vein possible (refer to IV cannulation package)</td>
</tr>
<tr>
<td>• Discuss with doctor or IV Certificated nurse /midwife, IV Link Staff nurse cannulator or senior nursing staff member</td>
</tr>
<tr>
<td>• Re secure or redress as required</td>
</tr>
<tr>
<td>• Document the above actions and assessments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Phlebitis (irritation by IV medications or fluids)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Possible Causes</strong></td>
</tr>
<tr>
<td>• Infusion Alkaline solutions: - e.g. acyclovir, azathioprine, ganciclovir, phenytoin or Acid solutions - vancomycin, thiamine, glucagon, cyclizine, haloperidol</td>
</tr>
<tr>
<td>• Infusion of hyper/hypotonic solutions (link to IV certification package)</td>
</tr>
<tr>
<td>• Speed and method of infusion delivery</td>
</tr>
<tr>
<td><strong>Management</strong></td>
</tr>
<tr>
<td>• Remove IV cannula and reinsert appropriate vascular access device in new location.</td>
</tr>
<tr>
<td>• Apply warm moist compress (i.e. body temperature) to site for 20 mins, 6 hourly for 24 hours for non cytotoxic drugs only</td>
</tr>
<tr>
<td>• Use smallest gauge, cannula in largest vein possible (refer to IV package)</td>
</tr>
<tr>
<td>• Dilute irritating solutions to acceptable dilutions in consultation with pharmacy</td>
</tr>
<tr>
<td>• Decrease infusion rate</td>
</tr>
<tr>
<td>• Discuss with doctor or IV Certificated nurse /midwife, IV Link Staff nurse cannulator or senior nursing staff member</td>
</tr>
</tbody>
</table>
### Bacterial Phlebitis (irritation by bacteria or bacterial toxins)

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Break in aseptic technique during insertion or routine care.</td>
<td>Remove IV cannula and reinsert appropriate vascular access device in new location.</td>
</tr>
<tr>
<td>Inadequate skin preparation and/or hand hygiene</td>
<td>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)</td>
</tr>
<tr>
<td>Use of contaminated/expired IV solution or medication.</td>
<td>Obtain swab for culture if there is ooze from the site.</td>
</tr>
<tr>
<td>Cannula remaining in situ past date of expiry (refer to IV cannulation package)</td>
<td>Apply warm moist compress (ie. body temperature) to site for 20 mins, 6 hourly for 24 hours (non cytotoxic drugs only)</td>
</tr>
<tr>
<td></td>
<td>Discuss with doctor for ongoing management</td>
</tr>
<tr>
<td></td>
<td>Document the above actions and assessments</td>
</tr>
</tbody>
</table>

#### 1.2.2 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

1.2.3 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

1.2.4 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
- Recomence the medication administration if patent
- Document the above actions and assessments

1.2.5 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

### 1.2.6 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.

1.2.7 **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

1.2.8 **Sepsis (Septicaemia / Bacteraemia /Fungaemia/ bloodstream infection**
References

- INS Standards of Infusion Practice 2011
- CDC Guidelines for the Prevention of Intravascular catheter-related infections 2011

<table>
<thead>
<tr>
<th>Procedure Owner</th>
<th>Professional Developmental IV Nurse Educator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure Authoriser</td>
<td>CDHB Fluid and Medication Management Committee</td>
</tr>
<tr>
<td>Date of Authorisation</td>
<td>August 2014</td>
</tr>
</tbody>
</table>