

## Extravasation Injury in NICU

### Procedure Responsibilities and Authorisation

<b>Department Responsible for Procedure</b>	NICU
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### Procedure Review History

Version	Updated by	Date Updated	Description of Changes
2	Joyce Mok	January 2017	Update
1	Leanne Baker	January 2012	First version

## Extravasation Injury in NICU

### 1. Overview

#### 1.1 Purpose

- To outline measures to prevent extravasation injury.
- To provide guideline on interventions for intravenous infiltration injuries.

#### 1.2 Definitions

- Extravasation of intravenous (IV) fluids occurs with non-intentional leakage of infused fluid or medication into the surrounding tissue leading to tissue damage and skin necrosis. Preterm infants are at high risk due to long term exposure to IV therapy, immature skin and reduced venous integrity.
- Extravasation, the infiltration of a vesicant drug or solution into the surrounding tissue, results from a punctured vein or leakage around a venipuncture site. Extravasation differs from infiltration in that the latter occurs when a non-vesicant solution or medication escapes into surrounding tissue. Mechanical, physiologic and pharmacologic factors can increase the risk of extravasation.
- Vesicant is an agent that has the potential to cause blistering, severe tissue injury, or tissue necrosis when extravasated.

#### 1.3 Identification of intravenous extravasation injury

IV and central line sites must be closely monitored for colour, skin integrity and patency. All sites should be monitored at least hourly and more often if medications/fluids known to be have potential to damage tissue is being infused.

If extravasation does occur, skin sloughing and tissue necrosis may occur, as well as damage to deeper tissue, nerves and muscles. Plastic surgery may be necessary in extreme cases.

*It is vital that treatment is initiated immediately on recognising injury. For Stage III and IV injury photographs to be taken for clinical records and incident form (Datix) completed.*

#### 1.4 Highly irritant solutions

Irritant is an agent that causes aching, tightness and phlebitis with or without inflammation, but does not typically cause tissue necrosis. Irritants can cause necrosis if the extravasation is severe or left untreated.

Highly irritant solutions include: Solutions containing >10% dextrose, calcium, antibiotics (vancomycin, nafcillin), calcium salts, potassium salts, radio contrast media, hypertonic saline, blood, parenteral nutrition and sodium bicarbonate. These may all be treated with hyaluronidase.

#### 1.5 Extravasation antidotes

When vesicant drugs extravasate, they cause tissue damage. Extravasation antidotes are used to decrease tissue damage and reduce chance of permanent disability or disfigurement.

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- Hyaluronidase for extravasated agent such as dextrose, electrolytes (calcium, potassium, sodium bicarbonate), phenytoin, antibiotics (nafcillin, vancomycin), and plant alkaloids.
- Phentolamine for vasopressors (dobutamine, dopamine, epinephrine, norepinephrine, vasopressin).

For dosage and administration: refer to *Pediatric and Neonatal Dosage Handbook* (p2255-2263) in Clinical Workroom; or Lippincott procedure on intranet: *Extravasation management, pediatric* – section on treatment for vesicant drug extravasation.

## 2. Clinical Management

### 2.1 Competency required

- NICU medical staff: Registrar, NNP, CNS, Consultant
- Registered Nurse who completed L2 orientation

### 2.2 Equipment

- Syringes, e.g. 1ml
- 0.9% sodium chloride
- Needles, e.g. 26G or smaller
- Alcohol/Chlorhexidine wipes
- Gauze pads
- Measuring tape
- Prescribed antidote, e.g. Hyaluronidase or Phentolamine as indicated
- Hydrocolloid dressing, e.g. duoderm
- Local anaesthetic
- Needle 25G or small needle (for saline flush-out technique)

### 2.3 Procedures

#### 2.3.1 Prevention measures

- Avoid areas difficult to immobilize.
- Always expose the IV site if the baby is in a cot.
- Secure cannula so insertion site is clearly visible.
- Tape loosely enough to maintain circulation.
- Limit IV glucose upper concentrations to 12.5%. Higher concentrations and clear TPN solutions require a central line.
- Dilute medications per drug protocol.
- Assess catheter site and distal region hourly.
- Stop infusion immediately if signs of infiltration are present.

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### 2.3.2 Signs and symptoms:

- Swelling
- Pain
- Coolness of skin
- Blanching
- Bruising
- Leakage at site
- Erythema (redness)
- Blistering
- Poor perfusion/paleness at site

### 2.3.3 Millam's (1988) staging severity of IV infiltration

Stage I	<ol style="list-style-type: none"> <li>1. Painful IV site</li> <li>2. No erythema</li> <li>3. No Swelling</li> </ol>
Stage II	<ol style="list-style-type: none"> <li>1. Painful IV site (baby flinches or cries with access)</li> <li>2. Slight swelling</li> <li>3. No blanching</li> <li>4. Good pulse below infiltration site</li> <li>5. Brisk capillary refill below infiltration site</li> </ol>
Stage III	<ol style="list-style-type: none"> <li>1. Painful IV site (baby cries on access)</li> <li>2. Marked swelling</li> <li>3. Blanching</li> <li>4. Skin cool to touch</li> <li>5. Good pulse below infiltration site</li> <li>6. Brisk capillary refill below infiltration site</li> </ol>
Stage IV	<ol style="list-style-type: none"> <li>1. Painful IV site (Baby cries with any handling of limb or cannula)</li> <li>2. Very marked swelling</li> <li>3. Blanching</li> <li>4. Skin cool to touch</li> <li>5. Decreased or absent pulse*</li> <li>6. Capillary refill &gt; 4 seconds*</li> <li>7. Skin breakdown or necrosis*</li> </ol>
	<p><b>* The presence of any of these constitutes a stage IV infiltration</b></p>

### 2.3.4 Interventions for intravenous infiltration injuries

- Stop infusion.
- Do not remove IV cannula at this stage.
- IV cannula should be left in place to facilitate aspiration of fluid from the extravasated site and, is appropriate, administration of an antidote.
- Check with medical staff whether cannula can be removed.
- Remove any constricting bands that may act as tourniquets i.e. tapes, sleeves.
- Assess severity using Millam's (1988) staging Guide (refer to table above).

## Extravasation Injury in NICU

- Inform medical staff and ACNM/Coordinator if site assessed at Stage III or IV. Take photo and document in clinical notes and Datix.
- For Stage I and II infiltrations: elevate limb, monitor site over next 4 – 6 hours, document in clinical notes.

### 2.3.5 Interventions for Stage III and IV infiltrations

- Report immediately to medical staff for assessment.
- Interventions may include:
  - Local infiltration of area with antidote as per NICU drug protocol.
  - For additional information on dosage and administration: refer to *Pediatric and Neonatal Dosage Handbook* (p. 2255-2263); or Lippincott procedure: *Extravasation management, pediatric* – treatment for vesicant drug extravasation.
  - Saline flush-out technique may be used at medical team's discretion. This involves four small stab incisions made around periphery of lesion and isotonic saline is flushed into subcutaneous space using a 25G or smaller needle. Administer multiple subcutaneous injections along the periphery of the extravasated site, changing the needle with each new injection. The saline is then massaged towards the incisions to facilitate removal of extravasated fluid (Gault technique). Consider local anaesthetic for this procedure.
  - After flush out cover with hydrocolloid dressing (or as advised by medical staff) and elevate for 24hrs.
  - Consider plastic surgery consultation if extensive necrosis or tissue damage evident

## 3. References

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