

EXTRAVASATION INJURIES

BACKGROUND

- Approximately 4% of babies develop skin necrosis as a result of extravasation of an IV infusion
- A small proportion of these babies develop long-term cosmetic or functional compromise
- Cochrane review shows that centrally placed catheters may cause extravasation as often as peripheral cannulae
- Extravasation can lead to both short and long-term complications
- Use this guideline to define the grading and management of subcutaneous extravasation injuries in babies, either from peripheral or central lines

IV SITE

Precautions

- Examination of IV line site before and during infusion
- Document in daily summary (electronic or patient notes):
 - site of insertion
 - peripheral or central line and
 - if any concerns e.g.:
 - redness
 - swelling around the site or in limb
- Extravasation can be due to:
 - cannula piercing vessel wall or
 - distal venous occlusion causing backpressure and increased vascular permeability
- Limiting the IV pump cycle to 1 hr **may** minimise the extent of tissue damage from extravasation providing the entry site is observed concurrently
- Degree of tissue damage due to extravasation is dependent upon:
 - volume of infusate, its pH and osmolality
 - the properties of any drug(s) being infused

ASSESSMENT

Table 1: Grading of extravasation injuries

Grade 1	Grade 2	Grade 3	Grade 4
<ul style="list-style-type: none"> • IV device flushes with difficulty • Pain at infusion site • No swelling or redness 	<ul style="list-style-type: none"> • Pain at infusion site • Mild swelling • Redness • No skin blanching • Normal distal capillary refill and pulsation 	<ul style="list-style-type: none"> • Pain at infusion site • Marked swelling • Skin blanching • Cool blanched area • Normal distal capillary refill and pulsation 	<ul style="list-style-type: none"> • Pain at infusion site • Very marked swelling • Skin blanching • Cool blanched area • Reduced capillary refill <ul style="list-style-type: none"> • +/- arterial occlusion • +/- blistering/skin breakdown/necrosis

- See **Pain assessment and management** guideline

Investigations

- No specific investigations required. However, if wound appears infected:
 - wound swab
 - FBC
 - CRP
 - blood culture
 - start appropriate antibiotics [see **Infection (late onset)** guideline]

ACUTE MANAGEMENT

Table 2

Grade 1 and Grade 2	Grade 3	Grade 4
<ul style="list-style-type: none"> • Stop infusion immediately • Remove cannula and splints/tapes • Elevate limb 	<ul style="list-style-type: none"> • Stop infusion immediately • Remove constricting tapes • Leave cannula <i>in situ</i> until review by doctor/ANNP • Withdraw as much of the drug/fluid as possible via the cannula • Elevate limb • Inform tissue viability nurse 	<ul style="list-style-type: none"> • Stop infusion immediately • Remove constricting tapes • Leave cannula <i>in situ</i> until review by doctor/ANNP • Withdraw as much of the drug/fluid as possible via the cannula • Photograph lesion – provided no delay in further treatment • Discuss with consultant whether to irrigate affected area (see below) • Elevate limb • Inform tissue viability nurse/registrar/consultant +/- plastic surgery team

- Most extravasation injuries are of Grades 1 and 2 and do not require extensive intervention
- Grade 3 and 4 injuries have a greater potential for skin necrosis, compartment syndrome and need for future plastic surgery, depending on type of solution extravasated

Compartment syndrome

- Risk of compartment syndrome from large volume extravasations to limbs in small babies
 - significant swelling
 - pallor
 - weak or absent pulse
 - delayed capillary refill

Management

- Stop infusion
- Elevate affected limb as much as is possible
- Prompt referral to surgical team for assessment and consideration of fasciotomy

Irrigation of affected area

- A Cochrane review concluded that there is insufficient evidence to assess the effects of irrigation, with or without hyaluronidase
- The procedure itself may cause scarring whilst not all extravasation injuries leave scars
- Irrigation should only be considered in the most serious injuries with large volume extravasation and/or caustic solutions (e.g. calcium)
- See below for details of procedure

Wound dressings

- When choosing wound dressing, consider need to prevent:
 - further trauma
 - epidermal water loss
 - contractures by allowing a full range of limb movements
- Dressings must be:
 - easy to apply to small body surface areas
 - sterile
 - suitable for use in humidified/incubator environments
 - thin hydrocolloid dressing (to blistered, broken or necrotic skin) and refer to tissue viability team

Documentation

- Document extent and management of the injury in medical record

FOLLOW-UP AND REVIEW

- Determined by grade of extravasation
- neonatal medical staff review minor grades after 24 hr
- neonatal/plastic surgery staff/tissue viability nurse review Grades 3 and 4 within 24 hr to assess degree of tissue damage and outcome of irrigation procedure if performed

Other considerations

- **Family-centred care** – inform parents of extravasation injury and management plan

Special considerations

- Infection prevention – observe standard infection prevention procedures
- Complete an incident report for Grade 3 and 4 extravasations

IRRIGATION OF EXTRAVASATION INJURIES

Procedure

- Withdraw as much of the drug and or fluid as possible via cannula or catheter
- Infiltrate the site with lidocaine 1% 0.3 mL/kg before to reduce pain
- Using a scalpel, make 4 small incisions around periphery of extravasated site
- Insert blunt Tuohy needle, or pink cannula with needle removed, into each incision in turn, and irrigate damaged tissue with hyaluronidase* followed by sodium chloride 0.9%. It should flow freely out of other incisions
- Massage out any excess fluid using gentle manipulation
- Cover with paraffin gauze for 24–48 hr

*Preparation of hyaluronidase

- Reconstitute a 1500 unit vial of hyaluronidase with 3 mL of water for injection
- Use 1–2 mL shared between each incision then irrigate with sodium chloride 0.9%

When irrigating with sodium chloride 0.9%, use discretion depending on baby's weight

Documentation

- Person performing procedure must document in baby's medical record