

Infiltration & Extravasation Injuries

Explanation: Infiltration is the leakage of infused intravenous fluid into the surrounding tissues. Extravasation is the injury caused by infiltration of irritant solutions. Extravasation injuries can result in scar formation, contractures and nerve or tendon damage resulting in loss of function. 4% of premature infants will leave NICU with cosmetically or functionally significant scars from extravasation injuries.

Causes: Agents which are irritant to tissues include parental nutrition, glucose 10%, calcium, sodium bicarbonate, flucloxacillin, blood and phenytoin. Vasopressors may produce intense local vasoconstriction and ischemia.

Who's at risk? Preterm infants particularly have a lack of subcutaneous tissue and increased skin fragility. They are also more likely to need parental nutrition and potentially irritant agents and vasopressors.

Anticipating Injury: Awareness and regular assessment of a clearly visible infusion site is the mainstay of prevention. Early identification of infiltration will minimise extravasation injury. It is important to note the following:

- A change in pressure (demonstrated by the pump) reflects changes of pressure within the whole line and not necessarily just within the cannula therefore line pressure is not a good indicator of a 'tissued' cannula.
- Infiltration can occur with lower pressures than those set to cause the pump to alarm.
- Early indicators of infiltration include resistance on flushing, swelling or blanching of the skin and pain on infusion (the baby may well withdraw their limb as you flush). If any of these occur you should resite a new cannula and remove the existing one.

Assessing Degree of Injury

1. Infiltration: painful intravenous site, slight swelling, erythema, flushes with difficulty. No persistent blanching of skin and good capillary refill and pulse volume below the infiltration site.

2. Extravasation Injury: painful intravenous site, marked swelling, persistent blanching of skin, cool to touch, capillary refill more than four seconds and decreased or absent pulse distal to infiltration site, skin breakdown or necrosis.

Initial Action

1. Infiltration: Resite IV cannula in another limb, remove existing IV cannula and elevate limb.

2. Extravasation Injury: Attempt to aspirate any fluid from IV cannula and then remove it. **All significant extravasation injuries should be discussed with the consultant on call.**

Therapeutic Options

Skin intact, white or blistered

1. Attempt to aspirate fluid from the cannula and then remove it
2. Rest, elevate limb and keep clean, dry and undressed.
3. If significant extravasation injury, inform consultant on-call.
4. If consultant instructs irrigation of the wound the procedure is described as follows:
 - Clean the site under aseptic conditions and infiltrate with 1% lignocaine (hyperlink) as local anaesthesia.
 - Create 4 small incisions with a scalpel around the periphery of the extravasated area.



- Flush 10-20ml boluses of saline through the original cannula site (see figure, right). This can be done using a large bore cannula re-inserted into the intradermal space (needle removed to leave plastic catheter in skin; some units may use a blunt ended Verres needle). It is possible to flush through up to 500ml and this can be done with cannula in different positions within the area. If the fluid collects in the surrounding subcutaneous tissue it can be massaged down to the exit sites and expressed
- The area will need to be covered afterwards (see below) and the limb elevated.
- Inform plastics and ask for review.
- Note: irrigation is only rarely necessary and there is a lack of evidence to support the preferential use of this method compared to conservative management, particularly in preterm infants where such a method may contribute to further skin damage due to a lack of subcutaneous tissues. **Irrigation should only be carried out by senior medical staff (consultant or grid trainee).** Hyaluronidase and Nitroglycerin are no longer licensed for use in neonates in the UK.

For vasoconstrictive agents such as dopamine consider applying glyceryl trinitrate ointment (kept on the unit).

Skin Breakdown or Necrosis

1. The wound should be dressed. See nursing guideline for dressing advice.
2. If necrotic, cover the area with a water based occlusive dressing such as duoderm (hydrocolloid) to keep wound moist and speed epithelisation.
3. If necrotic or skin breakdown present, contact Tissue viability nurse (Ext 23396) for advice as soon as possible
4. Consider plastics review.

Documentation

1. Record in notes the site, time and date of initial observation of injury and subsequent steps taken in management.
2. Give a detailed description of the injury and obtain medical photography as soon as available. N.B. If a medical photographer is unavailable, photographs can be obtained using the NNU digital camera and these inserted into the 'Medical Record' section of the baby's record in Badger.
3. Daily documentation recording progress with healing and observe for signs of secondary infection.

4. Inform parents of the injury as soon as possible and regularly update on progress. Record communications in Badger.

5. Complete Datix form.

Follow Up

Any injury that has not healed totally prior to discharge will need to be incorporated into discharge planning i.e. community nurse involvement for dressing changes and wound monitoring, other speciality input such as plastics.