Management of Extravasation Injury in Neonates

Background
Due to difficult and fragile venous access and the use of potentially caustic infusates, extravasation to skin is one of the main iatrogenic injuries in Neonatology. Common sites of injury are dorsum of the hand and foot. Lack of subcutaneous tissue makes these sites both attractive for cannulation and vulnerable to severe injury. Potential risks are compartment syndrome, permanent scarring and damage to growth plates if the injury is close to joints.

Common agents of extravasation in neonates are:

<table>
<thead>
<tr>
<th>Hyperosmolar agents</th>
<th>Vascular regulators</th>
<th>Extreme pH, osmolarity or toxic excipients</th>
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<tbody>
<tr>
<td>Parenteral nutrition</td>
<td>Dopamine</td>
<td>Vancomycin</td>
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<td>Sodium bicarbonate</td>
<td>Dobutamine</td>
<td>Aciclovir</td>
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<td>Calcium chloride</td>
<td>Adrenaline</td>
<td>Amphotericin</td>
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<td>Calcium gluconate</td>
<td>Epoprostenol(Prostacyclin)</td>
<td>Erythromycin</td>
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<td>Hypertonic glucose (10% or greater)</td>
<td>Alprostadil (PGE1)</td>
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<tr>
<td>Hyperosmolar saline (10% or greater)</td>
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<td>Magnesium sulphate</td>
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Staging of injury:
I: Painful infiltration, no erythema, no swelling
II: Slight swelling (0-20%), no blanching, brisk capillary refill below the site
III: Marked swelling (30-50%), blanching, skin cool to touch
IV: Very marked swelling (30-50%), blanching, skin cool to touch, decreased or absent pulse, capillary refill > 4 secs, skin breakdown or necrosis

Management:
In an event of an extravasation, following steps should be taken immediately: (Use extravasation kit, available on the NNU).

1). Stop the intravenous infusion immediately.
2). Remove any constricting bands that may act as tourniquets
3). **Aspirate as much fluid as possible through the cannula.**
4). Remove the cannula.
5). Mark extravasation area.
6). Consider use of Hydrogel (Intrasite gel)
7). Elevate limb to reduce oedema.
8). Classify the agent causing extravasation and stage the lesion.

- Stage I and II lesions: The above measures are usually adequate.
- Stage III or IV lesions: Consider saline flush-out. Discuss with consultant if this is considered.

Dr S Joshi/ Dr J Calvert
To be reviewed August 2009
Saline Flush-out Technique:

- Clean and drape the area of skin as for a sterile procedure
- Ensure adequate analgesia (sucrose, paracetamol, morphine)
- Make 4-6 incisions around the periphery of the lesion using a large needle (green)
- Use the cannula and 20 ml syringe to flush the area with Normal Saline. Insert the cannula into each separate incision and flush.
- If the saline collects in the surrounding subcutaneous area, massage towards the incisions to facilitate removal of extravasated fluid.
- Clean the area and dress with a sterile jelnet and gauze dressing.
- Elevate the limb for 24 hours.
- Change dressing daily.
- Early review by Plastic surgeons may be necessary.
- Ensure adequate analgesia

Note: In rare occasions, if severe injury occurs with vascular regulators (eg Dopamine, Dobutamine), discuss with consultant regarding possible use of following antidotes:
- Phentolamine 0.01mg/kg/dose (up to max 5mg) subcutaneous injection at the site of extravasation.
- 2% Nitroglycerin ointment 4mm/kg (or 2mg measured as 0.1ml in a syringe) to be applied over the ischemic area.

Documentation:
- Document the extent of injury in patient’s medical notes including photographic evidence in significant cases
- Complete a Cardiff and Vale NHS Trust Incident record form
- Inform the Parents and Consultant
- Inform Plastic surgeons if injury is severe (Consultant decision)
- Involve Wound Healing Team as required
- Complete an extravasation report (green card) and post
- Return opened extravasation kit to pharmacy for replacement

References:
2. Wilkins C E. Extravasation Injuries in Regional Neonatal Units. ADC 2004;89:F274-275
3. The National Extravasation Information Service [www.extravasation.org.uk](http://www.extravasation.org.uk)
4. Cardiff and Vale NHS Trust Policy for Managing Extravasation