Skin care guidelines for babies in NICU

Sites where Local Guideline applies
- Neonatal Intensive Care Unit-NICU, Special care nursery and High Dependency Unit

This Local Guideline applies to:
1. Adults
   - No
2. Children up to 16 years
   - No
3. Neonates – less than 29 days
   - Yes

Target audience
- All clinical staff, who provide care to neonatal patients

Description
- Provides information to staff to avoid damage to skin integrity and manage loss of skin integrity

Keywords
- Glamorgan scale (modified), humidity, neonate, NICU, preterm, skin, TEWL (trans epidermal water loss), JHCH, NAS

Document registration number
- JHCH_NICU_03.05

Replaces existing document?
- Yes

Registration number and dates of superseded documents
- Skin care guidelines for babies in NICU JHCH_NICU_03.05

Related Legislation, Australian Standard, NSW Ministry of Health Policy Directive or Guideline, National Safety and Quality Health Service Standard (NSQHSS) and/or other, HNE Health Document, Professional Guideline, Code of Practice or Ethics:
- NSW Health Policy Directive 2014_036 Clinical Procedure Safety

Prerequisites (if required)
- N/A

Local Guideline note
- This document reflects what is currently regarded as safe and appropriate practice. The guideline section does not replace the need for the application of clinical judgment in respect to each individual patient but the procedure/s require mandatory compliance. If staff believe that the procedure/s should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patients health record.

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Date authorised
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This document contains advice on therapeutics
- No

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- 28/02/2017

Review date
- 28/02/2020
RISK STATEMENT

This local guideline has been developed to provide guidance to clinical staff in NICU to assist in assessment and management of skin integrity in the newborn. It ensures that the risks of harm to the infants skin whilst caring for an infant are identified and managed.

Any unplanned event resulting in, or with the potential for injury, damage or other loss to infants/staff/family as a result of this management must be reported through the Incident Information management System and managed in accordance with the Ministry of Health Policy Directive: Incident management PD2007_061. This would include unintended injury that results in disability, death or prolonged hospital stay.

Risk Category: Clinical Care & Patient Safety

ABBREVIATIONS & GLOSSARY

<table>
<thead>
<tr>
<th>Abbreviation/Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELBW</td>
<td>Extremely Low Birth Weight</td>
</tr>
<tr>
<td>NAS</td>
<td>Neonatal Abstinence Syndrome</td>
</tr>
<tr>
<td>TEWL</td>
<td>Trans Epidermal Water Loss</td>
</tr>
<tr>
<td>SC</td>
<td>Stratum Corneum</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>

OUTCOMES

1. The NICU care guidelines will positively influence skin integrity
2. Neonates in NICU will be bathed in a pH neutral solution
3. Neonatal skin will be protected from stripping, maceration, extravasation and pressure injury
4. Premature neonates will be cared for in an environment that reduces Trans Epidermal Water Loss (TEWL) and promotes Stratum Corneum (SC) barrier maturation

Skin care guidelines for babies in NICU- One Page Summary and Checklist

Background-Full term infant

- Preterm Infant

Implications for Practice

Patient hygiene: bathing
Emollients
GUIDELINE

This Guideline does not replace the need for the application of clinical judgment in respect to each individual patient.

Rationale
To provide evidenced based skin care to the neonate in NICU

Background

The Full Term infant

At birth a newborn leaves a warm, sterile, fluid environment and enters a dry, gaseous and bacteria filled environment. Skin, the largest organ of the body, serves many functions after birth that include thermoregulation, a barrier to water loss and chemicals, infection control, insulation and fat storage and acid mantle formation.

Due to vernix caseosa the skin of the full term infant has developed an epidermal barrier. Vernix is a complex mix of water, protein and lipids that provides a hydrophobic surface and allows for the formation of the outer layer of the epidermis called the stratum corneum (SC). The SC is the main barrier to water loss but will allow normal water vapour from respiration to be released. It provides a barrier to penetration by outside agents due to its “bricks (cells) and mortar (lipids)” structure and although it is only the thickness of a half a sheet of paper it is incredibly strong.

Normal well developed skin has a strong connection between the dermis and the epidermis reducing the risk of injury. In a process called desquamation, skin loses approximately one layer of SC per day to the environment; desquamation requires an appropriate level of hydration. Insufficient hydration results in poor desquamation that results in scales or dry skin flakes. Excess hydration may result in skin maceration, barrier breakdown and inflammation or irritation.

At birth, the skin of a full term infant is pH neutral and over a one week period will drop to pH 5. This formation of what is known as the acid mantle, is designed to act as a barrier to protect against micro-organisms.
The Preterm infant

The preterm epidermis is not fully formed at birth. It is markedly thinner, lacks the “bricks and mortar” structure and the SC is poorly formed. The structural integrity of the SC is directly related to gestational age with a rapid barrier development occurring between 24-34 weeks. At 23 weeks gestation the SC is nearly absent, severely compromising barrier functions and increasing trans-epidermal water loss (TEWL) to 10-15 times that of the full term neonate. Increased TEWL puts the infant at risk of thermal instability, dehydration and electrolyte imbalances.

Vernix is absent in babies born at less than 28 weeks gestation. This may have implications for infection defences as vernix has been shown to contain anti-infective agents such as lysozyme and lactoferrin.

In premature neonates the fibrils that connect the dermis to the epidermis are fewer in number and more widely spaced. Due to this weak structure the skin of the premature infant is more easily damaged by products such as adhesives that may, when being removed, strip the epidermis. See appendix 3.

In a study of premature infants aged 24-34 weeks gestation, the skin pH at birth was greater than 6 and took three weeks to drop to a level of 5 increasing the risk of infection during this time. Visscher, Odio et al. Neonatology (2009) 96:226-234

The NICU care environment aims to:

- Minimize TEWL
- Reduce the risk of infection
- Protect against potential wounds such as epidermal stripping, extravasation, wound breakdown and excoriation.
- Minimize the risk of pressure injury
- Provide evidence based care for wounds

Implications for practice

Patient hygiene: bathing

The purpose of bathing is to remove waste materials, potentially reduce microbial colonisation and increase aesthetics. Bathing the newborn also has many potential cultural and social benefits.

Bathing may be detrimental by inducing changes in skin pH. Because skin antibacterial effect is optimal at pH values below 5.0 and an acidic pH is also important for preventing nappy dermatitis from faecal enzymes, frequent bathing may compromise this protective aspect of the skin’s antimicrobial defence. Literature suggests that preterm neonates can be safely bathed every 4 days without increasing their risk of infection and less frequent bathing minimizes behavioural and physiological instability of premature infants.

Randomized control trials have recommended that pH neutral cleansers are used for bathing, the frequency of bathing be reduced from daily to once or twice per week and that water only should be used for bathing infants less than 1000gms.

Premature babies (≤ 30wks) - may be bathed daily 5-6 weeks after birth when skin has sufficiently matured

Term babies may be bathed daily after one week of life if stability allows.
**Recommendations**

- Only use pH neutral, soap-free cleansers on babies greater than 1000 grams. Note: Johnson & Johnson® baby wash meets these guidelines
- Neonates are considered contaminated with blood borne pathogens until they are cleansed of blood and amniotic fluid. Consider a 5-10 minute nurse attended sponge at 4-6 hours (after thermal stability is reached) of life to remove maternal debris. If baby is unstable then at least attend this sponge within 24 hours.
- Until this first sponge is attended use standard precautions including wearing gloves.
- Preterms <1000 grams washed in clean water only. Sponge only if condition allows and if unstable then sponge under the neck, arms and in the groin only.
- Ensure that the bath equipment is disinfected before and after each use.
- Follow procedure in the CPG “Thermoregulation of the Neonate in NICU JHCH_NICU_04.02” to minimise heat loss during the bath/sponge.
- Leave vernix on the skin as per the WHO guidelines for newborn care. Remove the debris only and do not vigorously scrub the skin.
- Note: routine bathing is not recommended for ill premature neonates.
- Both bath/sponge and weigh dates must be documented on the observation chart, patient care board and in the medical records. Remember to graph the weight on the flow chart and weight graph.

**Hygiene/Skin care products approved for use**

Skin wash: soap-free and pH neutral (Johnson and Johnson® baby wash)
Zinc cream (Sudocrem®)

**Umbilical Cord care -Recommendations**

Initial care:
- Clean the umbilical cord and surrounding skin as a part of the initial bath using standard precautions including gloves
- Dry thoroughly
- Leave cord clamped, stump clean, dry and uncovered
- Implement standard infection control measures including hand hygiene

Ongoing care:
- Continue with standard infection control measures when handling the cord
- Use natural drying without the routine use of topical agents
- Keep the umbilical cord area clean, with water if necessary and dry
- Allow for natural separation/detachment at around 7-10 days after birth, if separation is delayed then evaluate for other conditions such as infection.
- Redness, swelling and drainage are abnormal findings and require reporting and management

**Emollients**

Emollients are used to act as a barrier for the skin and decrease TEWL. While the use of emollients may improve skin condition, some studies have shown this practice can increase the incidence of nosocomial bacterial infection and fungal infections. The use of emollients is controversial, and the literature inconclusive for example, Connor et al,
reviewed four trials in 2009, including a total of 1304 premature infants and concluded that infants who received emollient use as part of their care had better skin condition, but also reported more bacterial infections than infants receiving no emollient.

**Recommendations**

Recent research indicates the routine use of emollients is contraindicated due to the increased risk of infection. Skincare guidelines for infants 23-30 weeks gestation being cared for in the NICU should not include this practice as part of routine care due to the proven increased risk of bacterial and fungal infection. TEWL can be controlled by other means such as humidity.

**Humidity**

Caring for the baby in a humidified environment such as a neonatal humidified incubator is an effective strategy used to significantly reduce skin injury as well as heat and transepidermal water loss (TEWL).

Recent studies however have shown high humidification for prolonged periods may result in a slower rate of skin barrier formation, potentially prolonging the increased rates of TEWL. Other aspects of skin barrier function may also be affected but recent studies are inconclusive.

**Recommendations**

Clinical management is as per CPGs “Giraffe Incubator care in NICU” JHCH_NICU_04.01 and Thermoregulation of the Neonate in NICU JHCH_NICU_04.02. Humidity should be commenced in all infants < 30 weeks gestation. Humidity should start at 75-85%. Greater than 85% results in excess rainout and temperature instability and may cause skin maceration. Humidity should be reduced with respect to gestation and temperature stability as outlined below.

- Infants of 28-30 weeks gestation: if temperature is stable after 24 hours, 85% humidity can be reduced by 5% each day.
- Infants < 28 weeks gestation: Maintain humidity at 85% for the first 7 days of life, and then reduce by 5% daily if temperature stability allows.
- Humidity should be discontinued when a level of 50% is reached and temperature stability allows.

**Prevention of skin injury and breakdown**

Newborn skin acts as a barrier to microorganisms and toxins’, therefore maintaining this barrier is an important factor for assisting newborns to adapt to extra uterine life. Newborn skin integrity is subject to potential disruption and trauma during clinical practices. Potential causes of skin breakdown during clinical practices include epidermal stripping (removal of adhesives), dehiscence of surgical wounds, pressure injuries, skin excoriation (nappy rash/dermatitis), chemical burns, etc with Chlorhexidine 2% and extravasation.

**Epidermal Stripping**

One of the most common practices in NICU is the use of adhesives to a range of devices and tubes. The use of, and particularly the removal of, adhesives has been found to be the
primary cause of skin breakdown in NICU patients. Prevention of this kind of skin trauma includes minimizing the use of tapes or adhesives where possible and delaying the removal of these adhesives until adherence is reduced. When removing adhesives ensure it is done very slowly and carefully with warm water.

**Adhesives**

Adhesives have been shown to disrupt the skin surface of neonates resulting in skin breakdown. The breakdown may be from epidermal stripping or due to sensitivity to the adhesive. This can be a challenge for those newborns that will require care in a NICU or special care nursery.

**Recommendations**

- Minimal use of adhesives on all neonates
- Aim to use a hydrocolloid (like Duoderm®) under adhesives
- Delay the removal of adhesive for at least 24 hours after application.
- If unable to avoid the use of an adhesive, gently remove adhesives with warm water soaked soft gauze. Avoid solvents and alcohol they can cause irritation and may be absorbed percutaneously.
- Use alternative adhesive applications directly to the skin such as hydrocolloid and double sided tape.
- Use only gel electrodes or an electrode designed for the ELBW with a gel interior and a hydrocolloid exterior. Inspect and change as required.

**Examples of products to replace adhesives:**

- Hydrocolloids
- Double sided tape
- Gel electrodes
- Films
- Silicone tape e.g. Mepitac® See Appendix 1
- Plastic polymer skin barrier film (beneficial for stoma patients)

**Nappy Dermatitis**

Nappy rash/dermatitis is a non-specific term used to describe inflammatory irritations (rashes) in the nappy region. It is a condition that commonly occurs in infants causing discomfort to the baby and anxiety to the caregivers. Symptoms can range from chafing and ulceration to swollen red erythema with a confluent rash which is commonly associated with concurrent infection, generally Candida Albicans.

The skin in the nappy environment is constantly in contact with strong alkalinizing agents (urine and faeces, bile salts and faecal enzymes) and the pH in this area is prone to high alkalinity that damages the skin integrity. Mechanical friction (both skin to skin and nappy to skin) makes the skin prone to maceration and increases its permeability to other irritants. Prolonged wetness of the skin makes it more prone to damage.

These factors predispose the skin to opportunistic infection by faecal microbes such as Candida Albicans thereby causing a more severe and potentially chronic nappy dermatitis.
The vulnerability of newborn infant’s (especially pre-term infants) skin to mechanical injury and nappy dermatitis makes this group worthy of separate consideration.

**Recommended Strategies:**

The approach to resolving skin breakdown in the nappy region should be:

- Early intervention to minimize or eliminate potential causes
- Skin should be monitored closely at each nappy change
- Risk factors need to be assessed e.g. loose or frequent stools, drug withdrawal or medication–induced diarrhoea
- Early detection and treatment of subsequent fungal infections
- Nappy rash can be reasonably prevented by reducing moisture and contact between urine, faeces and the skin by the frequent changing of nappies.
- Use gentle skin cleansing methods and minimize rubbing
- Cleanse the nappy area with water or pH neutral cleanser as soon as possible after soiling and apply a cream such as Sudocrem® to form a physiological barrier and minimize the contact with irritants. The cream used should contain a skin protectant such as zinc oxide to promote healing, provide a shield or barrier to further damage, and be easy to remove to prevent epidermal stripping. Sudocrem® has been approved for this use
- Skin should be thoroughly dried each time the nappy is changed by exposing it for a few minutes. The bottom should be wiped from front to back to avoid faecal matter from reaching the genito-urinary area
- Regular assessment, re-evaluation and modification of treatments should be carried out to monitor any deterioration in the area. Document the area of involvement and severity of damage (erythema, rash, bleeding etc). Always re-evaluate & modify the care plan.

*See Appendix 3 for the flow diagram for nappy rash treatment.*

**Dehiscence of Surgical Wounds**

Dehiscence of a surgical wound is known as the partial or complete separation of the wound edges. Surgical wounds that open or dehisce are infrequent, but when they do occur they will require immediate wound management. Ongoing assessment of the surgical site includes inspection of the wound edges, skin integrity around the sutures or staples, redness or discolouration, swelling and warmth of the surgical site.

**Recommendations**

- Notify the medical/NP team immediately and seek treatment advice from the surgical team. Notify the CNC Paediatric Surgery next business day for consult. It is important to clearly document the wound assessment and ongoing care process in the notes and care plan. *For specific wound dressings that are appropriate for the newborn and NICU, please refer to the dressing chart located in appendix 2 (wound poster from Molnlycke™)*

As with all wounds, consult a wound care specialist if you have any concerns regarding wound healing or management.
Pressure Injuries

Pressure injuries are defined as any injury caused by unrelieved pressure that result in the damage of the skin and its underlying tissue. Pressure injuries can occur due to prolonged pressure or insufficient blood supply, particularly at bony prominences. In order to promote healing of these pressure injuries, the pressure on the particular area must be eliminated.

Most common causes of neonatal pressure injuries

<table>
<thead>
<tr>
<th>Cause</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobility</td>
<td>Reposition with each cares</td>
</tr>
<tr>
<td>Devices</td>
<td>Use Hydrogel products, avoid pressure from equipment, CPAP prongs, tubes, sharp objects &amp; scratches</td>
</tr>
<tr>
<td>Extrinsic factors – friction, shear, moisture</td>
<td>Reduce friction/rubbing injuries, particularly in infants suffering NAS (Neonatal Abstinence Syndrome) - protect knees &amp; elbows with a hydrocolloid (Duoderm™) if necessary</td>
</tr>
</tbody>
</table>

Modified Glamorgan pressure injury risk assessment

<table>
<thead>
<tr>
<th>Trigger Factors</th>
<th>Risk Assessment</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA &lt;32 weeks</td>
<td>Infant cannot be moved without great difficulty or deterioration in condition (a ventilated infant who de-saturates with position changes or in certain positions. Poor peripheral perfusion: cold extremities, capillary refill &gt; 2 seconds / cool mottled skin)</td>
<td>20</td>
</tr>
</tbody>
</table>
| • Vascular compromise or poor tissue perfusion (HIE, Cooling, inotropes).  
  • Impaired neurological / sensory perception.  
  • Immobility due to illness and/or sedation, muscle relaxation.  
  • Sepsis, dehydration, oedema.  
  • Ventilation – ETT and nasal CPAP.  
  • Post Surgery.                                                                 | 15    |
| Monitoring devices/Cables/Leads           | Infant unable to change his/her position without assistance/reduced body movement (an infant may be unable to move themselves, but carers can move the infant and change his/her position without deterioration in vital signs). |       |
| • ETT, nasal CPAP, HHF, low flow  
  • TCM, SaO₂, ECG leads, temp probes.  
  • Medical taping (IV lines/splints, gastric tubes, phototherapy eye pads)  
  • Mattress surface                                                                 | 10    |
| Normal mobility for age                   | Some mobility, but reduced for age (infant has some ability to change their own position but this is limited / restricted (infants on CPAP, nested, IV splints & fluids). |       |
| Equipment / objects / hard surface pressing or rubbing on skin. Any object pressing or rubbing on the skin for long enough or with enough force can cause pressure damage | 15    |

**ACTION TAKEN**

Ensure plan of care is implemented / reviewed for all identified areas of concern. Scores >30 – commence Wound Assessment and Management Plan if there are any areas of concern.
### Modified Glamorgan pressure injury risk management scale

<table>
<thead>
<tr>
<th>Risk score</th>
<th>Category</th>
<th>Suggested action following pressure injury risk assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not at risk</td>
<td>Continue to reassess daily and every time condition changes</td>
</tr>
<tr>
<td>10+</td>
<td>At risk</td>
<td>Inspect skin at least with each cares. Relieve pressure by repositioning with each cares. Use a size and weight appropriate pressure redistribution surface if necessary. Such as Memory foam (Giraffe bed). Re-site monitoring with each cares as needed.</td>
</tr>
<tr>
<td>15+</td>
<td>High risk</td>
<td>Inspect skin at least with each cares. Relieve pressure by repositioning with each cares. Re-site monitoring with each cares as needed. More frequently if indicated. Use a size and weight appropriate pressure redistribution surface if necessary.</td>
</tr>
<tr>
<td>20+</td>
<td>Very high risk</td>
<td>Inspect skin at least with each cares. Relieve pressure by repositioning with each cares. Re-site monitoring with each cares as needed. More frequently if indicated. Consider using specialised pressure relieving equipment. Use a size and weight appropriate pressure redistribution surface if necessary.</td>
</tr>
</tbody>
</table>

### Key Points

- NSQHS standard 8 - prevention and management of pressure injuries specifies the need for the use of screening tools and risk assessment frameworks.
- A daily pressure injury assessment can lead to detection of risks associated with hospitalisation.
- The application of reliable risk assessment tools provides a useful means for identification of at-risk infants so appropriate and timely prevention strategies can be implemented.
- Pressure from medical devices and the degree of immobility are the 2 key trigger factors which place infants at risk.
- When performing skin assessments ensure adherence to standard infection control measures to reduce transmission of infection (hand hygiene, environmental cleaning).
- Be aware of and identify infants with environmental, treatment or management factors that may alter skin integrity.
- Be aware of and identify infants with risk factors for pressure injury from unrelieved pressure over bony prominences/dependent body parts and monitoring devices, e.g. CPAP prongs, caps, attachments.
- In the event of skin breakdown or pressure injury, use wound assessment and management strategies to document findings and management.
**Recommendations**

- Prevent pressure injuries by repositioning the newborn when cares are attended or on a regular basis. Document the position on the observation chart.
- Infants on CPAP must have their nasal septum checked regularly and prongs must NEVER rest on the septum.
- CPAP hats need to be removed and head / ears inspected for pressure areas every shift.
- Document this care on the patient care board.
- Adequate nutrition is an important factor to promoting healing, so ensuring that the newborn has an adequate nutritional intake is an important aspect to wound healing. Recurrence of pressure injuries should be anticipated; therefore active, preventive intervention and frequent continuing assessments are essential.

**Skin Excoriation**

Skin excoriation occurs when the skin or epidermis is traumatised or abraded due to a range of factors which can include external trauma, infection, scratching or even during the healing process. The presence of minor skin damage in the high-risk neonate increases the likelihood of further injury, thus prevention and intervention of skin excoriations in the neonate has become a necessary focus.

**Recommendations**

- Attend the Neonatal Skin Condition Score
- Attend with cares (4-8th hourly depending on infant stability) and document on the observation chart.
- Document findings in medical records.
- Notify MO & T/L if score > 4.
- Decide on and document a care plan

**Neonatal Skin Condition Score (N Skin Score on NICU Observation chart)**

<table>
<thead>
<tr>
<th>Dryness</th>
<th>Erythema</th>
<th>Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal, no sign of dry skin</td>
<td>1 None evident</td>
</tr>
<tr>
<td>2</td>
<td>Dry skin, visible scaling</td>
<td>2 Small localised areas</td>
</tr>
<tr>
<td>3</td>
<td>Very dry skin, cracking fissures</td>
<td>3 Extensive</td>
</tr>
</tbody>
</table>

Score 1-3 for each category, Perfect score = 3 worst score = 9

- Treatment for skin excoriation includes cleansing the wound with warm sterile water to help gently cleanse away any dead tissue from the wound area, allowing for a better healing surface.
- Once the wound surface is clear, ointments may be used to help promote healing. (Seek advice from the Surgical CNC)
- In some cases, the use of a transparent dressing may also be used as this can help promote moist healing and will allow for the migration of epithelial cells across the site.
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It is important to note that when using a transparent dressing, there must always be a rim of intact skin around the wound to adhere the dressing to.

- These dressings should be left in place until they become loose, as removing and reattaching the dressings on a regular basis can cause further injury to the skin around the wound and further impede the healing process.

**Extravasation**

Extravasation is defined as the leakage of intravenous (IV) fluid from the vein into the surrounding tissue. This can occur from the cannula piercing the vessel wall or even an occlusion of the distal veins causing backpressure within the vessel walls. Both peripheral cannulas and central lines are capable of causing extravasation.

**Recommendations**

_Neonatal Visual Infusion Phlebitis Score (N.V.I.P. Score)_ adapted from Jackson I.V Therapy and care phlebitis scale (PIVC Score on NICU Observation chart)

<table>
<thead>
<tr>
<th>I.V. site appears healthy</th>
<th>0</th>
<th>No signs of phlebitis. Continue to observe</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following evident:</td>
<td>1</td>
<td>Possible 1st signs of phlebitis. OBSERVE CLOSELY / consider resiting cannula</td>
</tr>
<tr>
<td>Baby grimaces &amp; withdraws limb / signs of discomfort when site touched</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slight redness near I.V. site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two of the following evident:</td>
<td>2</td>
<td>Early stages of phlebitis. Notify MO Stop infusion Resite Cannula. Document.</td>
</tr>
<tr>
<td>Baby grimaces &amp; withdraws limb / signs of discomfort when site is touched</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erythema •Swelling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All of the following is evident:</td>
<td>3</td>
<td>Early stages of phlebitis. Notify MO. Stop infusion Follow Extravasation CPG Resite Cannula. Document. Complete IIMS</td>
</tr>
<tr>
<td>Baby grimaces &amp; withdraws limb / signs of discomfort when site touched</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erythema •Induration (hardening)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All of following is evident &amp; EXTENSIVE</td>
<td>4</td>
<td>Advances stage of phlebitis. Notify MO. Stop infusion Follow Extravasation CPG Document. Complete IIMS CONSIDER TREATMENT</td>
</tr>
<tr>
<td>Baby grimaces &amp; withdraws limb / signs of discomfort when site touched</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erythema •Induration (hardening) •Blistering, necrosis or ulceration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Score _every hour_ for all cannulas Score for 24 hours after removal if redness is evident and for 12 hours if there are no signs of phlebitis. Insert a photo into the clinical record and continue to document progressive photos for any severe extravasation. Obtain permission from the parents for photos.
• Prevention of IV extravasation includes ensuring adequate taping of IV devices with a transparent dressing so that the insertion site is clearly visible.
• Observe the site hourly and ensure that proper documentation is attended. (see above Phlebitis scale)
• If extravasation of IV fluids has occurred, stop infusion immediately leaving the device in place and notify the medical officer.
• Hyaluronidase is the most common type of medication used in the treatment of extravasation, but this must be administered within an hour of extravasation occurring. Hyaluronidase is an enzyme that can cause the interstitial barrier to breakdown and will allow the diffusion of the extravasated fluid to a larger area in order to prevent necrosis of the surrounding tissue.
• Phentolamine is used for extravasation of vasoconstrictors such as Dopamine, Dobutamine and Adrenaline to prevent dermal necrosis and sloughing.
• See NICU Guideline 5.4.5 ‘Extravasation of IV in NICU’ JHCH_NICU_10.02

Chemical Burns

The use of skin disinfectants is never completely innocuous, even though they have been shown to reduce the risk of bacteraemia, catheter related infections and skin contamination during blood culture sampling. Selecting a disinfectant should be based on evaluating risks and benefits of each product relative to efficacy, potential for toxicity, and skin irritation as there is insufficient evidence to recommend a single product for neonates. Using a disinfectant in infants less than 1500 grams in weight and who are less than 7 days old carries a risk of skin injury particularly with Chlorhexadine gluconate containing solutions and also carries a risk of potential toxicity from iodine absorption. However, removing all disinfectants as completely as possible using sterile water or saline may prevent these risks.

Infections from an extra-luminal source (infection occurs shortly after an IV catheter is inserted) can be prevented by effective cutaneous antisepsis at the insertion site and those from an intra-luminal source (infection occurs when the catheter has been in place for a prolonged period) can be prevented by strict adherence to aseptic technique for catheter hubs, tubing and connectors. (See ‘Aseptic technique in NICU’ CPG JHCH_NICU_03.01)

Recommendations

• Chlorhexidine gluconate’s bacteriocidal properties increase cell membrane permeability and is effective against both gram positive and gram negative organisms. It also binds to the stratum corneum and leaves a residual bacteriocidal effect that is resistant to alcohol removal. Use 2% Chlorhexidine gluconate in purified water and 10% ethanol for disinfection of both skin and IV access needleless connectors, ports and hubs. Consider applying to the skin with two consecutive applications followed by removal with sterile water or saline.
• Povidone-iodine is equally effective in reducing bacterial colony counts before IV catheter insertions and is more efficacious than isopropyl alcohol. Consider applying to the skin of the ELBW <1000gm neonate with two consecutive applications, allowing to dry for 30 seconds followed by removal with sterile water or saline.
• Observe the skin and attend the Neonatal skin condition score after the procedure.
References

AWHONN: Neonatal skin care third edition

AAP and ACOG, 2012:3


Blume-Peytavi et al., 2009:3; CDC, 2006


Garland et al., 2009:1

Lashkari, Chow and Godambe, 2012


John Hunter Children’s Hospital NICU guidelines


(The Royal Children’s Hospital, Melbourne, 2009).


www.joannabriggs.edu.au

www.blackwellpublishing.com/medicine/bmj/nnf5/.../skin care .pdf
APPENDIX 1

To use this chart's management options for wound care, consider the following:

- **Wound Appearance**: The appearance of the wound can provide clues about its nature and potential causes.

- **Description**: A detailed description of the wound can help in determining the appropriate treatment.

- **Depth**: The depth of the wound can influence the choice of dressing and treatment.

- **Treatment Objective**: Setting clear objectives is crucial for effective wound care.

- **Suggested Products**: Choosing the right products is essential for wound management.

- **Nutrition**: Proper nutrition is vital for the healing process.

APPENDIX 2

Nappy Rash Treatment Flow Diagram

1. Skin Breakdown Noted
   - Candida Infection
     - Yes: Treat with antifungal
     - No: Bacterial Infection
       - Yes: Treat per policy
       - No: Stool has excess enzymes, bile salts, irritants
         - Frequent diaper changes, Gentle cleansing
           - Apply topical barrier protectant
             - Did stool remove barrier
               - Yes: Select different barrier
               - No: Is skin improving
                 - Yes: Continue plan & Monitor
                 - No: Re-evaluate Develop new plan
ANATOMY AND PHYSIOLOGY OF NEWBORN SKIN

Concerns Over the Use of Traditional Adhesives

**Stratum Corneum**
- The outer most layer of cells which form the epidermal barrier:
  - 10-20 layers in full term infants
  - 2-3 layers at 30 weeks gestational age
  - Virtually no layers are present at less than 24 weeks of gestation
- Protective functions against toxins and infectious agents deficient in premature infants

**Dermal Instability**
- Collagen is deposited in the dermis of the foetus in the last trimester, preventing accumulation of fluid in this layer
- Premature infants exhibit edema because of less collagen and fewer elastic fibers in the dermis
- Edema may put the infant at risk for ischemic injury due to reduced blood flow

**Epidermal & Dermal Cohesion**
- Fibres that connect the epidermis at the epidermal junction of the skin are widely spaced and fewer in numbers in premature infants
- Premature infants are at a higher risk for injury from adhesive removal and blistering from friction or thermal injury
- The bond of adhesives to the epidermis may be stronger than the bond of the epidermis to the dermis, resulting in stripping when adhesives are removed

**Concerns over use of traditional adhesive**
- Adhesives may be applied and removed daily in the neonatal and paediatric ICU environments
- Adhesive removal can result in stripping and disruption to skin surfaces
- Alteration in skin barrier function has been shown in premature infants after one removal of adhesive tape
- Adhesive removal is sometimes facilitated by the use of solvents. Solvents, however, may present a danger of toxicity to the premature infant.

**No stripping of epidermal cell on dressing removal**

Dressings with Safetac® technology do not adhere to the moist wound, yet adhere gently to the surrounding skin, minimizing trauma and pain at removal.

**Traditional adhesives**

**Safetac® technology**

References:
- Prevention and Management of Pain and Stress in the Neonate [REF945].

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