EXTRAVASATION AND INFILTRATION INJURIES – PREVENTION AND MANAGEMENT

This LOP is developed to guide safe clinical practice in Newborn Care Centre (NCC) at The Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this Local Operations Procedure (LOP).

INTRODUCTION
The inadvertent leakage of a solution from its intended vascular pathway can cause severe injury to the surrounding tissues. Early identification of injuries and timely intervention are critical for optimal outcomes.

1. AIM
- To prevent and manage extravasation and infiltration injuries

2. PATIENT
- Neonates

3. STAFF
- Medical and nursing staff

4. EQUIPMENT
Irrigation of extravasation injuries
- Blue incopads
- Oral sucrose
- Dressing pack
- 0.9% saline
- Chlorhexidine acetate aqueous solution 0.05% w/v (blue solution)
- 19 & 25 G needles
- 2ml & 10/20ml syringes
- 1% lignocaine
- Hydrogel dressing
- Systemic analgesia if required (eg. paracetamol, morphine)

5. CLINICAL PRACTICE

Prevention of infiltration and/or extravasation – insertion
1. Follow NCC clinical guideline for insertion of cannulas and catheters. See “Intravenous Cannula – Insertion of Intravenous Cannula in neonate” and “PICC Line – Insertion of percutaneous intravenous central catheter”.
2. Avoid placing cannula and catheter tips in susceptible areas such as over bony prominences, the wrist, the dorsum of the foot and the scalp where possible.
3. Apply any taping loosely to allow circulation.
4. Do not obscure the site of insertion.
5. Vesicant solutions should be administered by a central line where possible.

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Prevention of infiltration and/or extravasation – maintenance

1. Document all intravascular lines using NCC observation charts.
    - Cannula sites should be checked hourly:
        - Document site visual infusion phlebitis (VIP) score
        - Record pump pressure for any infusions
        - Document current status of cannula with every new daily observation chart
    - Catheters should be checked with all cares with particular attention to the expected tip position:
        - Document site VIP score
        - Record pump pressure hourly for any infusions
        - Check state of dressing after shift change and with cares
        - Document current status of catheter with every new daily observation chart
2. Monitor site regularly as above for signs of infiltration or and/or extravasation.
    - The following signs suggest potential infiltration:
        - Blanching at the insertion site or at the location of the tip
        - Swelling either around an insertion site, limb or along path of catheter and catheter tip area
        - Tenderness or discomfort
        - Tight or stretched skin
        - Leakage of fluid at the insertion site
    - The following signs suggest potential extravasation:
        - Early – redness, pain or discomfort when using cannula or catheter
        - Late – blistering, ulceration, tissue necrosis
3. Alert medical staff if:
    - Pump pressures are alarming high or any increase >50 mmHg above baseline
    - Difficulty with bolus administration of medication/infusion
    - There are any signs of infiltration and/or extravasation

Management of infiltration and/or extravasation

1. Stop any infusions immediately and notify medical team.
2. Disconnect the administration set from the cannula or catheter (maintain sterility).
3. Estimate the severity of infiltration using the site assessment table on the extravasation notification form (see appendix).
   N.B. For stage 4 infiltrations, it is an option to leave the cannula or catheter in situ as it may be used for medications or to flush the area (see Appendix 1).
4. Remove cannula or catheter unless advised otherwise.
5. Mark, measure and document any areas affected by extravasation in progress notes.
6. Provide adequate analgesia, which may include a combination of oral sucrose, paracetamol and/or morphine.
7. The affected area or limb should be elevated where possible.
8. Inform neonatologist and parents.
9. Consult plastic surgery team (page #44917 or call through switch) for all stage 4 infiltrations. Photographs of the injury should be made for the medical notes (permission from parents must be sought prior to taking photos).
10. Complete extravasation notification form (Appendix 2.
11. Notify incidents using the Incident Information Management System (IIMS) for all stage 4 infiltrations.

EXTRAVASATION AND INFILTRATION INJURIES – PREVENTION AND MANAGEMENT cont'd

Irrigation of extravasation injuries

1. Explain the procedure to the parents.
2. Provide adequate analgesia, which may include a combination of oral sucrose, paracetamol and/or morphine.
   - Do not use topical local anaesthetics.
   - Do not rupture any formed blisters.
3. Identify the infant for the procedure. The proceduralist ensures that "Time Out" is performed before commencing. A level 1 procedure checklist sticker must be completed.
   NB. This procedure must be performed using an aseptic technique.
4. Wrap the infant with the affected limb exposed.
5. Place blue incopad under selected limb.
6. Position the infant comfortably.
7. Collect necessary equipment.
8. Wash hands after touching the infant.
9. Clean work surface for equipment with neutral detergent.
10. Ensure sharps disposal container is close to allow for direct disposal of sharps after use.
11. Open packets of equipment for the procedure.
12. It is optional, at the discretion of the neonatologist, to inject 3-5ml of 0.9% saline through a cannula if still in situ, then remove.
13. Wash hands and put sterile gloves on.
14. Clean the affected area with antiseptic solution (see Equipment List).
15. Infiltrate the affected area with subcutaneous local anaesthetic (1% lignocaine maximum dose 0.3ml/kg) in four quadrants using a 25G needle.
16. Irrigate the area using the puncture marks made when infiltrating the local anaesthetic. Use a 19G needle and 10-20ml of 0.9% saline each time.
17. Massage out any swelling towards the puncture marks.
18. Aim to irrigate with 100-400ml of 0.9% saline. Any coloured effluent, such as lipids, should become clear.
19. Apply a hydrogel dressing, such as Mepilex, over the site. Refer to wound product information, located in level 2 store room and on central line trolley.
20. Keep the affected limb elevated. Do not apply hot or cold packs.
21. Review the affected area with all cares and document in Observation Chart.
22. If the injury requires ongoing wound care please use the wound assessment and management plan. If unsure of what dressing products to use please speak to a nurse educator or Sydney Children's Hospital wound clinical nurse consultant.

6. DOCUMENTATION

- Integrated Clinical Notes
- Observation Chart
- Extravasation Notification Form

7. EDUCATIONAL NOTES

- Infiltration is the leakage of a non-vesicant solution from its intended vascular pathway into the surrounding tissue. Infiltration is generally benign but a large volume of infiltrate can cause a compartment syndrome, compressing nerves and compromising circulation.
- Extravasation is the leakage of a vesicant solution from its intended vascular pathway into the surrounding tissue. The degree of injury ranges from mild skin reaction to severe necrosis. This can lead to infection, complex regional pain syndrome, loss of function and amputation.
- A vesicant is any fluid with the potential to cause severe tissue injury or necrosis if it leaks from its intended vascular pathway. The severity of injury is related to the type, concentration and amount of vesicant extravasation.

EXTRAVASATION AND INFILTRATION INJURIES – PREVENTION AND MANAGEMENT cont'd

- Common vesicants used in the NCC include:
    - Medications – vancomycin, gentamicin, cefotaxime, acyclovir, ganciclovir, phenytoin
    - Vasocompressors – dobutamine, dopamine, adrenaline, noradrenaline
    - Hyperosmolar solutions – TPN, >10% dextrose
    - Radiographic contrast media
    - Concentrated electrolyte solutions, particularly calcium and sodium bicarbonate
    - Blood
    - Cytotoxic agents

8. RELATED POLICIES/PROCEDURES/CLINICAL PRACTICE LOP

- Intravenous Cannula – Insertion of Intravenous Cannula in neonate
- PICC Line – Insertion of percutaneous intravenous central catheter

9. RISK RATING

- Medium

10. NATIONAL STANDARD

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11. REFERENCES

- Great Ormond Street Hospital Clinical Guidelines: Extravasation and infiltration. Available at http://www.gosh.nhs.uk/health-professionals/clinical-guidelines/extravasation-and-infiltration
- The Children's Hospital at Westmead Practice Guideline: IV extravasation management – CHW. Available at http://www.schn.health.nsw.gov.au/_policies/pdf/2012-8007.pdf

12. ABBREVIATIONS AND DEFINITIONS OF TERMS

NCC	Newborn Care Centre	IIMS	Incident Information Management System
PICC	Peripherally inserted central catheter	TPN	Total parenteral nutrition
VIP	Visual infusion phlebitis		

AUTHOR:

Primary	13/9/2016	Dr Timothy Schindler, NE Jo Sheils, CNS Teena George
Revised	Date	Person

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APPENDIX 1

Site assessment	Stage 1	Stage 2	Stage 3	Stage 4 - Medical Emergency
Swelling	**None**	**Slight/Mild**	**Moderate swelling above and or below the site of insertion or tip of Catheter**	**Sever swelling above &/or below the site of insertion or tip of catheter**
Leakage	**Yes/No**	**Yes/No**	**Yes**	**Yes**
Blistering	**No**		**Potential**	**Yes**
Hardened Areas	**No**	**Possibility**	**Yes**	**Yes**
Skin Colour	**Unremarkable, may have discolouration at site**	**Slight/mild blanching, redness, may have discolouration at site**	**Blanching of the skin, redness &/or discoloration which may be purple or black**	**Blanching of the skin, redness &/or discoloration which may be purple or black**
Site Temperature	**Warm**	**Warm**	**Cool to touch**	**Cool to touch or cold**
Skin integrity	**Intact**	**Intact**	**Altered**	**Altered**
Palpable Pulse	**Good**	**Good**	**Good or weak**	**Weak or absent**
Capillary refill	**1-2 sec below site**	**1-2 sec below site**	**2-3 seconds below site**	**>4 sec below site**
Flush	**With difficulty**	**With difficulty**	**Unable to flush**	**Unable to flush**
Pain at Site	**Yes**	**Yes**	**Yes**	**Yes/no**
				Degree of extravasation may mean there is altered sensation to limb resulting in no pain at site
Site assessment stage:				

Adapted from: Thigpen, J.L. (2007). Peripheral intravenous extravasation: Nursing procedure for the initial treatment. *Neonatal Network,* 26, 379-384

Date: Time:

Level of Care:

Extravasation Notification Form

Patient identification label

Intravenous device					
Please circle type		Site of catheter:		Catheter size:	
IVC PICC UVC		Insertion date:		Fluids/medications infusing:	
Patency strategies - please circle.					
IV Flushes	Yes/No/NA	Fluids running	TKVO/NA		
Interventions					
Tapes loosened	Yes/No	Limb elevated	Yes/No	Cannuala removed	Yes/No
Site assessment					
Date/time of last VIP score or site assessment:		Site visiable at time of event	Yes/No	Pump Pressure documented	Yes/No

Using table below circle the site assessment

Site assessment	Stage 1	Stage 2	Stage 3	Stage 4 - Medical Emergency
Swelling	None	Slight/Mild	Moderate swelling above and or below the site of insertion or tip of Catheter	Sever swelling above &/or below the site of insertion or tip of catheter
Leakage	Yes/No	Yes/No	Yes	Yes
Blistering	No		Potential	Yes
Hardened Areas	No	Possibility	Yes	Yes
Skin Colour	Unremarkable, may have discolouration at site	Slight/mild blanching, redness, may have discolouration at site	Blanching of the skin, redness &/or discoloration which may be purple or black	Blanching of the skin, redness &/or discoloration which may be purple or black
Site Temperature	Warm	Warm	Cool to touch	Cool to touch or cold
Skin integrity	Intact	Intact	Altered	Altered
Palpable Pulse	Good	Good	Good or weak	Weak or absent
Capillary refill	1-2 sec below site	1-2 sec below site	2-3 seconds below site	>4 sec below site
Flush	With difficulty	With difficulty	Unable to flush	Unable to flush
Pain at Site	Yes	Yes	Yes	Yes/no Degree of extravasation may mean there is altered sensation to limb resulting in no pain at site
Site assessment stage:			**Complete IMMS and notify Plastic team (#44917) for stage 4**	

Comments:

Print name