HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Neonatal Intensive Care Unit (NICU)		
Document:	Departmental Policy and Procedure		
Title:	Insertion of Peripheral Intravenous Lines		
Applies To:	All NICU Staff		
Preparation Date:	January 12, 2025	**Index No:**	NICU-DPP-046
Approval Date:	January 26, 2025	**Version :**	2
Effective Date:	February 26, 2025	**Replacement No.:**	NICU-DPP-046 (1)
Review Date:	February 26, 2028	**No. of Pages:**	5

1. PURPOSE:

1.1 Achieve vascular access through the peripheral venous network to provide a route through which fluids, medications, nutritional therapies and other substances are injected or infused directly into the circulatory system.

1.2 Ensure safe precautions to avoid complications.

2. DEFINITIONS:

2.1 Insertion of an appropriate gauge butterfly needle or over-the-needle cannula device (angio-catheter) in an appropriate site of the peripheral venous network to provide vascular access for the newborn.

2.2 It is used for administration of parenteral fluids or nutrition, medications, blood products, contrasts and/or dyes or an emergency vascular access.

2.3 Abbreviations:
PIV: peripheral intravenous, IV: intravenous, KVO: keep vein open.

3. POLICY:

3.1 Insertion of intravenous cannula is done by a qualified trained neonatology nurse or physician.

3.2 Maximum of three attempts are allowed per person. If after 3 attempts, the assigned nurse is not successful, she should inform the head or charge nurse who tries to insert it. If unsuccessful, the charge nurse informs SOD who decides to insert it himself, assigns it to the ROD or decides other alternative e.g. more rapid increase of feeds, placement of Peripherally inserted Central Catheter (PICC).

3.3 The following concentrations of fluids should not be exceeded in the peripheral intravenous line:
- 3.3.1 Dextrose; 12.5%
- 3.3.2 Amino acids; 2.5%
- 3.3.3 Potassium chloride; 40 mEq/L
- 3.3.4 Calcium Gluconate; 45 mg /100 ml of intravenous fluids (central route preferred)
- 3.3.5 Osmolality; 900 milli osmol/L (+ 200)

3.4 Preferred infusion sites in the newborn are:
- 3.4.1 Initial infusions should begin distally e.g. back of hand or foot (dorsal venous plexus) followed by scalp vein.
- 3.4.2 Antecubital region of the arm should be preserved for possible need of a PICC line. Utilize only as a last resort.
- 3.4.3 Avoid areas of flexion and/or close to joints as there is increased risk of infiltration due to movement. The length of the catheter should not cross the joint.
- 3.4.4 Avoid areas with local cellulites, any loss of skin integrity, impaired circulation or swelling especially from previous IV insertion.

3.5 Before inserting catheters veins must be differentiated from arteries as follows:
- 3.5.1 Palpate the vessel for pulse.
- 3.5.2 Determine the direction of flow by using a stroking compression along the length of the vessel with a finger and note from which direction the vessel refills. Veins always flow towards the

heart and arteries flow away from the heart e.g. scalp arteries fill from below, veins fill from above.

3.5.3 Note color of blood obtained.

3.5.4 Look for blanching of skin over vessel when small volume of saline (0.5ml) is infused. Blanching indicates placement in an artery (arterial spasm).

3.6 Peripheral IV line is changed every 3 days.

3.7 Inspection of IV site is done every 2 hours for any complication (Table 1). If signs or symptoms of any complication are noticed, the assigned nurse should inform the ROD/SOD immediately.

Table 1: Check for the possibility of any of the following complications every hour:

Complication	Etiology	Signs & Symptoms
Extravasation	- integrity of vein wall is lost or vein is perforated, -interstitial infiltration of infusate,	**Staging of extravasation injury**: **Stage I**: Pain at site, IV cannula flushes with difficulty, No swelling or redness. **Stage 2**: pain, redness & mild swelling at site with brisk capillary refill. **Stage 3**: moderate swelling blanching of area, cold skin, brisk capillary refill & good pulse below site. **Stage 4**: severe swelling around site, blanching of area, cold skin, area of skin necrosis or blistering, prolonged capillary refill time, decreased or absent pulse. **Action**: STOP infusion, attach 1 ml syringe to angio-catheter and aspirate as much fluid as possible before removing the cannula (unless cannula is needed for administration of antidote). Elevate limb. Cover with saline soaked gauze.
Thrombosis	Damage to vessel wall, Sluggish rate of flush solution, Inadvertent disconnect from IV tubing with retrograde blood flow into catheter, Failure to flush when locking IV	Loss or weakening of blood flow below site, Pain, loss of warmth, sensation or mobility below site, Pallor or cyanosis at extremity
Air bubble in line	Empty IV bag, Improper flushing, * Loose connection.	Can cause air embolism. Check for loose connections in the line & flush any bubbles out. Ensure constantly available infusing solution
Hematoma	Traumatic insertion	Bruising & swelling at and /or just distal to insertion site. * Action: withdraw PIV & apply pressure for 5 minutes
Infection	Septic technique Improper skin preparation Contaminated equipment or solution	Redness, hotness or pain at site, ± purulent discharge, Can cause generalized sepsis
Hemorrhage	Dislodged catheter, Disconnected line, Laceration of vein	Blood leaking into dressing * Bruising & swelling at insertion site

4. PROCEDURE:

4.1

Steps	Rationale
Provide appropriate heating equipment if the incubator is opened e.g. overhead warmer, and pain management according to nursery policy.	Provide comfort measures as this is a painful procedure; bundling, pacifier with 24% sucrose,2 minutes prior to procedure
If choosing a scalp vein, careful shaving of the selected area may be necessary.	Better visualization of vein & securing the catheter with tape.
Select site for insertion. Apply tourniquet if anatomical site indicates.	Preferred sites in neonates are: scalp, dorsum of hand, dorsum of feet, reserving the arm anticubital veins as a last resort.
Wash hands for 2 minute (aseptic wash)	Routine practice for prevention of infection
Don sterile gloves	To reduce the risk of contact with patient bodily fluid.
Cleanse the skin with 1% aqueous chlorhexidine for neonates < 1500 gm, 1% chlorhexidine in 70% alcohol for neonates >1500 gm, or povidone-iodine, leave it to dry for 30 seconds. Remove it with sterile water or normal saline, after the procedure. Cleansing is in a circular motion from the point of insertion to periphery. Drape the area with sterile drape	
Attach syringe filled with sterile saline to the catheter and purge the system with saline while maintaining sterility of tubing	
Choose vein by direct visualization or by palpation. Palpate for pulse & note the direction of blood flow to ensure it is not an artery	Choose a straight vein with the fewest joints and curves
Select appropriate sized catheter for insertion - If not available, use butterfly needle.	Inspect the angio-catheter for bumps or frayed edges on the catheter.
Stabilize vein by stretching skin overlying vein between thumb & index finger	To prevent rolling of the vein
Grasp the angio-catheter between thumb & index finger (of the other hand) with needle bevel up. Enter the vein in the direction of blood flow towards the heart. * For butterfly insertion, attach a syringe filled with saline to the needle & purge the system off air. Remove syringe, set it aside and maintain its sterility.	If procedure not successful on the first puncture use new clean needle every time the skin is penetrated.
Insert needle through the skin at a slight angle, just beside or directly over the vein	To ensure correct placement
Once skin is entered, lower the needle hub nearly in contact with skin and direct the needle toward the stabilized vein	A sensation of release may be felt when the catheter enters the vein.
Pause after initial insertion and observe for blood return in catheter. *For butterfly needle, attach syringe and aspirate gently for blood return.	Blood return indicates correct placement in the vein, however, blood return occurs very slowly as inner needle is smaller gauge than actual outer cannula. Blood return on withdrawal of needle may only indicate perforation of the vein.
When certain that the catheter is in the vein, withdraw the needle and advance only the catheter	NEVER-re-insert the needle into the cannula after it has been withdrawn as the needle may puncture

	or tear the catheter that may cause catheter emboli.
Attach syringe to catheter and while gently infusing solution, advance the catheter further into the vein so that the hub is almost flush with the insertion site.	Infusion of fluid dilates the vein and promotes ease of catheter insertion.
Check placement by flushing gently with approximately 0.5m1 of saline and observe infusion site	Blanching, redness or edema indicate incorrect placement. It indicates placement in an artery. * A correctly placed PIV should flush easily with little or no resistance
Tape catheter in place; apply pre- cut sterile transparent dressing over cannula insertion site "Tegaderm", leaving connection site exposed. Take approximately 7cm piece of narrow transparent tape, slide it's adhesive side up under cannula and tape in a criss-cross fashion. Secure cannula with an additional piece of tape. *For butterfly needles, apply pre-cut sterile transparent dressing over the insertion site and lower third of the butterfly wings. Place small wedge of cotton fluff under the wings of the butterfly. Take approximately 7cm piece of clear tape; slide it, adhesive side up, under the wings of the butterfly and tape in a criss-cross fashion. Secure butterfly tubing to the site and skin with an additional piece of tape	Ensure that taping method does not impair circulation distal or proximal to PIV site. Maintain normal joint position to maintain mobility of joints, ensure fingers or toes are visible. If limb is used, it is an option to secure the limb to arm-board with transparent tape.
Observe site for redness or edema near IV injection site and any blanching while IV solution is infusing.	
Label IV with date & time	
Document procedure in the nurses notes including date, time, type of catheter, site, solution used, individual who started the IV and any difficulty encountered	

5. MATERIAL AND EQUIPMENT:

5.1 Sterile gloves
5.2 Sterile drape
5.3 Appropriate antiseptic (1% aqueous chlorhexidine, 1% chlorhexidine in 70% alcohol, Povidone-iodine
5.4 Restraints
5.5 Sterile water or normal saline (for cleaning after the procedure)
5.6 Clean sterile 2 x 2in gauze pads
5.7 Appropriate gauge intravenous catheter or butterfly winged needle
5.8 Infusion set
5.9 Appropriate sterile transparent covering " Tegaderm",
5.10 Clean tape for securing IV catheter/tubing + arm-board,
5.11 3cc flush syringe filled with normal saline flush solution,
5.12 Appropriate heating equipment (blanket, over bed warmer) if required,

6. RESPONSIBILITIES:

6.1 Physician
6.2 Nurse

7. APPENDICES:

N/A

8. REFERENCES:

8.1 R K Lockwood, M G MacDonald, M R Eichelgerger. Peripheral Intravenous ([V) Line Placement. Atlas of Procedures in Neonatology. Lippincott Williams & Wilkins. 2007,143-153

8.2 Gomella T.L. (2009). Neonatology: management, procedures, on-call problems, diseases and drugs Lange Medical Books McGraw-Hill: New York, 240-243

9. APPROVALS:

	Name	Title	Signature	Date
Prepared by:	Ms. Afrah Saud Al Shammari	NICU Head Nurse		January 05, 2025
Prepared by:	Dr. Falah Nabhan Al Shammari	NICU Quality Coordinator		January 05, 2025
Reviewed by:	Mr. Sabah Turayhib Al - Harbi	Director of Nursing		January 07, 2025
Reviewed by:	Dr. Sarhan Hamdan Al Shammari	NICU Head of the Department		January 08, 2025
Reviewed by:	Mr. Abdulellah Ayed Al Mutairi	QM&PS Director		January 09, 2025
Reviewed by:	Dr. Tamer Mohamed Naguib	Medical Director		January 12, 2025
Approved by:	Mr. Fahad Hazam Al - Shammari	Hospital Director		January 19, 2025