HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Pediatric Intensive Care Unit (PICU)		
Document:	Departmental Policy and Procedure		
Title:	Assisting in Arterial Line Insertion		
Applies To:	All Pediatric Intensive Care Unit Staff		
Preparation Date:	January 05, 2025	**Index No:**	PICU-DPP-007
Approval Date:	January 21, 2025	**Version :**	2
Effective Date:	February 21, 2025	**Replacement No.:**	PICU-DPP-007 (1)
Review Date:	February 21, 2028	**No. of Pages:**	8

1. PURPOSE:

1.1 To provide competency based guidelines in an ongoing care and management of arterial lines.
1.2 To provide safety in the management of patient with arterial lines.
1.3 To provide a standard approach to arterial line management.
1.4 The arterial line with transducers is usually used to obtain accurate continuous, beat-to-beat blood pressure readings. This is especially important in monitoring the hemodynamic status of a critical patient.
1.5 With an arterial line, the immediate effects of medication can be seen. Both systolic, diastolic and mean pressures can be monitored immediately. This is especially important when vasopressors such as epinephrine, nor-epinephrine or dopamine are being used.
1.6 Another advantage of using an arterial line is that frequent blood samples can be obtained when needed

2. DEFINITONS:

2.1 **Arterial Line** – is an arterial catheter inserted into an artery and connected to monitoring tubing to allow for continuous blood pressure monitoring. The pressure is sensed by a section of the tubing known as the transducer which converts the mechanical pressure into an electrical waveform via a cable connected to a cardiac monitor. An arterial line is usually inserted in the wrist radial artery, alternatives are: ulnar, brachial, axillary artery, femoral artery, or dorsalispedis end artery. In pediatric age group, radial artery is the preferred choice

3. POLICY:

3.1 An arterial line catheter is to be inserted by a physician assisted by a staff nurse following an Allen's test.
3.2 The procedure is carried out under aseptic technique.
3.3 Patient safety and comfort is observed at all time.
3.4 The arterial alarm parameters will remain activated at all time. Alarm parameters should be set at 20 above and 10 below the patient's normal arterial pressure. The pressure will be kept 300 mmHg to maintain catheter patency.
3.5 Indications:
  3.5.1 Measuring blood pressure very closely
  3.5.2 Drawing frequent blood samples for lab tests
3.6 Contra Indications :
  3.6.1 Severe coagulopathy or platelet count <50,000
  3.6.2 Poor collateral circulation at proposed site. (Modified Allen's test)
3.7 The arterial catheter must be removed after 72 hours; tubing should be changed every 48 hours, the heparinized solution or the infused solution under the pressure bag must be changed after 24 hours.
3.8 Arterial line sites must be monitored every 2 hours and documented on the PICU flow sheet.
3.9 Physician will be notified of any abnormal findings.

3.10 Assisting for insertion and managing arterial line must be performed by staff nurse only after completion of the skill competency on arterial line insertion; assisting in care and monitoring of arterial line.

4. PROCEDURE:

4.1 Verify physician written order for procedure.
4.2 Identify patient correctly by two identifiers (4 names for Saudi / complete name for Non – Saudi and Medical Record Number).
4.3 Staff nurse must act as a witness in securing the informed consent (medical – surgical procedure), physician should explain the elements of consent in full details to the patient. Simple straight forward language is most effective. Psychological preparation of the patient to establish trust, provide support and give explanation in easy to understand terms.
4.4 Inquire for allergy to latex and Iodine. Inform physician if patient is sensitive to these products.
4.5 Assess patient for any contraindications of procedures like potential bleeding. Review coagulation profile result and notify physician immediately.
4.6 Perform hand hygiene.
4.7 Prepare and organize all needed equipments on the trolley and bring it to the patient's bedside.
4.8 Provide privacy throughout the procedure and position patient comfortably.
4.9 Procedure for priming the transducer set:
- 4.9.1 Turn on the cardiac monitor. Make sure that the reusable arterial line cable connection is working and compatible with the arterial line transducer kit.
- 4.9.2 Gather all equipment. Using an aseptic technique remove the transducer from its package and tighten the luer connections.
- 4.9.3 Position the patient either lying flat or head not elevated by more than 45 degree.
- 4.9.4 Position the patient's arm, palm up with the wrist in dorsiflexion by placing a rolled towel under the wrist. Make sure the blood pressure cuff for routine monitoring is placed on the contralateral arm so it does not impede blood flow while placing the line.If having difficulty palpating the radial artery, use index and middle finger to locate the artery by starting medially and slowly moving laterally until you feel the radial pulse.
  Sterilize and drape the area per proper aseptic technique better by Chlorhexidine dripping for 60 seconds and then adequately anesthetize the puncture site
  Hold an 22 or 24 gauge needle like a pencil and puncture skin with needle bevel up at a 30-degree angle, this near parallel insertion of the needle will minimize trauma to the artery and allow the smooth muscles fibers to seal the puncture hole after you withdraw the needle.Once the line is placed, hook up the flushed arterial line transducer tubing to the catheter tip, secure arterial line to the skin and cover by transparent plaster.
- 4.9.5 **Precaution**
  - 4.9.5.1 Haemorrhage may occur if there are leaks in the system. Connections must be tightly secured, the giving set and line closely observed and appropriate BP alarm limits set.
  - 4.9.5.2 No drugs should be infused via an arterial line; accidental drug injection may cause severe, irreversible damage to the artery and to the supplied area
- 4.9.6 Care Of Arterial Line
  - 4.9.6.1 Arterial line transducer set up: prepare a 500 ml bag of normal saline. Most institutions no longer use a heparinized bag. Spike the bag with the transducer administration set. Remove all air from the tubing and transducer set. Pay particular attention to the transducer part of the Tubing and the flush port. The smallest air bubble must be removed to insure transducer accuracy. The easiest way to do this is to pressurize the bag up to 300 mm Hg, then invert the bag, and fast flush it to remove all air from the bag. Pressurize the pressure bag to 300 mm Hg; the purpose of this is to provide backpressure to prevent blood from contaminating the transducer.

4.9.6.2 With the transducer connected to the monitor, select arterial monitor, and perform a transducer check by fast flushing the line. As you do this, you should see a change in the waveform. This is called a square wave test.

4.9.6.3 Zero the transducer and monitor by placing the transducer at the phlebostatic axis of the patient. Close the line off to patient and open to air. Press zero on the monitor. To monitor pressure, close the port off to an air and open to patient

4.9.6.4 At this point the patient catheter is ready to be connected. Connect the catheter and fast flush to clear the catheter of blood. You should now see an arterial waveform on the monitor with arterial blood pressure and mean visible on the monitor screen. Check for good waveform.

4.9.7 Set the alarms.

4.9.8 Label the system clearly with date and time and when the system is changed

4.9.9 Set appropriate alarm limit per patient's acceptable range determined by physician in accordance to patient's condition.

4.9.10 Document blood pressure readings hourly or more frequently if the patient's clinical condition dictates.

4.9.11 Label the arterial insertion site with arterial in a red colored ink. Do not infuse anything except the flush solution. Drugs and hypertonic solutions must never be given via an arterial line.

4.10 Frequently check the oscillioscopic display of the arterial blood pressure waveform. If the waveform is reduced or flattened or the dicrotic notch is no longer visible.

4.10.1 Check the patient to see if she/he stable and compare with the reading non – invasive blood pressure reading

4.10.2 Check to see that the stopcocks are positioned correctly.

4.10.3 Check the catheter system for loose connections or bubbles.

4.10.4 Aspirate blood, check for small clots, discard aspirate and gently flush the system.

4.10.5 Check if the catheter is not kinked and not taped too tightly.

4.10.6 Check the catheter for air bubbles.

4.11 Check the skin around the catheter site for any signs of infection, cyanosis, blanching and extravasation.

4.11.1 Observe for signs of cannula displacement into the tissues:

4.11.1.1 Swelling

4.11.1.2 Bleeding

4.11.2.3 Lack of normal arterial waveform

4.11.2.4 Fluid leakage

4.11.2.5 Blanching

4.11.2.6 Pain or discomfort

4.11.2 Continuously monitor the circulation on the cannulated limb for signs of the following:

4.11.2.1 Cyanosis

4.11.2.2 Decreased pulse

4.11.2.3 Blanched color

4.11.2.4 Cool skin/ extremities

4.11.2.5 Sluggish capillary refill time

4.11.2.6 Bleeding

4.11.3 Flushing of the arterial line and performing a square wave test:

4.11.3.1 The cannula does not need regular flushing while on a pressure bag system, but a flush may be required to gain an arterial trace. The cannula can be flushed with the manual fast flush device and thus performing square wave test.

4.11.3.2 This test is designated to help identify if the arterial line is over or under damped.

4.11.3.2.1 Activate the flush device on the transducer then observe the arterial waveform

4.11.3.2.1 Square off at the top of the scale.
4.11.3.2.2 Then drop to the zero as the flush is released.

4.11.3.4 Maintain the pressurized flush bag at a pressure of 300mmHg. If the waveform changes check the pressure

4.12 Dressing of the arterial line:

4.12.1 Select a sterile dressing that is moisture permeable, clear and dressings should only be changed when:

4.12.1.1 Soiled.
4.12.1.2 The line is being changed.
4.12.1.3 It is ineffective in securing the cannula.
4.16.1.4 If the site is not clean.
4.16.1.5 The cannula is kinked under the dressing.
4.16.1.6 Bleeding has occurred.

4.12.2 Perform hand hygiene and put on non-sterile gloves. Standard precaution must be adhered at all times and observe aseptic non-touch technique.

4.12.3 Carefully remove the old dressing, holding the cannula in place at all times.

4.12.4 Thoroughly inspect the site of entry of the cannula for any signs of infection, cannula displacement or any indications for removal. Notify physician immediately.

4.12.5 Remove non – sterile glove, then don on sterile gloves.

4.12.6 Clean using Povidone – Iodine and alcohol swab for 30 – 60 seconds and allow drying.

4.12.7 Apply the new clear dressing assuring that the cannula is well protected.

4.12.8 Re apply the splint ensuring that it is secure and avoids occluding the visibility of the cannula site or circulation of the limb.

4.12.9 Every time a dressing will be change, it should be labelled with date and time.

4.13 Sampling from arterial line:

4.13.1 Perform hand hygiene and observe sterile technique at all times.

4.13.2 Place a sterile 4 x 4 inch gauze pad under the stopcock closes to the arterial catheter.

4.13.3 Clean port with alcohol swab; allow drying prior to any access and cleaning after use.

4.13.4 Attach a syringe on the sampling port, turn the stopcock off to the fluid flush source and gently pull back on the syringe plunger withdrawing enough infusate solution and blood to ensure that the catheter and stopcock are free of infusate solution.

4.13.5 Turn 3 – way stopcock and tap diagonally to close off artery, port and transducer. This prevents back flow of blood from artery and contamination with infusate. Remove the syringe with the blood and infusate solution and place the syringe in sterile 4 x 4 inch gauze pad.

4.13.6 Connect either heparinized blood gas syringe or sampling syringe to the sampling port, turn the stopcock off to the fluid source, and withdraw the amount of blood needed.

4.13.7 Turn the stopcock to the diagonal position remove the sampling syringe and immediately place the blood on each designated blood bottle.

4.13.8 Place the syringe with the blood, flush solution mixture into the sampling port and turn off the stopcock to the fluid source. Aspirate the catheter before returning the blood to the patient, tapping any air bubbles up to the plunger end, and carefully return the blood from the syringe to the patient.

4.13.9 Open the stopcock to the patient and transducer. Flush the entire line using the pull tab flush device for no more than 3 second intervals until the patient line are clear of any blood residue.

4.13.10 Observe for the return of the arterial wave form.

4.14 Dispose of all used equipment.

4.15 Perform hand hygiene.

4.16 Document in the nurse's note: insertion time and date, insertion site and cannula size, name of the Physician who perform the procedure, time dressing changed, changes noted around the site, amount of blood withdrawn, patient's response to the procedure.

5. MATERIALS AND EQUIPMENT:

5.1 Arterial Line Catheter Set
5.2 Arterial Line Transducer and Priming Set
5.3 IV Pole With Transducer Mount
5.4 Cardiac Monitor
5.5 500 Ml Bag of Normal Saline with 500 Units Heparin (1 Unit/Ml)
5.6 Pressure Bag
5.7 Basic Procedure Set/ Cut Down Set
5.8 Alcohol Swab
5.9 Povidone Iodine Solution
5.10 1 % Lidocaine Injection
5.11 10cc Syringe
5.12 3cc Syringe
5.13 Three – Way Stopcock
5.14 Sterile Gloves
5.15 Sterile Gown
5.16 Surgical Face Mask
5.17 3 – 0 Silk Suture
5.18 Sterile Gauze
5.19 Opsite/Plaster
5.20 Blood Specimen Tube
5.21 Blood Gas Syringe

6. RESPONSIBILITIES:

6.1 Physician
6.2 Nurses

7. APPENDICES:

7.1 Nurses Progress Notes

8. REFERENCES:

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9. APPROVALS:

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KINGDOM OF SAUDI ARABIA

وزارة الصحة
Ministry of Health

Hospital: _____ مستشفى:

Region: _____ المنطقة/المحافظة:

Dept./Unit: _____ القسم/الوحدة:

MRN: | | | | | | | | | | رقم الملف الطبي:

Name: _____ الاسم:

Nationality: _____ الجنسية:

Age: _____ ☐ سنة Years ☐ شهر Months ☐ يوم Days العمر:

Date of Birth: ____ / ____ / 14____ H ____ / ____ / 20____ تاريخ الميلاد:

Gender: ☐ Male ☐ Female الجنس:

NURSES PROGRESS NOTES FORM

DATE &TIME	NURSES NOTES (D-data A-action R-response)	REGISTERED NURSE INITIAL WITH ID NUMBER

Note: Write the time in each entry & affix your initial at the end of each paragraph. Document your complete Name, Initial, Job number, Date & Time at the closure of your documentation. Draw a line across empty spaces.

Name: الاسم:	MRN: رقم الملف الطبي:

NURSES PROGRESS NOTES FORM

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