



Policy/Procedure

TITLE:	Arterial Catheter Insertion, Care and Management	NUMBER:	40005
Date Issued:	May 2012	Pages:	8
Applies To:	Registered Nurses in the Women's Health Operating Room/Post Anesthesia Care Unit and Birth Unit within the Women's and Newborn Health Program		

THIS IS A BEYOND ENTRY LEVEL COMPETENCY FOR REGISTERED NURSES

POLICY

Registered Nurses working in the Women's Health Operating Room/Post Anesthesia Care Unit and Birth Unit within the Women's and Newborn Health Program (WNHP) will perform Arterial Catheter Care and Management which includes assisting with insertion, blood sampling, invasive blood pressure monitoring and catheter removal.

Arterial Catheter Care and Management is a Beyond Entry Level Competency (BELC) and requires certification/recertification before performing. It is the responsibility of the registered nurse to maintain competency of a BELC through the certification/recertification process, (IWK Administrative policy #324.2). Registered Nurses will be required to recertify this BELC annually or as practices change.

The purpose of an arterial line is to monitor and identify changes in arterial pressure, evaluate medical therapy (i.e. titration of drugs, fluid administration) and obtain blood samples. Arterial lines are to be inserted by an Anesthesiologist, Anesthesia Resident, or Anesthesia Assistant (AA). Consent is obtained as per IWK policy. Registered Nurses certified in this BELC are permitted to remove **Radial** arterial lines.

Arterial lines must be connected to a transducer and attached to a waveform monitor to collect accurate hemodynamic monitoring information.

No medication is to be injected or infused through an arterial line.

DEFINITIONS

Allen's Test: a test performed on the radial and ulnar arteries See educational learning package for picture to assess collateral circulation prior to puncturing the artery.

GUIDING PRINCIPLES AND VALUES

1. Patients with an arterial line in situ require continuous monitoring and assessment by qualified personnel.
2. The principles of aseptic technique and routine practices are to be adhered to while performing Arterial Catheter Blood Sampling, Blood Pressure Monitoring and or Catheter Removal.
3. Monitors vary from unit to unit. Refer to the manufacturer's instructions for monitor set up, zeroing and/or calibration.
4. The least amount of blood discard is used to prevent the patient from nosocomial anemia (Wiegand & Carlson, 2005, p.470). Discard two times the dead space volume prior to sampling. Dead space varies with the length of the line.

PROCEDURE/PROTOCOL

A. Preparing Arterial Monitoring Line

1. Tighten all connections along the line.
2. Connect the tubing from the arterial line monitoring kit to the IV solution. 0.9% Sodium Chloride (NaCl) is the solution to be used. Ensure to de-air IV bag prior to connecting the tubing.
3. Place the pressure infuser device over the IV bag and hang on the IV pole. **Do Not Inflate.**
NOTE: Priming the tubing under pressure increases turbulence and may cause air bubbles to enter the system.
4. Prepare a label with the date, time and the RN's signature and apply to the tubing.
5. Fill the drip chamber halfway.
6. Flush the tubing including stopcock ports. Ensure all connections and tubing are free of air.
7. Ensure all caps are non-vented. If not, change vented caps to non-vented caps using aseptic technique.
8. Inflate pressure device to 300 mmHg.

B. Assisting with Insertion

1. Assemble equipment for insertion found on arterial/CVP line cart (See Appendix A for contents of cart).

2. Bring the primed monitor line tubing and IV pole to the bedside. The arterial line is to have a pressurized, saline flush line attached to it **at all** times. **It is never to be saline locked.**
3. Assist the inserter (anesthesiologist/AA) with positioning of the arm to be used for the arterial line insertion.
4. After the catheter is inserted, assist with connecting the monitor line tubing to the catheter. Pull pressure set-up pigtail or push pressure button to flush solution to end of tubing as it is connected to the newly inserted catheter. Flush again to clear any blood in the catheter (Children's Health Program Clinical Policy #1606).
5. Assist the inserter with securing of the catheter by taping. May stabilize arm with armboard when using radial site.
6. Apply a transparent occlusive dressing.
7. Level the air-fluid interface to the patients' reference space (4th intercostal space, mid-axillary line) Inaccurate position can result in large errors with pressure measurement.
8. Zero the monitor and observe the waveform. (Refer to next section for zeroing procedure).
9. Document the procedure in the health record.

C. Zero Balancing and Calibration

1. Connect the monitoring cable to the disposable transducer and monitor.
2. Level the air-fluid interface (stopcock closest to transducer) to the phlebostatic axis (4th intercostal space, midaxillary line).
3. Close the stopcock to the patient.
4. Remove the non-vented cap from the air port of the transducer exposing to atmospheric pressure (keeping it clean).
5. Zero balance and/or calibrate the arterial monitoring system according to the monitor's manual.
6. Replace the non-vented cap to the transducer air port.
7. Reopen the stopcock, flush the pigtail and assess the arterial waveform pattern on the monitor.
8. Set the alarms as per physician parameters.

D. Blood Sampling

1. Gather the following equipment found in Arterial Line/CVP Cart (See Appendix A for list).
 - a. 1 –5 mL syringe
 - b. Labels
 - c. 2 x 2 sterile gauze dressing
 - d. Non-sterile glove
 - e. Vacutainer and needle less Luer-Lok adapter
 - f. Blood Tubes
 - g. Heparinized blood gas syringe
 - h. ice
2. Apply gloves.
3. Expel all air from 5 mL syringe. Uncap port of stopcock and attach the 5 mL syringe to the port.
4. Suspend the alarms.
5. Turn stopcock handle off to the transducer. Stopcock is now open to patient and syringe port.
6. Gently aspirate fluid until blood is noted in the syringe, then continue to withdraw additional 3 mLs of blood, turn off stopcock to air/syringe and discard the sample.
7. Connect the vacutainer and blood tubes/ new syringe or heparinized syringe if drawing blood gases.
8. Close the stopcock to the transducer and collect samples in the appropriate order of blood draw
9. If obtaining arterial blood gases attach the heparinized syringe to the port in an upright position and allow 2 mLs of blood to flow freely into the blood gas syringe.
10. When the collection is complete, turn the stopcock off to air/syringe and remove blood collection device (syringe or vacutainer).
11. Turn the stopcock off to the patient and flush the port by pulling the pigtail (1-2 times) to clear blood using sterile 2 x 2 gauze to absorb the solution (*Note: Multiple times may be required to flush until clear*). Recap the port using sterile technique.
12. Close port to air which opens stopcock to patient and flush system by pulling pigtail.
13. Observe for the return of the arterial wave form.
14. Turn the alarms back on.

15. For arterial blood gases, eliminate air bubbles from the syringe and cap the syringe. Label the specimen and place on ice and send to the lab.
16. Document in the patient's health record.

E. Ongoing Maintenance and Patient Safety

1. Monitor the cannulated extremity immediately after insertion and every 4 hours while the arterial line is in situ for:
 - bleeding
 - hematoma formation
 - pain
 - infection
 - change in color, size, temperature & sensation
 - motor function
 - pulse
 - capillary refill
2. Ensure site is visible and accessible at all times (ie.not covered by linens or bedding).
3. Every 4 hours assess for pressure bag inflation (at 300 mmHg) and fluid in flush bag and make sure connections are tight. Use NaCl 0.9% as the flush solution for arterial lines
Note: If Heparin solution requested by Anesthesia: use: Heparin 1000 units / mL with 500 units / 500 mL NaCl 0.9 % IV solution.
Relative contraindications include coagulopathy, low platelets.
4. Monitor for dampened wave forms. The waveforms are to be assessed frequently for dampening. Dampened waveforms will result in inaccurate readings of blood pressure.
5. The catheter is to be zeroed at least once per shift or when:
 - i. when the patient has been moved (e.g. up to the chair, transported off the unit, etc.)
 - ii. when the level of the bed/transducer has changed.
 - iii. Ensure the transducer remains level with the phlebostatic axis.
6. Change the dressing, tubing and flush bag every 96 hours. In addition, the dressing is to be changed whenever it becomes soiled, loose or the site needs to be inspected.
7. Ensure alarms are on to detect any sudden hypertensive or hypotensive episode, disconnection of the catheter or pulseless electrical activity.

F. Removal of Arterial Catheter

1. A physician's order is required for removal.
2. Assess patient's coagulation status (PTT, INR, platelets) as per physician order.
3. Gather equipment:
 - Chlorohexidine and alcohol solution
 - Sterile scissors
 - 4 x 4 gauze
 - Non-sterile gloves
4. Apply gloves.
5. Discard used dressing.
6. Cleanse the site.
7. Remove the suture (if applicable).
8. Place a 4 x 4 dressing over the insertion site.
9. Remove catheter slowly and apply continuous pressure to the site for at least 5 minutes.
10. Assess the tip of the catheter to ensure it is intact.
11. Secure dressing to site.
12. Document in the patient's health record assessment and intervention details.
13. Observe the affected limb for signs of bleeding, hematoma formation, pain, changes in color, size temperature, sensation or movement.

REFERENCES

Capital Health District (2008). Arterial Catheter Blood Sampling/ Blood Pressure Monitoring/ Catheter Removal Policy #CC 80-005. Interdisciplinary Clinical Manual Policy & Procedure.

Capital Health District (2006). Learning Module for Arterial Catheter Blood Sampling/Blood Pressure Monitoring/Catheter Removal.

Urden, L.D., Stacy, K.M. & Lough, M.E. (2002). *Thelan's Critical Care Nursing Diagnosis and Management (4th Edition)*. Mosby: Missouri.

Wiegand, D.J.L. & Carlson, K.K. (2005). *AACN Procedure Manual for Critical Care (5th Edition)*. American Association of Critical Care Nurses. Elsevier Saunders:Philadelphia.

RELATED DOCUMENTS

Policies

IWK Health Centre (2007). Approval and Performance of Beyond Entry Level Competencies by Registered Nurses at the IWK Health Centre. Administrative Policy #324.2

IWK Health Centre (2009). Blood Specimen Collection from Arterial Lines Policy #1753. Children's Health Program Clinical Policy Manual.

IWK Health Centre (2007). Identification and Handling of Diagnostic Laboratory Specimens. Policy #1230. Clinical Policy/Objective Manual.

IWK Health Centre (2002). Arterial Line – Setting Up Arterial Line and CVP Line Policy #1404. Children's Health Program Clinical Policy Manual.

IWK Health Centre (2002). Arterial Line – Setting Up a Single Arterial Line Policy #1403. Children's Health Program Clinical Policy Manual.

IWK Health Centre (2009). Arterial Line Removal Policy #1752. Children's Health Program Clinical Policy Manual.

IWK Health Centre (2004). Arterial Line ,Assisting with Insertion #1606. Children's Health Program Clinical Policy Manual.

IWK Health Centre (2004). Arterial Line Care Policy #1608. Children's Health Program Clinical Policy Manual.

IWK Health Centre (2005). Consent to Treatment. Administrative Policy #124.0

Appendix (es):

Appendix A: Arterial /CVP Line Insertion Equipment

